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THE

CYCLOPÆDIA;

OR,

Universal Dictionary

OF

ARTS, SCIENCES, AND LITERATURE.

VOL. XXVII.

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THE

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OR,

UNIVERSAL DICTIONARY

OF

Arts, Sciences, and Literature.

BY

ABRAHAM REES, D.D. F.R.S. F.L.S. *S. Amer. Soc.*

WITH THE ASSISTANCE OF

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CYCLOPÆDIA:

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UNIVERSAL DICTIONARY

OF

ARTS and SCIENCES.

PERTUSSIS.

PERTUSSIS, in *Medicine*, popularly termed the *kink-cough*, *kin-cough*, *chin-cough*, and *hooping* or *whooping-cough*, is a violent convulſive cough, occurring but once during life, and therefore chiefly affecting children, and propagated by a ſpecific contagion.

Different opinions have been entertained reſpecting the origin of theſe names, which are of popular invention, for it would appear, that the diſeaſe was familiarly known to the vulgar (like many others), before any clear account was given of it by medical writers. The term *whooping*-cough, indeed, is obviouſly taken from the peculiar ſound which is produced during the fit of coughing, in drawing in the breath, and which is commonly called a *whoop*. The term *chin-cough* Dr. Johnſon was diſpoſed to derive from the Dutch word *kinckin*, which ſignifies *to pant;* but this is probably a miſtake. The word *kink* is ſtill a provincial term, uſed in the north, as ſynonimous with *fit* or *paroxyſm;* whence in Scotland they ſpeak of a kink of laughing, a kink of crying, &c. as well as of a kink of coughing. (See Dr. Watt's Treatiſe on Chin-cough, p. 18.) The term *kink-cough*, therefore, very appropriately expreſſes a ſpecies of cough, which is principally diſtinguiſhed by its violent *fits* or *paroxyſms*. *Kin-cough* and *chin-cough* are apparently the ſame word; abbreviated, in the former inſtance, by dropping the final *k*; and ſoftened by the ſouthern dialect, in the latter, in the ſame manner as *kirk* is ſoftened into *church*.

Among medical writers in Latin, the diſeaſe has been deſignated by a variety of names. Sydenham appears to have given it the appellation of *Pertuſſis*, which was adopted by Dr. Cullen, and has become the noſological term. By Willis, Hoffmann, and others, it has been called *Tuſſis convulſiva, ferina, clangoſa, ſuffocativa, puerilis*, &c., all which epithets refer to ſome circumſtance ſuppoſed to be peculiar to the diſeaſe. By the French, it is called *la coqueluche*.

This diſeaſe uſually commences with the ordinary ſymptoms of a catarrh ariſing from cold, and commonly retains this character for the ſpace of a fortnight or more. In ſome inſtances, indeed, although evidently originating from the contagion of chin-cough, it has never put on any other form than that of a common catarrh. This, however, is a rare occurrence: for, in general, about the end of the ſecond, or beginning of the third week, the ſymptoms undergo a remarkable change, and the diſeaſe exhibits its peculiar and characteriſtic ſymptoms, a *convulſive* cough. This is a cough in which the expirations are made with extraordinary rapidity and violence, and ſo long and frequently repeated, that the whole air ſeems to be expelled from the lungs, and the patient appears to be in danger of ſuffocation. At length a full and violent inſpiration is neceſſarily made for his relief, which, from the unuſual velocity with which the air ruſhes in, produces the peculiar ſound, or *whoop*, which reſembles the crowing of a cock, or the rapid paſſage of air through a brazen tube. After this ſonorous inſpiration, the convulſive coughing and expirations are again renewed, and followed by another *whoop:* and thus the alternate actions go on, until a quantity of mucus is thrown up from the lungs, or the contents of the ſtomach are ejected by vomiting. Either of theſe evacuations commonly puts an end to the coughing, and the patient remains free from it for ſome time after. The duration of the paroxyſm and the relief obtained are very different in different inſtances. Frequently expectoration or vomiting takes place after the ſecond coughing, and terminates the fit; but ſometimes this happens only after ſeveral alternate coughings and whoopings: and in very ſevere caſes, the paroxyſm ends in the complete exhauſtion of the patient, without any diſcharge whatever.

The fits of coughing return at various intervals, rarely obſerving any exact period. They happen ſeveral times in

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the courſe of the day, and more frequently in the courſe of the night. In general they come on without any obvious cauſe; but they are alſo brought on ſooner and more violently by various ſources of irritation, as by conſiderable bodily exertion, ſuch as running, or even laughing, turning from ſide to ſide in bed, diſtending the ſtomach by food, or irritating it by ſuch as is indigeſtible, ſwallowing food or drink, &c. Fretting and exciting the patient to anger, eſpecially if it produce crying, commonly brings on the fit. Though the paroxyſms come on ſuddenly, the patient has commonly ſome warning, which excites his alarm; and to avoid the violent and painful concuſſion which the coughing occaſions to the whole body, he ſometimes throws himſelf on the ground, or clings faſt to any thing that is near him, or demands to be held faſt by any perſon that he can come at, and will even run acroſs the room for that purpoſe, with terror and ſupplication expreſſed in his countenance. Even when the patient is lying in bed, it ſeems to give him a ſort of relief to have his back and head ſupported. When the fit is over, if it has been ſevere, he breathes faſt and ſeems to be fatigued for a ſhort time; but in ordinary caſes very little of this appears; and children are commonly ſo entirely relieved, that they immediately return to their play, as if nothing had happened. If the fit of coughing ends in vomiting up the contents of the ſtomach, the patient is commonly immediately after ſeized with an irreſiſtible craving for food, which he ſwallows greedily.

At the commencement of the diſeaſe, there is ſometimes very little expectoration, and that of a thin mucus only; and while this continues to be the caſe, the fits of coughing are more violent, and continue much longer: but commonly the expectoration ſoon becomes conſiderable, and a very thick mucus, often in great quantity, is thrown up; and as this is more readily expectorated, the fits of coughing are of ſhorter duration. If the fits are violent and long continued, they neceſſarily interrupt the free tranſmiſſion of the blood through the lungs, and conſequently alſo the free return of blood from the veſſels of the head. This gives riſe to that turgeſcence and ſuffuſion of the face, which commonly attend the fit of coughing, and ſeems to occaſion alſo thoſe eruptions of blood from the noſe, and even from the eyes and ears, which ſometimes happen in this diſeaſe.

Sydenham ſpeaks of the whooping-cough as unconnected with fever; and Dr. Cullen does not ſeem to have conſidered fever as an eſſential part of the diſeaſe, ſince he has not placed it among the *Pyrexiæ*, in his noſology. Neverthleſs, this able obſerver remarks, "though Sydenham had ſeldom obſerved it, we have found the diſeaſe very frequently accompanied with pyrexia, ſometimes from the very beginning, but more frequently only after the diſeaſe had continued for ſome time. When it does accompany the diſeaſe, we have not found it appearing under any regular intermittent form. It is conſtantly in ſome degree preſent; but with evident exacerbations towards evening, continuing till next morning." (Firſt Lines, parag. mccccx.) Dr. Watt obſerves, upon this point, "as far as my experience goes, I am diſpoſed to believe, that, even in the mildeſt caſes, as long as the kinks (paroxyſms) continue, there is always ſome part of the day when the preſence of fever can be detected. It may be ſo ſlight as hardly to deſerve notice; but ſtill, to an attentive obſerver, who has opportunities of ſeeing the patient day and night, it is abundantly obvious. I have remarked it even in thoſe favourable caſes, where the appetite continued good, and where the patients ſeemed to ſuffer little or nothing in their general health." Treatiſe on Chin-cough, p. 50.

In almoſt every caſe of the diſeaſe, the breathing is more or leſs affected. Frequently there is a difficulty of breathing, not only immediately before and after the fits of coughing, but conſtantly preſent. Even in the mildeſt caſes, the patient is ſooner out of breath than uſual; and in the more ſevere, he pants on the leaſt exertion, as if he had run a race, or performed ſome feat of bodily ſtrength.

The courſe and event of this diſeaſe are very uncertain. In the mildeſt form, in which it appears, it commonly continues from one to three months; and, in the more ſevere, conſiderably longer. Even after it has nearly or wholly ceaſed, an accidental expoſure to cold occaſions a return of the diſeaſe. When it proves fatal in very young children, Dr. Watt affirms, it is generally by inducing ſuffocation, convulſions, or by bringing on ſuch a ſtate of debility, that the patient ſeems to expire from pure exhauſtion. But, in children ſomewhat farther advanced in age, the ſymptoms of pneumonic inflammation, though ſometimes of a ſlow and obſcure character, more generally enſue. Dr. Cullen ſtates that he had hardly ever ſeen an inſtance of fatal chincough, in which a conſiderable degree of pyrexia and dyſpnæa had not been for ſome time conſtantly preſent. In fact, it would appear that the diſeaſe commonly proves fatal; in conſequence of inflammation ſupervening in the bronchial cells and tubes, conſtituting a ſort of peripneumonia notha, by which theſe air-paſſages are choaked up, a copious excretion of mucus taking place, beyond the powers of the conſtitution to expel. In ſeveral inſtances, in which the ſtate of the lungs was aſcertained by diſſection after death, the moſt remarkable phenomena that preſented themſelves, were, an inflamed condition of the trachea and bronchia, particularly of the latter, and an almoſt entire plugging up of the bronchial paſſages with a ſerous or mucous fluid, interſperſed with flakes of a ſemi-purulent matter. See Watt, on Chincough, p. 123.

From theſe conſiderations, the following circumſtances have been pointed out, as affording the means of prognoſticating the favourable or unfavourable event of the diſeaſe. The younger the ſubject, the more dangerous the diſorder; ſo that a large majority of thoſe who die from its attacks are obſerved to be under two years of age. The converſe of this is alſo true, the older children are, they are the more ſecure againſt an unhappy event, provided they be of ſound conſtitution. Children born of phthiſical and aſthmatic parents, are moſt liable to ſuffer from the violence of the diſeaſe.

When the diſeaſe begins in the form of a ſevere catarrh, and is attended with difficult breathing, and with little expectoration, it often proves fatal, without aſſuming the character of whooping-cough; that is to ſay, the inflammation is ſo rapid and extenſive as to terminate life, before the uſual courſe of whooping-cough is run; but, in the majority of caſes, the occurrence of the convulſive cough and whooping, bringing on at the ſame time a more free expectoration, generally removes the danger.

When the diſeaſe is fully formed, if the fits are neither frequent nor violent, the expectoration moderate, and the patient, during the intervals of the fits, is eaſy, retains his appetite, ſleeps well, and is without fever or difficulty of breathing, the diſeaſe muſt be conſidered as free from danger; and theſe circumſtances becoming daily more favourable, it very ſoon ſpontaneouſly terminates. But an expectoration, either very ſcanty or very copious, is attended with danger, eſpecially if the latter is accompanied with great difficulty of breathing. The danger of the diſeaſe in general, indeed, may be ſaid to be in proportion to the fever and difficulty of breathing attending it, which imply the degree of inflammatory action going on in the cheſt; ſometimes, though very rarely, the danger ariſes from the violence of the fits of coughing, which may be ſuch as to occaſion apoplexy, epilepſy, or immediate ſuffocation. When the diſeaſe attacks perſons under a ſtate of great debility, it has very often an unhappy event.

On the contrary, thoſe caſes in which the fits terminate by vomiting, and are immediately followed by a craving for food, are generally without danger. A moderate hæmorrhage from the noſe often proves ſalutary; but very large hæmorrhages are generally very hurtful. Cullen, Firſt Lines, § 1413.

Treatment of Pertuſſis.—The cure of whooping-cough has always been conſidered as difficult; for in its mildeſt form, it will run through its courſe without any interruption or abbreviation from medicine, no antidote to its ſpecific contagion being known; and in its more violent and dangerous ſhape, its ſymptoms are not eaſily mitigated by the active meaſures, which are generally remedial in violent affections of the cheſt ariſing from other cauſes. From this conſideration, however, it will follow, that in thoſe caſes in which the ſymptoms are mild, and the diſeaſe appears to proceed without any untoward tendency, very little medical interference is neceſſary. When the diſeaſe has continued a conſiderable length of time, it ſeems that in this, as in other contagious maladies, the contagion ceaſes to act, and that then the complaint is prolonged, after the manner of convulſive diſeaſes in general, by the power of habit alone. From this view of the matter, it will appear that when more violent ſymptoms demand the application of remedies, the practice muſt be directed to different purpoſes according to the period of the diſeaſe. In the early ſtages of the cough, the remedies to be employed muſt be ſuch as obviate the violent effects of the diſorder, and its fatal tendency; but after it has been of ſome continuance, and the ſevere and urgent ſymptoms are abſent, the only medicines to be adviſed, are thoſe which may interrupt its courſe, and break the habit of recurrence, and thus anticipate its ſpontaneous ceſſation.

The moſt urgent and dangerous ſymptoms are thoſe which indicate the occurrence of inflammation, whether it be ſeated in the mucous membrane lining the trachea and air-paſſages, or in the ſubſtance of the lungs, conſtituting a true peripneumony. In proportion, therefore, as the dyſpnæa and fever are ſevere, and as the patient is ſtrong and plethoric, it becomes neceſſary to employ *blood-letting*, and even to repeat it according to the urgency of the circumſtances. Even in more delicate and younger children, ſome evacuation may be neceſſary by means of the lancet, in the commencement of the diſeaſe; and local bleeding, by leeches applied to the cheſt, may be reſorted to, where general blood-letting is deemed inadmiſſible. The difficulty of the tranſmiſſion of blood through the lungs ſhould be watched, and early attacked by this efficient remedy, or the diſeaſe will often baffle all the ſubſequent efforts that can be made.

The next moſt important mode of diminiſhing irritation, and an inflammatory tendency, eſpecially in children, is the exhibition of *purgatives*. Every practitioner muſt have obſerved the almoſt conſtant derangement of the excretions of the bowels, under any acute diſeaſe in children, but more eſpecially under thoſe affecting the lungs, and the relief obtained, even in reſpect to the original diſorder, by regulating the alvine diſcharges. It is important, therefore, when the diſeaſe aſſumes an inflammatory type, to keep up a conſtant free ſtate of the bowels from the firſt, by the repeated uſe of laxatives, eſpecially of thoſe which contain a portion of calomel. According to the ſtate of actual conſtipation, or of mere derangement of the excretions, the purgatives will be uſed more actively at intervals, or more conſtantly in ſmaller doſes.

Of all other remedies, *emetics* appear to be among the moſt uſeful in this diſeaſe. For they not only tend to determine the fluids to the ſurface, and ſtill more effectually to relieve the lungs by promoting its ſecretions, but they tend to interrupt the recurrence of the ſpaſmodic affections, and alſo to relieve the ſtomach and bowels from their vitiated contents. Perhaps the kind of emetic adminiſtered is not of ſo much importance to be conſidered, as ſome writers have contended. The antimonial preparations, and thoſe of ipecacuanha, afford a ſufficient number for our choice, and the milder or more active will be choſen, according to the urgency of the caſe, and the vigour of the patient.

As a ſecondary expedient, with a view to obviate or remove inflammatory determination to the lungs, when it occurs in this diſeaſe, the application of *bliſters* is often beneficially reſorted to; and it may be adviſable to repeat the application ſeveral times, where the inflammatory tendency continues to prevail, after the more active meaſures have been carried to the extent which circumſtances admit of, or where the debility of the patient interdicts blood-letting altogether. The bliſters ſhould be applied to the cheſt, and not to diſtant parts. They do not, however, appear to act ſo beneficially in the relief of the pain and dyſpnæa attending this diſeaſe, as in ordinary caſes of catarrhal cough; and ought not to be relied on, where the inflammatory congeſtion in the lungs is conſiderable. They are moſt beneficial, when this inflammatory condition has been already partly ſubdued by the more active evacuations. *Iſſues* have been recommended by ſome practitioners; but their operation muſt be too ſlow to be depended upon in the acute ſtages of the diſeaſe; and they can only be indicated, therefore, where the diſeaſe has ultimately aſſumed a chronic form, or ſome phthiſical ſymptoms have ſupervened, with conſiderable local pain.

Theſe methods of treatment, together with the exhibition of light diaphoretic medicines, and the uſe of a cooling diet, are adapted to the early ſtages of whooping-cough, where the uſual urgent ſymptoms occur, and are calculated to obviate its fatal tendency, and to put it into a ſafe train. But in the after-ſtages, when the operation of the contagion may be ſuppoſed to have ceaſed, and the convulſive cough to be continued through the influence of habit, a different indication ariſes, and different remedies are to be employed. That the power of habit contributes to keep up the diſeaſe, after the influence of the contagion has declined, is to be inferred from theſe circumſtances, *viz.* that the ſymptoms have diſappeared, like other nervous ſymptoms, in conſequence of the impreſſion of terror, or other ſtrong emotions of the mind; that any conſiderable change in the ſtate of the ſyſtem, ſuch as the occurrence of ſmall-pox, has alſo cured it; and that it has yielded to antiſpaſmodic and tonic medicines: none of which agents can be ſuppoſed to have the power either of correcting or expelling a morbific matter from the conſtitution, but which are evidently ſuited to change the ſtate and habits of the nervous ſyſtem. It might perhaps, indeed, be alleged, that when the contagion is extinguiſhed, it implies that the violence and danger of the diſeaſe are over, and conſequently that the diſeaſe will ſoon ſpontaneouſly ceaſe. This ſuppoſition, however, is contradicted by experience; as the diſeaſe, like many other convulſive and ſpaſmodic affections, may continue for a long time by the power of habit alone, and the repetition of the paroxyſms may be productive of hurtful effects, and more eſpecially as their violence and injurious influence may be much aggravated by various external cauſes, that may be accidentally applied.

The indication, therefore, of breaking the habit of recurrence is proper to be attended to; and it is principally to be fulfilled by thoſe means which leſſen irritability local or general, and give tone to the ſyſtem at large; in other words, by *antiſpaſmodics* and *tonics*.

The moſt effectual means of allaying irritability are found in the *narcotic* antiſpaſmodics, ſuch as *opium*, *henbane*, and *hemlock*, in their various preparations; and the moſt powerful of theſe is opium. This medicine requires conſiderable caution, however, in its adminiſtration. "If very liberally employed," to uſe the words of Dr. Watt, "it ſuppreſſes the cough, allows the mucus to accumulate, obſtructs the breathing, increaſes the fever, and in fact aggravates every ſymptom of the diſeaſe. This is ſtill more particularly the caſe, if previous evacuations have been neglected. Where the bowels are already in a loaded and torpid ſtate, opiates invariably do harm. Some practitioners have ſuppoſed, that they may be given in ſuch ſmall doſes as to compoſe the nervous ſyſtem, and yet not interfere with the operation of other remedies. If this can be done, the practice is leſs objectionable." It is only in ſmall doſes that opiates can be adminiſtered, even in the later ſtages of whooping-cough, on account of this aſtringing and ſuppreſſing power over the diſcharges. On this account, perhaps, the *conium* or *hyoſcyamus* are preferable remedies. They are more gently anodyne, and have no aſtringency, and therefore interfere little with the ſecretion of mucus, and perhaps not at all with the alvine ſecretions. The conium, or hemlock, has been extolled by Dr. Butter as almoſt a ſpecific in this diſeaſe; and from our own experience, we can ſpeak favourably of its influence, when the inflammatory ſtage of the diſorder is paſt. The hyoſcyamus is likewiſe beneficial under the ſame circumſtances. The *digitalis*, or fox-glove, from its power in moderating vaſcular action, and thus of reſtraining exceſſive ſecretion, as well as of acting upon the urinary diſcharge, might be expected to be ſerviceable in this diſeaſe; and experience ſeems to have proved its utility.

The more ſtimulant antiſpaſmodics, ſuch as *aſſafœtida*, *caſtor*, *muſk*, *oil of amber*, *camphor*, &c. have alſo been recommended by ſeveral practitioners for the relief of whooping-cough. The evidence, however, which the ſubſequent obſervation of cautious phyſicians has obtained, is by no means favourable to the efficacy of theſe medicines; and if there is any tendency to fever, or congeſtion about the lungs, the influence which they do exert muſt prove hazardous, if not always injurious.

But theſe ſtimulants have been frequently applied *externally*, ſince the time of Hoffmann, in liniments and embrocations; and they are popularly employed, in various empirical noſtrums, in the ſame manner. The oils of turpentine, amber, thyme, nutmeg, &c. with ſoap, camphor, the compound ſpirit of ammonia, tincture of opium, of cantharides, &c. the juice of garlic, liniments of tartrite of antimony, and various other irritants, have been employed, ſeparately and combined, being rubbed into the cheſt, and on the back in the courſe of the ſpine, and even on the feet, by continued but moderate friction. This mode of uſing antiſpaſmodics is certainly productive of beneficial effects; and theſe may be produced in two ways, namely, by the actual abſorption of the ſubſtance ſo applied to the ſkin, or by the mere ſtimulation of the ſurface, which thus occaſions a ſort of counter-irritation. Opiate liniments unqueſtionably operate in the former manner, and produce ſimilar effects, though in a ſmaller degree, with opiates taken by the mouth. They relieve the difficulty of breathing, and diminiſh the cough, and diſpoſe the patient to reſt, and therefore have been deemed by ſome writers the ſafeſt form in which opium can be employed. It is probably, however, in the ſecond mode only that the majority of embrocations and liniments operate; and accordingly it will generally be found, that they are productive of the greateſt relief, when they excite ſome degree of redneſs or eruption on the ſkin.

The adminiſtration of tonics, and eſpecially of the *Peruvian bark*, has been much extolled by Dr. Cullen, as the moſt effectual mode of curing the diſeaſe in its ſecond ſtage, when the fever had diſappeared. This remedy may doubtleſs be reſorted to with advantage, towards the concluſion of the diſeaſe, when all the inflammatory ſymptoms have been previouſly ſubdued by other means, or where they have been naturally very mild, and have ſpontaneouſly ſubſided. But in other circumſtances, the bark is not only a doubtful, but a dangerous remedy.

It was perhaps originally with the view of interrupting the force of habit, that a conſiderable change in the ſituation and manner of life was ſuggeſted as a remedy for whooping-cough, and eſpecially a *change of air*, which has been very generally deemed the moſt effectual remedy in the advanced ſtages of the diſeaſe. So ſtrong, indeed, has this impreſſion been made upon the public, that it has been generally believed, that any change of air, even from a better to a worſe, is beneficial. This, however, ſeems improbable; and the fact perhaps is as Dr. Watt has ſtated it. "It no doubt frequently happens," ſays that intelligent writer, "that a child is better on being taken from one place to another, even when the air in the latter place is ſuppoſed to be worſe than the former. Here, however, I ſhould be diſpoſed to attribute the good effects, not to coming into a more impure atmoſphere, but to the child's *being abroad*, any atmoſphere being better than confinement to the houſe." (Loc. cit. p. 222.) In ſummer, or when the temperature is mild and dry, the ſymptoms of whooping-cough, even in the early ſtage, appear to be alleviated by expoſure to the open air, and to be aggravated when the patient returns into the houſe: but this alleviation only takes place, when it is unaccompanied by actual pneumonic inflammation, when the pulſe is neither ſtrong, nor full, nor frequent, when the cough is not very violent, when there is no pain of the cheſt, and, above all, when there is no oppreſſion of the breathing. Under the preſence of theſe ſymptoms, ſuch expoſure is extremely deleterious. Towards the concluſion of the diſeaſe, travelling, or other conſtant exerciſe in the open air, as in other caſes of convaleſcence from coughs, is doubtleſs one of the moſt effectual remedies that can be reſorted to.

PERU, in *Geography*, a viceroyalty of South America, the limits of which have been greatly reſtricted during the courſe of the laſt century; for in the year 1718 the provinces of Quito in the north, as far as the river Tumbez, were annexed to the viceroyalty of New Granada; and in 1778, ſeveral opulent provinces in the ſouth of Peru were annexed to the new viceroyalty of La Plata. Modern Peru, therefore, according to the ſtatement of Mr. Pinkerton, extends N. and S. from the river Tumbez to the chain of Vilcanota, being, by the computation of Eſtalla, 289 geographical leagues; but along the coaſt to the river Loa, the length may be 423 leagues; its medial breadth may be about 80 leagues; ſo that its whole content may be eſtimated at 33,630 ſquare leagues. By the map of La Cruz, the ſouthern extremity of the chain of Vilcanota is 15°, and the river Tumbez in 3° 30′, both S. lat.; and the difference, being 11° 30′, will give 690 geographical miles; but that long ſtrip, called the province of Arica, extending to the river Loa 21° 15′, the nominal length will be augmented by about 6° 15′, or 375 geographical miles. The viceroyalty of Peru borders, towards the N., on that of New Granada; on the N.E. with the Pampa del Sacramento; on the E. with the ſavage nations of the Pajonal, which is a vaſt ſteppe, covered with ſtony graſs, whence its name; and on the S.E. with the viceroyalty of Buenos Ayres, which embraces the province and deſert of Atacama, formerly the boundary between Peru and Chili. But if Peru extends eaſtwards ſo as to include Colonna, or the land of the Miſſions, which depend on the viceroy, it will thus reach to the Portugueſe frontier.

Before we farther deſcribe this viceroyalty geographically, we ſhall introduce a brief account of its hiſtory. The firſt intelligence which any European received concerning this country, was communicated to Vaſco Nugnez de Balboa, governor of a ſmall Spaniſh colony at Santa Maria, in Darien, in the year 1512; and he flattering himſelf with ſanguine ideas of the wealth it would afford from the vague deſcription that was given of it, prepared to make a voyage in ſearch of it. But being ſuperſeded in the government of Darien by Pedrarias Davila, who was appointed by Ferdinand of Spain to ſucceed him, he was diſappointed in the accompliſhment of the ſchemes which he had projected; and it was reſerved for Franciſco Pizarro to obtain the patronage of Pedrarias, and to ſet ſail, with ſome choſen aſſociates, on this adventurous expedition. After encountering various difficulties, they at length, in the year 1526, diſcovered the coaſt of Peru, and landed at Tumbez, about 3° S. of the line; a place of ſome note, diſtinguiſhed for its ſtately temple, and a palace of the Incas or ſovereigns of the country. Pizarro, however, was under the neceſſity of ſatisfying himſelf with a general view of the opulence and civilization of the country; as the force, which he commanded, was not equal to any attempt that would be likely to ſucceed for gaining poſſeſſion of it. Having explored the country along the coaſt, maintaining a peaceable intercourſe with the natives, he took with him ſome ſpecimens of the productiveneſs of the territory and opulence of the inhabitants, and returned to Panama towards the cloſe of the third year of his departure from it. The governor diſcouraged his ſcheme of conqueſt, but the three aſſociates, Pizarro, Almagro, and Luque, determined to perſevere; and Pizarro went to Spain, in order to procure the force that was neceſſary for their purpoſe. Here he diſregarded his aſſociates, and ſecured the ſole command to himſelf, as well as the appointment of governor, captain-general, and adelantado of the whole country, which he had diſcovered and hoped to conquer. With a ſupply of men, money, and military ſtores, apparently very inadequate to the neceſſary demands of his propoſed expedition, and accompanied by his three brothers Ferdinand, Juan, and Gonzalo, and his mother's brother Franciſco de Alcantara, he returned to Panama. Pizarro, with an armament conſiſting of three ſmall veſſels, and 180 ſoldiers, ſet ſail in February, 1531, for Peru, in order to invade that great empire, and after a voyage of thirteen days landed his troops in the bay of St. Matthew, 100 leagues N. of Tumbez, the place of his deſtination. The imprudence of Pizarro in attacking the natives, ſoon after landing on their coaſt, the apparent infertility, unhealthfulneſs and ſcanty population of the adjoining country, and the difficulties that occurred in their march, diſcouraged his companions; and ſtruggling with famine, fatigue, and various kinds of diſeaſes, they began to complain and to reproach their leader: but in the month of April they arrived in the province of Coaque, and having ſurpriſed a principal ſettlement of the natives, they ſeized veſſels and ornaments of gold and ſilver, amounting, in value, to 30,000 peſos, beſides other booty, which diſpelled their doubts, and inſpired the moſt deſponding with ſanguine hopes. Having taken meaſures for obtaining a reinforcement from Panama and Nicaragua, he continued his march along the coaſt, and met with hardly any reſiſtance, until he attacked the iſland of Puna in the bay of Guayaquil. From Puna, which he had not been able to reduce to ſubjection in leſs than ſix months, he proceeded to Tumbez, where, on account of the diſtemper which raged among his troops, he was obliged to remain for three months. From Tumbez he advanced, in May 1532, to the river Piura, and in an advantageous ſituation near its mouth, he eſtabliſhed the firſt Spaniſh colony in Peru, to which he gave the name of St. Michael.

At the time when the Spaniards invaded Peru, the dominions of its ſovereigns extended in length, from N. to S., above 1500 miles along the Pacific ocean: and their breadth, from E. to W., was much leſs conſiderable, being uniformly bounded by the vaſt ridge of the Andes, ſtretching from one of its extremities to the other. Peru, like other parts of the new world, was originally poſſeſſed by ſmall independent tribes, differing from each other both in manners and policy. It is generally ſaid, that they were ſavage and uncivilized, and that they roamed about naked in the foreſts, with which the country was covered, more like wild beaſts than like men. Whilſt they were ſtruggling with the hardſhips and calamities of this barbarous ſtate, tradition reports, that there appeared on the banks of the lake Titiaca, a man and woman of majeſtic form, and clothed in decent garments, who declared themſelves to be children of the ſun, ſent by their beneficent parent to inſtruct and to reclaim them. At their perſuaſion, it is ſaid, ſeveral of the diſperſed ſavages united together, and receiving their commands as heavenly inſtructions, followed them to Cuzco, where they ſettled and began to lay the foundation of a city.

From what country the ancient Peruvians originated has been matter of conſiderable diſpute; but while the Mexicans bore many marks of innate African cruelty, the Peruvians diſplay the mildneſs of an Aſiatic tribe. The monarchs, however, and the ruling people, ſeem to have been very diſtinct from the general population.

The names of the extraordinary perſonages above mentioned were Manco Capac, and Mama Ocollo (or Oello.) Manco was the firſt Inca, and he is ſuppoſed to have reigned in the 12th or 13th century. Oello was his wife. Having collected ſome wandering tribes, Manco inſtructed the men in agriculture, and other uſeful arts; and Oello taught the women to ſpin and weave. After ſecuring the objects of firſt neceſſity in an infant ſtate, Manco turned his attention towards introducing ſuch laws and policy as might perpetuate their happineſs. In conſequence of theſe laws and inſtitutions which ſerved to reclaim and civilize a ſavage race, he received from his people the title of "Capac," or rich in virtue. Manco Capac founded the temple of the ſun at Cuzco, the capital of his empire, and appointed virgins of the royal blood to ſerve that divinity. Thus, according to the Indian tradition, was founded the empire of the Incas or lords of Peru. At firſt, its extent was ſmall. The territory of Manco Capac did not reach above eight leagues from Cuzco, within which narrow precincts he exerciſed abſolute and uncontrolled authority. The Incas, his ſucceſſors, arrogated a ſimilar authority over their ſubjects, and the deſpotiſm of Aſia was not more complete. The Incas were not only obeyed as monarchs, but revered as divinities. Their blood was held to be ſacred, and, by prohibiting intermarriages with the people, was never contaminated by mixing with that of any other race. The family was diſtinguiſhed by dreſs and ornaments, which it was unlawful for others to aſſume. The monarch himſelf appeared with enſigns of royalty reſerved for himſelf alone: and received from his ſubjects marks of obſequious homage and reſpect, which approached almoſt to adoration. But, among the Peruvians, this unbounded power of their monarchs ſeems to have been uniformly accompanied with attention to the good of their ſubjects. It was not the rage of conqueſt, as it has been ſaid, that prompted the Incas to extend their dominions, but the deſire of diffuſing the bleſſings of civilization, and the knowledge of the arts which they poſſeſſed, among the barbarous people whom they reduced. Of theſe Incas, Dr. Robertſon ſays, there was a ſucceſſion of twelve, and it is ſaid, that not one deviated from this beneficent character. Alcedo, in his account of Peru, cited by Mr. Pinkerton, reckons ſeventeen of theſe Incas. The 2d was Sinchi Roca, or Roca the brave, ſon of the former, who extended his dominions about 60 miles to the S. of Cuzco: the 3d was Lloque-Yupanqui, who ſubjected many tribes, and extended his kingdom, or empire, in many directions: the 4th was Maita Capac, ſon of the former, who alſo ſubdued ſeveral diſtricts, and erected ſome edifices: the 5th, Capac Yupanqui, was another conqueror: the 6th, Inca-Roca, ſubdued ſeveral little diſtricts and tribes: the 7th was named Yahuar-Huacac: the 8th, Inca-Ripac, with an army of 30,000 men, conquered many provinces; and the chief of Tucma, or Tucuman, is ſaid to have paid homage at Cuzco: the 9th, Inca Urco, was depoſed after 11 days: the 10th, Pachacutec, ſubdued Jauja, Tarma, and other provinces: the 11th, Yupanqui the third, carried his conqueſts to the river Mauli in Chili, and over the Majos, far to the E. of the Andes, about the year 1450: the 12th, Tupac Yupanqui, was alſo a conqueror: the 13th, Huayna Capac, ſubdued, as far as Tumbez, the kingdom of Quito, which he left to Atahualpa, and his own ſceptre to his eldeſt ſon: the 14th, Inti-Cuſi-Hualpa, who fought a bloody battle with his brother in the vicinity of Cuzco, but loſt the day, and was made priſoner: the 15th, Atahualpa, the uſurper, reigned at the time when Pizarro landed at Tumbez, and was made priſoner in a battle with that conqueror near Caxamalca, (Caxamarca,) and was beheaded in priſon, thus ſuffering a puniſhment which he had inflicted on his brother and legal ſovereign: the 16th, Manco Capac, was crowned, with permiſſion of Pizarro, at Cuzco, and being afterwards defeated by the Spaniards, retired to the mountains, and is thought to have died about 1553: the 17th, and laſt of the Incas, or emperors of Peru, Sayri Tupac, reſigned the ſovereignty to Philip II. of Spain, and died a Chriſtian, leaving only one daughter, who married Onez de Loyola, a Spaniſh knight, from whom deſcend the marquiſſes of Onepeſa and Alcaniſes. If we reckon 15 reigns to 1532, at 20 years each, we ſhall have 300 years for the duration of the monarchy. The monarchy of the Incas, extending from the river Tumbez 3° 30′, (without mentioning the ſubjection of Quito) to the river Mauli in Chili, 35°, that is, 31° 30′, or nearly 1900 geographical miles, may well deſerve the name of an empire; while the Mexican princes only ruled a country of about one-third of the extent, and which might be honoured by the title of a kingdom. We need not, therefore, be ſurpriſed by the comparative magnificence of the Peruvian monarchs.

When the Spaniards firſt viſited the coaſt of Peru, in 1526, Huayna Capac, the 12th (or by the laſt enumeration, the 13th) monarch from the founder of the ſtate, was ſeated on the throne. He died about the year 1529, and appointed his ſon, Ahatualpa, his ſucceſſor in the kingdom of Quito, and left the reſt of his dominions to Huaſcar (Inti-Cuſi, Hualpa), his eldeſt ſon, by a mother of the royal race. The arrangement of Huayna Capac excited general diſguſt, and terminated in a conteſt between the two brothers. When Pizarro landed in the bay of St. Matthew, this civil war raged in its greateſt fury, and contributed in no ſmall degree to the ſucceſs of his plan of conqueſt. Without detailing all the previous meaſures which he adopted, and extending the article far beyond our preſcribed limits, we ſhall merely obſerve, that he left St. Michael with a force, conſiſting of 62 horſemen, and 102 foot ſoldiers, of whom 20 were armed with croſs-bows and three with muſkets, and purſued his courſe to Caxamalca, a ſmall town at the diſtance of twelve days' march from St. Michael, where Ahatualpa was encamped with a conſiderable body of troops. Pretending that his views were pacific, and that he meant merely to aſſiſt the Inca againſt thoſe enemies who diſputed his title to the throne, the Inca gave him a friendly reception. On his arrival at Caxamalca, Pizarro took poſſeſſion of a large court, on one ſide of which was a houſe, called by the Spaniſh hiſtorians a palace of the Inca, and on the other a temple of the ſun; the whole being ſurrounded with a ſtrong rampart, or wall of earth.

Ahatualpa, relying on the perfidious profeſſions of Pizarro, left his camp, about a league diſtant from the town, and, in compliance with the invitation of the invader, determined to pay him a viſit. As the Inca drew near the Spaniſh quarters, father Vincent Valverde, chaplain to the expedition, advanced, with a crucifix in one hand, and a breviary in the other; and having ſtated to him a variety of theological doctrines, intermixed with the claims of St. Peter and the popes, and with an account of the donation made to the king of Caſtile, by pope Alexander, of all the regions in the new world, he required Ahatualpa to embrace the Chriſtian faith, to acknowledge the ſupreme juriſdiction of the pope, and to ſubmit to the king of Caſtile as his lawful ſovereign; promiſing, on this condition, that the Caſtilian monarch would protect his dominions, and permit him to continue in the exerciſe of his royal authority; and at the ſame time denouncing war and vengeance in his maſter's name, if he impiouſly refuſed to obey this ſummons. Ahatualpa's reply to this ſtrange harangue, a great part of which he could not be ſuppoſed to underſtand, was temperate: after obſerving, that he was lord of the dominions over which he reigned by hereditary ſucceſſion, and that he could not conceive how a foreign prieſt ſhould pretend to diſpoſe of territories which did not belong to him; and that if ſuch a prepoſterous grant had been made, he, who was the rightful poſſeſſor, refuſed to confirm it: he declared that he had no inclination to renounce the religious inſtitutions eſtabliſhed by his anceſtors, and that he would not forſake the ſervice of the ſun, the immortal divinity whom he and his people adored, in order to worſhip the gods of the Spaniards, who were ſubject to death; but with reſpect to other matter, new to him and unintelligible, he wiſhed to be informed where the prieſt had learned things ſo extraordinary. Valverde replied, "in this book," holding out to him his breviary. The Inca eagerly opened it, and turning over the leaves, lifted it to his ear: "This," ſays he, "is ſilent: it tells me nothing:" and threw it with diſdain upon the ground. The enraged monk, running towards his countrymen, exclaimed "To arms, Chriſtians, to arms: the word of God is inſulted; avenge this profanation on theſe impious dogs." Pizarro, inſtantly throwing off the maſk, gave the ſignal of aſſault, which was immediately commenced with great fury: and Pizarro himſelf advancing, at the head of his whole band, towards the Inca, ſeized him by the arm, dragged him to the ground, and carried him to his quarters as a priſoner. The fate of the monarch increaſed the precipitate flight of his followers, who were purſued by the aſſailants, and ſlaughtered, though the wretched fugitives did not once offer to reſiſt. The carnage did not ceaſe till the cloſe of the day; and, by taking a medium of different accounts, 4000 Peruvians were killed. Pizarro himſelf was wounded, but not a ſingle Spaniard fell. The plunder of the field was immenſe; and the march of the Spaniards was followed by the moſt extravagant exultation. The Inca made a moſt liberal offer of a ranſom. The apartment in which he was confined was 22 feet in length, and 16 in breadth; nevertheleſs, the captive monarch undertook to fill it with veſſels of gold as high as he could reach. Pizarro cloſed eagerly with this tempting propoſal; and a line was drawn upon the walls of the chamber, to mark the ſtipulated height to which the treaſure was to riſe. Ahatualpa, tranſported with the proſpect of regaining his liberty, diſpatched meſſengers to Cuzco, Quito, and other places, to collect the gold that was neceſſary for completing his ranſom. In the mean while, the Spaniards remained tranquil and unmoleſted in Caxamalca. At this time Almagro arrived with a conſiderable reinforcement, which was highly acceptable and encouraging to the Spaniards, and no leſs alarming to the Inca. Perceiving his own deſtruction to be inevitable, and apprized that his brother Huaſcar had promiſed to the Spaniards, on condition of their eſpouſing his cauſe, a quantity of treaſure very much exceeding what Ahatualpa had engaged to pay for his ranſom, determined to ſacrifice his brother's life, that he might ſave his own; and his orders for this purpoſe were immediately executed. The treaſures promiſed by Ahatualpa being collected, and ſome pieces of curious fabric being reſerved as a preſent for the emperor, the dividers of the ſpoil ſet apart a fifth part for the crown, and 100,000 peſos as a donation to the ſoldiers who had arrived with Almagro, and there remained 1,528,500 peſos to Pizarro and his followers. In this diviſion, above 8000 peſos, at that time not inferior in effective value to as many pounds ſterling in the laſt century, fell to the ſhare of each horſeman, and half that ſum to each foot ſoldier. Pizarro himſelf, and his officers, received dividends proportioned to the dignity of their rank. Although the Inca's ranſom was paid, Pizarro had no thoughts of fulfilling his promiſe by granting liberty to the captive ſovereign. While Almagro and his followers, who had made a demand of an equal ſhare in the Inca's ranſom, inſiſted eagerly on putting him to death, that all the adventurers in Peru might afterwards be on an equal footing, Pizarro himſelf either actually felt or feigned ſome apprehenſions on account of the forces that were aſſembled in the remote provinces of the empire. Ahatualpa alſo inadvertently contributed to haſten his own fate, by expreſſing his contempt of Pizarro, as a perſon of mean attainments. All theſe circumſtances concurred to bring him to a kind of mock-trial; Pizarro, Almagro, and two aſſiſtants being appointed judges, with full power to acquit or condemn. The reſult was what might have been expected, the condemnation of Ahatualpa to be burnt alive; but Valverde, availing himſelf of the fears of the Inca, prevailed upon him to be baptized, in token of his having embraced the Chriſtian faith; and thus, inſtead of being burnt, he was ſtrangled at the ſtake. On the death of Ahatualpa, the government was diſſolved, and Pizarro inveſted one of his ſons with the enſigns of royalty; hoping to take advantage of the inexperience of youth, rather than to entruſt power in the hands of an ambitious monarch, who had been accuſtomed to independent command. This happened in the year 1533. Pizarro haſtened his march to Cuzco, and took quiet poſſeſſion of that capital. During this march, that ſon of Ahatualpa, whom Pizarro treated as Inca, died; and as the Spaniards ſubſtituted no perſon in his place, the title of Manco Capac, a brother of Huaſcar, whom the people of Cuzco and the adjacent country acknowledged as Inca, ſeems to have been univerſally recognized. In the mean time Benalcazar, governor of St. Michael, marched to Quito, and reduced it. Whilſt theſe operations were carried on, Ferdinand Pizarro arrived in Spain; and by the immenſe quantities of gold and ſilver which he carried with him, ſecured a very favourable reception; and in recompence of his brother's ſervices, his authority was confirmed with new powers and privileges, and the addition of 70 leagues, along the coaſt, to the ſouthward of the territory, granted in his former patent. On Almagro was conferred the title of Adelantado, or governor, with juriſdiction over 200 leagues of country, ſtretching beyond the ſouthern limits of the province allotted to Pizarro. Ferdinand himſelf was admitted into the military order of St. Jago, and ſoon ſet out on his return to Peru, accompanied by many perſons of higher rank than any of thoſe who had yet ſerved in that country.

In the year 1534, Pizarro, after ſettling ſome differences between him and Almagro, began to introduce a form of regular government into the extenſive provinces ſubject to his authority. He diſtributed the country into various diſtricts; he appointed proper magiſtrates to preſide in court; and eſtabliſhed regulations concerning the adminiſtration of juſtice, the collection of the royal revenue, the working of the mines, and the treatment of the Indians, extremely ſimple, but well calculated to promote the public proſperity. In his march through the country, he was ſtruck with the beauty and fertility of the valley of Rimac, one of the moſt extenſive and beſt cultivated vallies in Peru. There, on the ſide of a ſmall river of the ſame name with the vale which it watered and encircled, at the diſtance of ſix miles from Callao, the moſt commodious harbour in the Pacific ocean, he founded a city, which he deſtined to be the capital of his government, and gave it the name of Ciudad de los Reyes; but it is now better known by the appellation of Lima.

In 1536, an inſurrection took place in Peru, which was excited and encouraged by the Inca, Manco Capac; who recovered poſſeſſion of one-half of Cuzco, though it was vigorouſly defended by the three brothers Juan, Gonzalo, and Ferdinand Pizarro. On this occaſion Juan was killed. But the intereſt and power of the Pizarros were ſtill more endangered by Almagro; who was at length, in 1538, defeated and taken priſoner, and ſoon after impeached of treaſon, formally tried, and condemned to die. The ſentence was executed by firſt ſtrangling him in priſon, and afterwards publicly beheading him. In 1540 Pizarro divided Peru among his followers; but in the following year the adherents of Almagro conſpired againſt his life, and without much delay put him to death. Pizarro was ſucceeded in the government by Vaca de Caſtro. During theſe convulſions in Peru the emperor and his miniſters were employed in preparing regulations for reſtoring tranquillity there, and introducing a more perfect ſyſtem of internal policy into all their ſettlements in the new world. Blaſco Nugnez Vela was appointed governor of Peru, with the title of viceroy. His conduct after his arrival increaſed the diſaffection and tumult which had begun to take place; and the malcontents made choice of Gonzalo Pizarro for their leader, which happened in 1544, and occaſioned a civil war. After a deciſive victory gained by Pizarro in a battle, which terminated his life, Pizarro was adviſed to aſſume the ſovereignty of Peru; but he choſe to negociate with the court of Spain.

In the mean while the Spaniſh government were preparing to ſend over as preſident Pedro de la Gaſca, a prieſt of no higher ſtation than counſellor of the inquiſition. Upon his arrival in Peru, in the year 1548, he firſt made every effort in his power towards an accommodation with Pizarro; but his attempts of a pacific nature were ineffectual: and both parties prepared for battle. Pizarro, whoſe government had been unpopular, was deſerted by his followers, and he ſurrendered himſelf to one of Gaſca's officers; and was beheaded on the day after he ſurrendered. In the year 1550, Gaſca having accompliſhed every object of his miſſion, and wiſhing to return again to a private ſtation, committed the government of Peru to the court of audience, and ſet out for Spain, where he was received with an univerſal admiration both of his abilities and his virtue. The tranquillity of Peru was not of long continuance after his departure. Several ſucceſſive inſurrections deſolated the country for ſome years. However, the commotions that occurred ſubſided; and men leſs enterpriſing, leſs deſperate, and more accuſtomed to move in the paths of ſober and peaceable induſtry than the firſt invaders, ſettled in Peru; and the royal authority was gradually eſtabliſhed as firmly there as in the other Spaniſh colonies.

The moſt ſingular and ſtriking circumſtance in the ancient Peruvian government, ſays Dr. Robertſon, is the influence of religion upon its genius and laws. The whole ſyſtem of civil policy was founded upon religion. The Inca appeared not only as a legiſlator, but as the meſſenger of heaven. Hence it followed, that his authority was, in the moſt extenſive ſenſe, unlimited and abſolute; and to this circumſtance it was alſo owing, that all crimes were puniſhed capitally, becauſe they were not conſidered as tranſgreſſions of human laws, but as inſults offered to the Deity. It is obſerved, that the ſuperſtition on which the Incas engrafted their pretenſions to the high authority which they aſſumed and exerciſed, was of a very different genius from that eſtabliſhed among the Mexicans. By directing their veneration to that glorious luminary, which, by its univerſal and vivifying energy, is the beſt emblem of divine beneficence, the rites and obſervances which they deemed acceptable to him were innocent and humane. They offered to the ſun a part of the productions which his genial warmth had called forth from the boſom of the earth and reared to maturity: they ſacrificed as an oblation of gratitude ſome of the animals who were indebted to his influence for nouriſhment; and they preſented to him choice ſpecimens of thoſe works of ingenuity which his light had guided the hand of man in forming; but the Incas never ſtained his altars with human blood, nor could they conceive that their beneficent father, the ſun, would be delighted with ſuch victims. Accordingly, the Peruvians, unacquainted with thoſe barbarous rites which extinguiſh ſenſibility, or ſuppreſs the feelings of nature at human ſufferings, were formed, by the ſpirit of the ſuperſtition which they had adopted, to a national character more gentle than that of any people of America. The influence of this ſuperſtition operated favourably on their civil inſtitutions, correcting whatever was adverſe to gentleneſs of character, and alſo on their military ſyſtem, ſo that the wars in which the Incas engaged were carried on with a ſpirit very different from that of other American nations.

It is further obſerved, that the ſtate of property in Peru was no leſs ſingular than that of religion, and contributed towards giving a mild character to the people. All the lands capable of cultivation were diſtributed into three ſhares; one ſhare was conſecrated to the ſun, and its product was applied to the ſupport of religious rites; the ſecond belonged to the Incas, and was devoted to the ſupport of government; and the third, being the largeſt ſhare, was reſerved for the maintenance of the people. No perſon had a right of excluſive property in the portion allotted to him; he poſſeſſed it only for a year, at the expiration of which a new diſtribution was made, according to the rank, number, and exigencies of each family. All theſe lands were cultivated by the joint induſtry of the community; and the people were ſummoned by a proper officer to the fields, and performed their common taſk, while ſongs and muſical inſtruments cheared them to their labour. In conſequence of this mode of diſtribution ſelfiſh principles were reſtrained and extinguiſhed, and each individual felt his connection with thoſe around him; and the ſtate thus conſtituted might be conſidered as one great family, in which the union of the members was ſo complete, and the exchange of good offices ſo perceptible, as to create ſtronger attachment than ſubſiſted under any form of ſociety eſtabliſhed in America. From this reſulted gentle manners, and mild virtues unknown in the ſavage ſtate, and with which the Mexicans were little acquainted. Notwithſtanding the bonds of affection which the inſtitutions of the Incas ſerved to ſtrengthen among their ſubjects, there ſubſiſted among them a great inequality of condition; and the diſtinction of ranks was fully eſtabliſhed.

Such a form of ſociety, from the union of its members, as well as from the diſtinction in their ranks, was favourable to progreſs in the arts; and the Peruvians had, in fact, advanced far beyond the Mexicans, both in the neceſſary arts of life, and in ſuch as have ſome title to the name of elegant. In Peru, agriculture was more extenſive and improved than in any part of America. The defects peculiar to their climate and ſoil ſerved to call forth the exertions of the people. In order to render that part of the country which was ſandy and barren, and which was never refreſhed with rain, fertile and productive, the Peruvians conducted water from the torrents that poured acroſs their country by means of canals to the fields that wanted a regular ſupply of moiſture; they alſo enriched the ſoil by manure obtained from the dung of ſea-fowls, that were numerous on the iſlands, which lay ſcattered along their coaſts; and though the uſe of the plough was unknown, they turned up the earth with a kind of mattock of hard wood.

In the conſtruction of their houſes and buildings alſo the Peruvians manifeſted their ſuperior ingenuity; but it was in the temples of the ſun, and in the buildings deſtined for their monarchs, that they diſplayed the utmoſt extent of their art and contrivance. The temple of Pachacamac, together with a palace of the Inca, and fortreſs, were ſo connected together, as to form one great ſtructure, above half a league in circuit. Though they had not diſcovered the uſe of mortar or of any other cement in building, the bricks or ſtones are joined with ſo much nicety, that the ſeams can hardly be diſcerned. Notwithſtanding the inconvenient arrangement of the apartments, and the want of windows, the architectural works of the Peruvians, which ſtill remain, muſt be conſidered as ſtupendous efforts of a people unacquainted with the uſe of iron, and with the mode of applying the mechanical powers. The voyage of Ulloa, referred to by Dr. Robertſon and other late writers, may be conſulted for other remains. Among the ancient edifices of Peru we might mention the obeliſks and ſtatues of Tiahuanacu, and the mauſolea of Chachapoyas, which are conical buildings of ſtone ſupporting large rude buſts, probably reſembling thoſe of Eaſter iſland.

Their public roads are alſo entitled to high praiſe; particularly thoſe two great roads from Cuzco to Quito, extending

tending without interruption above 500 leagues; the one through the interior and mountainous country, and the other through the plains on the ſea-coaſt. Theſe works of the Incas might be compared even to the famous military ways, which remain as monuments of the Roman ſkill and power. The formation of theſe roads introduced another improvement, which was that of bridges, equally unknown over all the reſt of America. See BRIDGE, BALZA, and BOAT.

The Peruvians had alſo made conſiderable progreſs in arts, that may be called elegant. As they poſſeſſed metals in greater abundance than any people of America, they manifeſted great ſkill and contrivance in procuring them, and in applying them to purpoſes of uſe and ornament. Accordingly in works of mere curioſity, and of an ornamental nature, their ingenuity has been highly celebrated. Many ſpecimens of theſe have been dug out of the "Guacas," or mounds of earth, with which the Peruvians covered the bodies of the dead. Among theſe are mirrors of various dimenſions, of hard ſhining ſtones highly poliſhed; veſſels of earthen ware of different forms; hatchets, and other inſtruments, ſome deſtined for war, and others for labour. Some were of flint, ſome of copper, hardened by an unknown proceſs to ſuch a degree as to ſupply the place of iron on ſeveral occaſions. But notwithſtanding a variety of circumſtances, ſome of which have been enumerated, and which ſeem to indicate a high degree of improvement in Peru, others occur that ſuggeſt the idea of a ſociety ſtill in the firſt ſtages of its tranſition from barbariſm to civilization. The Peruvians had no cities beſides Cuzco. Every where elſe, the people lived moſtly in detached habitations, diſperſed over the country, or, at the utmoſt, ſettled together in ſmall villages. In conſequence of this ſtate of limited aſſociation and imperfect union, they had no perfect ſeparation of profeſſions, which was leſs complete than that which ſubſiſted among the Mexicans. From the want of cities in Peru, there was little commercial intercourſe among the inhabitants of this great empire. But the moſt remarkable, as well as moſt fatal defect in their character, was their unwarlike ſpirit. By reaſon of this character, their country was ſubdued at once, and almoſt without reſiſtance, and remained in a ſtate of ſubjection; and the ſame character, connected with mildneſs of temper and manners, has deſcended to poſterity: ſo that the Indians of Peru are now more tame and depreſſed than any people of America. Their feeble ſpirits, relaxed in lifeleſs inaction, ſeem hardly capable of any bold or manly exertion.

Spaniſh writers have recorded ſome facts, which manifeſt, notwithſtanding all their good qualities, a great degree of remaining barbariſm in their manners. On the death of the Incas, and of other eminent perſons, a conſiderable number of their attendants was put to death, and interred around their Guacas, that they might appear in the next world with their former dignity, and be ſerved with the ſame reſpect. On the death of Huana Capac, the moſt powerful of their monarchs, above 1000 victims were doomed to accompany him to the tomb. In one particular, their manners appear to have been more barbarous than thoſe of moſt rude tribes. Although they were acquainted with the uſe of fire in preparing maize, and other vegetables for food, they devoured both fiſh and fleſh perfectly raw, and aſtoniſhed the Spaniards by a practice repugnant to the ideas of all civilized people. For other particulars we refer to the third volume of Dr. Robertſon's "Hiſtory of America."

The account which is given of the diſpoſition, character, and condition of the Peruvian Indians, in the "Mercurio Peruano," a periodical paper publiſhed at Lima in 1791, and the following years, differs in many particulars from that of Dr. Robertſon, and alſo of Kotzebue and Marmontel. They are ſaid to be of very limited capacities, and of little or no variety in their characters; melancholy from temperament; timid and diſpirited from oppreſſion; daſtardly in moments of danger; ſavage and cruel after victory; and ſevere and inexorable in the exerciſe of authority. They ſtand greatly in awe of the Spaniards, and are docile and obedient to their commands; but they ſecretly diſlike them, and ſhun their ſociety, and only hate them leſs than they do the negroes and mulattoes. They are of diſtruſtful tempers, and ſuſpect every one who does them a kindneſs, of a deſign to impoſe upon them. They are ſtout and robuſt, and capable of enduring labour; but lazy, dirty, and improvident. Their habitations are miſerable hovels, deſtitute of every convenience or accommodation, and diſguſtingly filthy. Their dreſs is poor and mean, and their food coarſe and ſcanty. Their ſtrongeſt propenſity is to ſpirituous liquors; and to this indulgence they ſacrifice every other conſideration. Their religion is ſtill tainted with the ſuperſtition of their forefathers; but they are great obſervers of the external rites and ceremonies of the church, and they ſpend large ſums of money in maſſes and proceſſions; a ſpecies of profuſion to which they are naturally excited and encouraged by their prieſts, who profit by it.

We ſhall here add ſome particulars from the work referred to, concerning the preſent condition of theſe people; firſt premiſing that ſoon after the conqueſt of America, that country was parcelled out into encomiendas, a ſort of feudal benefices, which were diſtributed on certain conditions to the Spaniards. The encomendero, or holder of the benefice, beſides owing military ſervice to the ſtate, was bound to reſide on his encomienda, to protect and defend the Indians living upon it, and to ſee them properly inſtructed in the principles of religion. The Indians were bound in return to pay him a ſtipulated tribute; but ſo far were they from being reduced to ſlavery, that he could not lawfully exact from them any perſonal ſervice whatever. The ſyſtem of encomiendas was introduced by the emperor Charles V.; and though variouſly modified and changed by his ſucceſſors, it was not finally aboliſhed till the reign of Philip V. All accounts agree, that, however well intended, it was in its effects oppreſſive and injurious to the Indians. The encomendero was continually exacting from them more than he was entitled to demand, and doing for them leſs than he was bound to perform.

The ſyſtem of encomiendas was followed by the ſtill more fatal plan of repartimientos; according to which the government, in conſideration of the limited faculties and improvident character of the Indians, directed the corregidor or judge of the diſtrict in which they lived, to ſupply them with cattle, ſeed-corn, inſtruments of agriculture, and even clothes and other neceſſaries of which they were in want, according to his diſcretion and opinion of their neceſſities; but at a price regulated by law, and without any profit to himſelf. The abuſes to which this ſyſtem muſt have led, may eaſily be conceived. They became at length ſo enormous, as to call again for the interference of the government, which, after mature deliberation, determined on aboliſhing the repartimientos. This was accordingly done in 1779.

The ſyſtem followed at preſent with regard to the Indians, is more conſonant to reaſon and juſtice, and more favourable to the developement of their faculties, than any under which they have lived ſince the conqueſt. They are left to manage their own concerns as they pleaſe; and no one, under pretence of doing them good, can interfere with the diſpoſal of their time or their property. It muſt be confeſſed, that, in ſome parts of the country, the indolence and ſluggiſhneſs of their character have ſo far prevailed, ſince they were taken from under the controul of the corregidor, that they have ſuffered the breed of mules, ſo neceſſary for the mines, to decreaſe; but in other parts they have been rouſed to greater induſtry and exertion. At Lambayeque, in particular, they have applied to agriculture, manufactures and commerce, with ſuch aſſiduity, as far to ſurpaſs the Spaniards; and as the produce of their farms and induſtry is exempt from the alcabala, and all other taxes, they have great advantages over the other caſts, of which they want only induſtry and ability to make a proper uſe.

The Indians pay a perſonal tax or tribute, which is extremely moderate, and to be regarded rather as a diſtinctive mark and token of vaſſalage, than as a ſerious burden. Indians of noble birth, that is, of the families from which the caziques are taken, enjoy an exemption from tribute, and are equally qualified with Spaniards to fill all kinds of offices under the crown. Where the Indians are the ſole inhabitants, they are governed by their caziques; and none of the other caſts are permitted to encroach upon their lands, or to ſettle among them, without their conſent.

The Indians are ſubject to another burden, the mita, or compulſory labour in the mines. Every male Indian from 18 to 50 muſt take his ſhare in this ſervice; and, for that purpoſe, a liſt is kept of all the Indians of the requiſite age, who are divided into ſeven parts, each of which ſerves in its turn. The term of ſervice laſts for ſix months; and, therefore, returns once in three years and a half. The mitayo, when it comes to his turn, is forced to leave his farm or other occupation, and go to the mine where he is ordered to ſerve. Some Indians are compelled to travel 200 or 300 leagues from home; and many take their families with them to the mines. They have a ſmall allowance for their travelling expences, and receive, for their work in the mines, at leaſt half a dollar a day, and, in general, a greater ſum.

The Indians and Meſtizoes are the only caſts in America who are able to endure the fatigue and unwholeſomeneſs of the mines. The Spaniards and Negroes have been often tried in this ſpecies of labour, but they always ſink under it after a ſhort time. Beſides the mitayos, there are Indians who ſerve voluntarily in the mines, and engage themſelves for a ſtipulated hire. The greater part of the miners is indeed of that deſcription; and it is to be regretted, that there ſhould be any perſons who ſerve upon other terms. A more intolerable hardſhip, and more flagrant injuſtice than the mita, cannot well be imagined. A forced conſcription for national defence, though liable to great abuſe, is on every principle a juſtifiable meaſure; but a forced conſcription, for the purpoſe of digging riches from the bowels of the earth for the profit of another, is the extremity of cruelty and injuſtice.

The number of Indians in South America has diminiſhed conſiderably ſince the conqueſt; and as the other caſts have not increaſed in a degree correſponding to this diminution, the whole population of the country is leſs than when firſt diſcovered by the Spaniards. The firſt cenſus after the conqueſt was made in 1551, when the Indian population of Peru, Santa Fé, and Buenos Ayres, amounted to 8,255,000 ſouls; but the ſame countries hardly contain, at preſent, four millions of inhabitants, of all claſſes and deſcriptions. A ſecond enumeration of the Indians was made in 1581, by D. Franciſco Toledo, viceroy of Peru, previouſly to the eſtabliſhment of the mita; from which it appeared, that Peru and Potoſi, without including Quito, Tucuman, Chili, or Buenos Ayres, contained, at that time, 1,067,697 male Indians, from 18 to 50, making a total population of at leaſt 4,270,788 perſons. But the whole population, from Tumbez to Buenos Ayres, does not exceed, at preſent, two millions and a half, or three millions of ſouls. Of whom not more than one-third are Indians.

Independent of theſe computations, there are many proofs of Peru having been formerly more populous and better cultivated than it is at preſent. Veſtiges of former cultivation, and remains of extenſive works for irrigation, are ſtill to be ſeen, where the country is now uncultivated and deſerted; and travellers meet continually with the ruins of towns and villages, which have been long ſince abandoned, and without inhabitants.

That this devaſtation is to be attributed, in a great meaſure, to the miſtaken policy, not to the inhumanity of the Spaniſh government, cannot be doubted; but many other cauſes have contributed to thin ſo dreadfully the number of the Indians. The abuſe of ſpirituous liquors deſtroys vaſt numbers of them. Ulloa alleges, that the uſe of ſpirits is fatal to more Indians in one year than the mines are in fifty. The Indians of the Sierra are ſo immoderately fond of ardent ſpirits, that they are often found dead in the fields at break of day, from the intoxication of the preceding evening. In 1759, the government was compelled to prohibit entirely the ſale and manufacture of ſpirits, on account of an epidemic fever then raging among the Indians, which owed its deſtructive power in a great meaſure to their habits of intoxication. The ſmall-pox and meaſles make alſo great havock among them; and a peſtilential fever, which broke out in 1720, ſwept away the inhabitants of whole villages, and cauſed every where the greateſt mortality. Another cauſe, which is continually diminiſhing the number of the Indians, and which muſt, in the end, extinguiſh them as a ſeparate race, is the progreſs of the other caſts. It is obſerved, that wherever the Indians are ſettled along with the Spaniards, their numbers decreaſe; but as their place is ſupplied with Meſtizoes and Samboes, this loſs is not to be deplored, but viewed as the indication of a future period, when all the pure races, whether Creoles, Indians, or Negroes, will be loſt and confounded.

Both the Peruvian Indians and the Creoles are remarkably long lived, and retain their vigour and bodily faculties to a very advanced age. In the ſmall province of Caxamarco, containing hardly 70,000 inhabitants, there were eight perſons alive in 1792, whoſe ages were 114, 117, 121, 131, 132, 135, 141, and 147; and in the ſame province, a Spaniard died in 1765, aged 144 years, 7 months and 5 days, leaving 800 perſons lineally deſcended from him.

The Meſtizoes, or offspring of the Spaniards and Indians, are the next claſs in rank to the Spaniards, and the moſt numerous after the Indians. They have neither the privileges and exemptions of the Indians, nor are they ſubject to the ſame burdens. They are cordially attached to the Spaniards, but conſtantly at variance with the Indians. The Quarteroons, or offspring of the Spaniards and Meſtizoes, are hardly to be diſtinguiſhed from Spaniards. The Cholos, on the contrary, ſprung from the Indians and Meſtizoes, are claſſed with the Indians, and ſubjected to tribute.

The Negro ſlaves in Peru are either employed in domeſtic ſervice, or on the ſugar plantations and farms of their maſters. About 500 negroes are annually imported from Africa, formerly by Panama, but now by Chili and Buenos Ayres. The free negroes, who are very numerous, are in general idle and diſorderly, and the authors of moſt of the murders and robberies committed in the kingdom.

The Mulattoes are called by Spaniſh writers the gypſies of South America, on account of their reſemblance in complexion, manners, and character to the Spaniſh gypſies. The female mulattoes are uſually employed by the Creole ladies as wet nurſes for their children; and they often acquire the confidence and entire management of their miſtreſſes. The free mulattoes are uſually tradeſmen, and ſeveral mechanical trades are chiefly in their hands.

The language of the ruling people in Peru was called the "Quechua;" and it is ſtill cultivated by the Spaniſh clergy as indiſpenſable in the converſion of the natives. The Quechua is declined by altering the termination, as "Runa" a man, "Runap" of a man, "Runapac" to a man, &c. The verbs have alſo moods and conjugations, the terminations extending to great length. In this dialect, the letters *b, d, g, r, x, z*, are wanting. The grammar of this language, and it is ſaid even that of the Tehuels (ſee PATAGONIA) is nearly as variegated and artificial as the Greek; a circumſtance which may ſerve to abate our wonder at the refinement of the Sanſcrit. Mr. Pinkerton has given in his "Geography" ſpecimens of this celebrated dialect of the Incas.

We now proceed to the geographical diviſion of the viceroyalty of Peru. Its provinces, or diſtricts, proceeding from S. to N. are as follow: *viz.* Arica, Arequipa, Canes and Canches, Paucartambo, Chilques, Chumbivilcas, Guancavelica, Aymaraez, Cotabamba, Cuzco, Abancay, Calca y Lares, Andahuaylas, Parinacochas, Lucanas, Ica, Caſtrovireyna, Vilcaſhuaman, Huanta, Angaraes, Yauyos, Canete, Guarohiri, Jauja, Tarma, Canta, Checras, Huanuco, Caxatambo, Santa, Huaylas, Conchucos, Paſtas, Caxamarquilla, Huamachucos, Truxillo, Sana, Caxamarca, Chacapoyas, Lamas, Luya y Chilloas, Piura, and ſome other ſmall diſtricts.

The moſt ſouthern province is that of Canes and Canches, bounded or pervaded by the Apurimac or genuine Maranon. The name is derived from two tribes, who originally occupied the country, and who were conquered by Roca, the ſecond Inca. This province abounds in cattle and ſheep, and alſo pacos; and in the heights and ſkirts of the Cordilleras there is alſo a great number of guanacos, vicunas, pacochas, venados, or a kind of deer, viſcachos, or a kind of rabbits, partridges and quails, and many birds of prey; the mountains contain gold, ſilver, copper, loadſtone, lead, tin, and quickſilver. The language of this diſtrict is the Quechua; the chief town is Siquani, containing about 6000 perſons, but only 92 Spaniards. The articles of culture are papas, or a kind of potatoe, beans, wheat, and barley. The province is governed by a judge, who is a delegate of the Intendant of Cuzco. The trade conſiſts in cattle and woollen cloths; but the moſt flouriſhing buſineſs is the weaving. The Indians bring wine, brandy, and cotton from the coaſt.

The government of this viceroyalty is divided, like that of the others, into political and eccleſiaſtic. By the new conſtitution there are ſeven intendants, and fifty-two ſub-delegates; all ſubordinate to the viceroy. The royal audience, created in 1543, (ſee AUDIENCE,) is now compoſed of a regent, an office created in 1776, eight oidors or judges, four alcalds of the court, and two fiſcals, the viceroy being preſident. It is divided into three chambers. There is alſo a ſuperior junta of the royal treaſury, compoſed of the viceroy, the regent, the dean of the tribunal of accounts, and other officers. The tribunal of accounts determines cauſes of the revenue. See LIMA.

According to Eſtalla, the population of this viceroyalty, by a cenſus very recently taken, amounts to 1,076,122 perſons of all denominations, *viz.* Spaniards, Indians, and Negroes, from the mixture of which reſult various caſts and colours: and the number of towns and villages is computed at 1460. But this cenſus is ſaid to have been careleſsly taken, and that the returns were conſiderably under the real population. The higheſt eſtimate does not raiſe them above 1,400,000 perſons, and the more probable opinion is, that it does not exceed 1,300,000. Lima may be called the maritime capital of Peru, and Cuzco the inland metropolis. The other cities or chief towns of the viceroyalty of Peru, are the biſhoprics of Arequipa, Guamanga, and Truxillo. Arica and Oropeſa have declined; nor is Piura of much conſequence. For an account of the other chief diſtricts and towns, ſee their reſpective titles.

The revenue of Peru amounts to near 5,000,000 of dollars annually; of which 300,000 are remitted to Panama; 15,000 to the iſle of Chiloe; and a third ſum to Valdivia. The clear revenue, after theſe remittances, and after defraying the expence of the government of Peru, does not exceed 500,000 dollars; and we are diſpoſed to regard that ſum as the total revenue which the king of Spain derives from this part of his dominions.

The commerce of Peru may be conſidered under three diviſions; *viz.* that by Cape Horn, that with the ports on the Pacific, and that of the interior with the ſouthern provinces. Since the freedom of commerce in 1778, the principal trade of Peru has been carried on by Cape Horn. The exports and imports have been nearly doubled ſince the freedom of commerce has been allowed, though ſeveral rich provinces have been withdrawn from the viceroyalty.

The exports of Peru, in a general view of them, are gold and ſilver, wine, brandy, ſugar, pimento, Jeſuits' bark, ſalt, Vicuna wool, coarſe woollens, and ſome other manufactures of little value; and it receives, in return, European goods, live ſtock, proviſions, tallow, cacao, Paraguay tea, coca leaf, indigo, timber, cordage, pitch and copper.

As luxury of dreſs is the predominant paſſion in Peru, and eſpecially at Lima, ſilks, ſuperfine cloths, fine linen, &c. form conſiderable articles of imports. Iron is alſo indiſpenſable in the mines and in agriculture. Moſt of the linens are from Brittany, with a few from other parts of France and Holland: the cottons, woollens, and ſilks are chiefly Spaniſh. The annual demand for rough iron is 6000 hundred weight, beſides many articles of hardware. Mercury, wax, paper, pepper, ſaffron, medicines, liqueurs, books, glaſs, and furniture, form alſo principal articles of import.

Lima carries on a conſiderable commerce with various ports of the Pacific. The fertile and opulent kingdom of Chili ſupplies abundance of grain and fruits, ſo that its mines, though they produce annually 1,400,000 dollars, are regarded as of ſecondary importance; the three havens of Valparaiſo, Conception, and Coquimbo, furniſh convenient outlets for its opulence. Lima annually imports from Chili vegetable products amounting to more than 1,100,000 dollars. Wheat forms the chief article ſent by Chili to Peru; but ſlaves from Africa, ſalted meat, ſoap, wine, copper, dried fruits, ſaffron, &c. &c. form alſo conſiderable articles. The returns from Peru are European goods, ſugar, cloths of home manufactory, pita, which yields a kind of flax, rice, chocolate, &c. See CHILI.

The ports of the viceroyalty of Peru, which are chiefly frequented, are thoſe of Arica, Ilo, Iquique, and Quilca: theſe are called "intermediate," and belong to the intendancy of Arequipa, and, with Piſco, in the diſtrict of Ica, form the whole number in the viceroyalty to the S. of Lima. Towards the N. are thoſe of Chancay and Guacho, both in the province of Lima; Guanchaco, Pacaſmayo, and Payta, in the intendancy of Truxillo. With the ſouthern ports, the trade is wine, brandy, iron, dried fruits, copper, tin, lead, &c.; with the northern, in wool, cotton, cordovan, rice, chocolate, and ſalted fiſh; Lima chiefly carrying from the northern ports to the ſouthern, and the contrary.

The chief markets and moſt populous towns are on the coaſt, Piura, Lambayeque, Truxillo; and, in the Sierra, Caxamarca, the royal ſtation of the mines of Chota; and towards the S. Ica, Arequipa, and the royal ſtation of Tarapaca; and towards the interior, Paſco, which is a mineral ſtation belonging to the intendancy of Tarma, Guanacha, Jauja, Guancavelica, Guamanga, and Cuzco. At theſe and other places, as Guarochiri, Caxatanbo, &c. traders or agents ſell for the merchants of Lima, European goods, liquors, and other articles ſufficient for the conſumption of the neighbourhood; and the returns are generally in bullion or coin, but ſometimes in articles of food for the uſe of the capital. The trade may yearly amount to 1,500,000 dollars in products; while that in bullion and money may amount to 4,000,000.

Upon the whole, according to Liquanda, cited by Pinkerton, the viceroyalty loſes, during five years, in the balance of maritime commerce, more than 6,500,000, but gains a balance with the viceroyalty of La Plata of nearly 1,200,000 annually; ſo that the amount being deducted, the loſs will be reduced to about 700,000 dollars, without mentioning the interior commerce, which cannot enter into the account.

From the "Mercurio Peruano," we learn that the exports of Peru to Potoſi, and the other provinces of the Rio Plata, are valued at more than 2,000,000 of dollars annually, and the imports at 860,000 dollars; ſo that the balance in favour of Peru is near 1,200,000, independent of the profits on the carriage of the goods, which belongs alſo ot Peru, as the carriers are Peruvians. Cuzco and Arequipa are the routes through which this trade paſſes.

The chief exports to the Rio Plata are brandy, wine, maize, ſugar, pimento, indigo, and woollens. The brandy alone amounts to near 1,000,000 of dollars. The woollens, which are next in value, are chiefly made in Peru, but part of them are brought from Quito. The provinces of the Rio Plata uſed formerly to take woollens, to a great amount, from Quito; but it is now found more economical to procure theſe articles from Europe by the way of Buenos Ayres. The indigo exported from Peru is previouſly imported from Guatimala.

The chief imports from the Rio Plata, are mules, ſheep, hams, tallow, wool, coca leaf, paraguay leaf, and a ſmall quantity of tin from Oruro: 20,000 mules are imported annually from Tucuman, for the ſervice of the mines.

The commerce of Peru, by ſea, with the other colonies of Spaniſh America, will appear from the following tables.

I.—Commerce of Callao with Chili, Guayaquil, Panama, and Guatimala, for the Years 1785, 1786, 1787, 1788, and 1789.

	Imports.	Exports.	Balance for Callao.	Balance againſt Callao.
Chili - - - -	5,533,775 1	4,686,423 3		847,351 6
Guayaquil - - - -	2,547,643 1	2,906,305 0	358,661 7	
Panama - - - -	59,035 5	201,631 7	142,596 2	
Guatimala - - - -	210,295 7	29,416 4		180,879 3
	8,350,749 6	7,823,776 6	501,258 1	1,028,231 1
Annual Average - - -	1,670,149 7	1,564,755 3		
Annual balance againſt Callao - - - - - - -				105,394 4

II.—Commerce of Arica, Payta, and other Ports of Peru, with the Kingdom of Chili, and the Ports of Panama and Guayaquil.

	Imports.	Exports.	Bal. againſt Peru.
Chili - - -	46,675		46,675
Panama and Guayaquil	350,000	130,000	220,000
	396,675	130,000	266,675

III.—Reſult of both.

	Imports.	Exports.	Bal. againſt Peru.
Annual trade of Peru, by ſea, with the other colonies	2,066,824 7	1,694,755 4	372,069 4

Forty-one veſſels, of different ſizes and deſcriptions, are employed in this trade; and all of them, except three, belong to Peru. Their united tonnage amounts to 351,500 quintals, and they are manned by 1460 ſeamen.

The chief exports from Peru to Chili are European goods, previouſly imported at Callao. Sugar, coarſe woollens, made in Peru, indigo from Guatimala, ſalt, cotton, pita, yarn, and ſome other trifling articles. The imports are chiefly wheat, copper; Negro ſlaves, ſome of them natives of Chili, but the greater part from Rio de Janeiro and Buenos Ayres; tallow, wine, paraguay tea, ſalt meat, timber, cordage, and leather. Part of the copper is uſed in the mint at Lima, and the remainder, except a ſmall quantity ſent to Guayaquil, re-exported to Spain. The ports of Chili that trade with Peru, are Valparaiſo, Conception, and Coquimbo; but Valparaiſo alone carries on three times as much trade as the other two. The timber is brought from the iſle of Chiloe.

Three-fourths of the exports to Guayaquil conſiſt of European goods, and the remaining fourth of flour, wine, brandy, and copper. The imports are chiefly cacao and timber. There is alſo imported into Peru, on account of the government, a conſiderable quantity of tobacco, the growth of Guayaquil, which is afterwards re-exported to Chili; but this is not included in the preceding tables.

The trade with Panama, which was formerly of ſuch magnitude, has declined ſince the middle of the laſt century, and is now reduced to a ſmall importation of timber and cacao, and to the remains of a ſlave trade, which is every day diminiſhing. The exports from Peru to Panama are coarſe woollens, ſugar, flour, and brandy. There is alſo a remittance of 300,000 dollars a-year from the treaſury of Lima, to pay the garriſon and civil government of Panama; without which that city muſt have fallen to ſtill greater inſignificance.

Indigo is the principal article of import from Guatimala. Small quantities of logwood, pitch, timber, and cacao, are alſo imported. The exports, which are very trifling, conſiſt chiefly of wine and woollens. The wines and brandies of Peru might be exported with advantage to San Blas, for the conſumption of Cinaloa, Sonora, and California; but though permiſſion has been frequently ſolicited from the government, it has been conſtantly refuſed, from an apprehenſion of interfering with the trade of the mother country in theſe articles.

The trade of Peru with Spain was carried on by Porto Bello and Panama till 1748, when regiſter ſhips were ſubſtituted for galleons, and the voyage by Cape Horn, for the circuitous route formerly in uſe. It is amuſing to conſider the progreſs made ſince that time in the art of navigation. The firſt Spaniſh veſſels which ſailed by Cape Horn, were inſured againſt ſea riſk at Cadiz, at the exorbitant rate of 20 *per cent.* of their value; but the veſſels which perform the ſame voyage at preſent are inſured for two. The regiſter ſhips, though liable to objections, were preferable in every reſpect to the galleons. They ſhortened the intercourſe between the mother country and the colony, and leſſened the expence attending it. By affording quicker returns, they led to more frequent adventures; and by meeting more effectually the demand, they diminiſhed the inducements to contraband. But the trade was ſtill clogged and impeded with much uſeleſs expence and unneceſſary delay, and ſubjected to an arbitrary licence, which was withheld or burdened with reſtrictions at the caprice of the miniſter.

The regiſter ſhips continued to be employed in the trade of Peru with the mother country, till the war for American independence, during which there was little intercourſe between Spain and this diſtant colony. At the peace of 1783, the ſyſtem of free trade, the order for which had been iſſued at Madrid ſome years before, began to be carried into effect in the South Sea. According to this ſyſtem, the moſt wiſe and liberal which Spain has ever laid down for her colonies, an unlimited intercourſe, without licences or other reſtrictions, is permitted between certain ports of Spain and certain ports of Spaniſh America; and among the privileged ports of America, are Callao and Arica, both ſituated in Peru.

The reſult of theſe innovations has been highly favourable to Peru. Its inhabitants enjoy foreign luxuries and conveniences at a cheaper rate, and in greater abundance than before; while their induſtry has been excited, the value of their exports increaſed, and the produce of their mines nearly doubled. Nor has the change of ſyſtem been leſs beneficial to the mother country, though ſome individuals have ſuffered by it. From 1714 to 1739, a period of twenty-five years, the whole exports to Spain from Peru, Chili, the Rio Plata, and Santa Fé, did not exceed 34,000,000 of dollars. But at preſent, the exports from Peru and Chili alone, exceed 6,000,000 annually; and the imports from Europe have increaſed in the ſame proportion. For ſome years, indeed, after the opening of the free trade, the merchants of the mother country, ignorant of the real ſtate and reſources of Peru, poured into that country a greater quantity of goods than its effective demand required, or enabled it to conſume; and by the conſequent want of ſale, and depreciation of theſe goods, the importers paid dearly for their raſhneſs. But though ſome merchants ſuffered by their over-ſpeculation, the manufactures of the mother country were benefited by it; and with regard to Peru, it would be difficult to ſhew how the abundance and low price of goods could be injurious to the conſumer. On the contrary, the ſpirit of induſtry has been awakened in that kingdom, by the ſight of luxuries and accommodations, formerly unknown to its inhabitants, or placed beyond their reach; and the increaſe of its exports ſince the free trade, is the ſureſt proof of its growing proſperity.

TABLES of the Commerce of Peru with the Mother Country.

I.—Imports of Lima from Spain in the Years 1785, 1786, 1787, 1788, and 1789.

		National Goods.	Foreign Goods.	Prime Coſt when exported.	Coſt, with Duties and other Expences to Lima.
In the year	1785	1,932,040 $0\frac{7}{8}$	3,106,056 $2\frac{3}{4}$	5,038,096 $3\frac{5}{8}$	6,965,231 $3\frac{3}{4}$
	1786	5,113,389 $5\frac{1}{8}$	6,358,901 5	11,472,221 $2\frac{1}{8}$	14,734,084 $4\frac{1}{2}$
	1787	3,225,167 $3\frac{3}{4}$	2,426,581 $6\frac{7}{8}$	5,651,749 2	7,257,741 $6\frac{3}{4}$
	1788	1,298,250 $7\frac{1}{8}$	995,055 $6\frac{7}{8}$	2,293,306 $5\frac{7}{8}$	2,940,992 $7\frac{3}{4}$
	1789	1,007,663 $7\frac{1}{8}$	1,216,855 $3\frac{1}{8}$	2,224,517 $2\frac{7}{8}$	2,856,965 $0\frac{7}{8}$
Total, according to the Cuſtom-houſe entry -		12,576,510 $0\frac{3}{8}$	14,103,450 $7\frac{1}{2}$	26,679,960 $7\frac{7}{8}$	34,755,015 $7\frac{5}{8}$
Addition of 22 *per cent.*		2,727,064 1	2,990,428 5	5,717,492 6	7,344,297 7
Total - -		15,303,574 $1\frac{1}{8}$	17,093,879 $4\frac{1}{2}$	32,397,453 $5\frac{7}{8}$	42,099,313 $6\frac{5}{8}$
Annual average -		3,060,714 $6\frac{5}{8}$	3,418,775 $7\frac{1}{4}$	6,479,490 $5\frac{7}{8}$	8,419,862 $6\frac{1}{8}$

In this table are included imports from China by the Philippine Company to the value of 421,120 dollars; and imports of European goods from other ports of America to the value of 270,237 dollars $7\frac{5}{8}$ reals.

The addition of 22 *per cent.* to the official value, is conſidered as the difference between the real and the official value.

The freightage, inſurance, duties, and other expences, from the time the goods leave the wharf, when they are embarked in Spain, till they are warehouſed at Lima, are eſtimated at 28 dollars $3\frac{5}{8}$ reals *per cent.* on all goods ſent round Cape Horn. A ſeparate charge is made for the goods from China, and from the American ports.

The European goods in greateſt requeſt in Peru are, ſilks, ſuperfine cloth, lace, fine linen, and other articles of luxury and ſhow. There is alſo a conſiderable demand for ordinary linen, and for the inferior ſorts of cloth and woollens. Cutlery, and all inſtruments of iron, are alſo in great requeſt.

II.—Exports from Lima to Spain in the ſame Period.

		Coin and Bullion.	Produce.	Total.	Total, with Coſt and Duties, to Spain.
In the year	1785	7,144,325 $2\frac{1}{8}$	733,587 4	7,877,912 $6\frac{1}{8}$	8,823,115 $6\frac{1}{8}$
	1786	8,285,659 $7\frac{6}{8}$	882,807 1	9,168,467 $0\frac{6}{8}$	10,369,502 $3\frac{6}{8}$
	1787	4,518,246 $3\frac{4}{8}$	906,022 0	5,424,268 $3\frac{4}{8}$	6,503,961 $2\frac{4}{8}$
	1788	5,463,973 $1\frac{7}{8}$	579,160 2	6,043,133 $0\frac{7}{8}$	6,798,374 $0\frac{7}{8}$
	1789	2,449,495 $6\frac{7}{8}$	523,080 0	2,972,575 $6\frac{7}{8}$	3,484,386 $2\frac{7}{8}$
Total -	-	27,861,700 $4\frac{7}{8}$	3,624,656 7	31,486,357 $3\frac{7}{8}$	35,979,399 $6\frac{7}{8}$
Annual Average -		5,572,340 1	724,931 3	6,297,271 4	7,195,879 $7\frac{7}{8}$

In this table is included the ſum of 2,790,000 dollars exported to Aſia by the Philippine Company.

Silver brought from Lima to Spain, coſts, in freightage, inſurance, and duties, $9\frac{1}{2}$ *per cent.*; and gold $2\frac{1}{2}$ *per cent.*

The articles of produce are chiefly Jeſuits' bark, Vicuna wool, copper from Chili, cacao from Guayaquil, and a ſmall quantity of cotton.

III.—Commerce of Peru with Spain, from 1775 to 1779, compared with the Commerce between the ſame Countries, from 1785 to 1789.

	Imports.	Exports.
From 1775 to 1779 -	23,838,183 $4\frac{4}{8}$	21,302,385 2
From 1785 to 1789 -	42,099,313 $6\frac{5}{8}$	35,979,339 $6\frac{7}{8}$
Total for ten years -	65,937,497 $3\frac{1}{8}$	57,281,725 $0\frac{7}{8}$
Exceſs of the 2d period above the 1ſt	18,261,130 $2\frac{7}{8}$	14,676,954 $4\frac{7}{8}$

It is further to be obſerved, that during the firſt of theſe periods, Potoſi, and the other provinces now annexed to the Rio Plata, formed part of the viceroyalty of Peru; and that, by the ſeparation of theſe provinces, Peru, during the ſecond period, contained only 49 or 51 diſtricts, inſtead of 74, of which it was formerly compoſed.

But, to form a juſt eſtimate of the commerce of Peru, we muſt take Buenos Ayres into the account, and conſider theſe two countries, and Chili, as part of the ſame commercial ſyſtem. It will then more fully appear, how ſmall are the means, and limited the reſources, of theſe extenſive colonies, and what falſe and exaggerated notions have been circulated in this country with regard to them.

View of the Reſources of Peru, Chili, and the Rio Plata, for maintaining Foreign Commerce.

	Dollars.
Annual coinage of Lima, from 1790 to 1794	5,593,513 0
Coinage of Potoſi in 1791 - - - -	4,365,175 0
Annual coinage of Santiago of Chili, eſtimated at - - - - - -	1,400,000 0
Annual export of produce from Callao, from 1785 to 1789 - - - -	724,931 3
Export of produce from Buenos Ayres in 1796 - - - - - - -	1,328,840 0
	13,412,459 3

It appears from this ſtatement, that the effective demand of theſe countries for foreign commodities, does not exceed, at preſent, 3,000,000 ſterling annually. It is true, that with a better government, and a more liberal ſyſtem of commercial regulations, theſe reſources might be greatly augmented, but ſuch improvements are in general the work of time, and in South America, many difficulties muſt firſt be ſurmounted. The population of the country is wonderfully ſmall, ſcattered over an immenſe ſurface, and compoſed of caſts which mutually hate and diſtruſt each other. The Indians, who are the moſt numerous claſs, prefer a life of indolence and apathy, to enjoyments that muſt be purchaſed with labour. Among the other caſts, emancipation from the mother country would be the ſignal of diſcord and political diſcuſſions the moſt adverſe, during their continuance, to the progreſs of opulence, and the ſteady exertions of induſtry. Some improvement might be expected in the mines. The labour of extracting the ore might be abridged by machinery, and the proceſſes for reducing it meliorated by more ſkilful applications of chemiſtry. But the ſcarcity of hands would prevent any great increaſe in the productiveneſs of the mines; and a ſeparation from the mother country, by increaſing the difficulty of finding a ſupply of quickſilver, might render them even leſs productive than they are at preſent. The mines of quickſilver in China are ſaid, within theſe few years, to have been exhauſted. None could be expected from Europe, in the preſent ſtate of that quarter of the world. No reſource would then remain but to repair the works at Huacavelica, and extract from it quickſilver for the other mines, without which, the greater part of them muſt be abandoned.

In ſome branches of produce, it is true, the exports from this part of America might be inſtantly augmented. The exports of hides, tallow, and ſalted proviſions from Buenos Ayres, might be greatly increaſed. Copper, the value of which is riſing every day at home, might be procured, in great abundance, from Chili and the Rio Plata. Valuable firs might be obtained in great numbers from the Andes; and in this ſpecies of induſtry the Indians, like their North American brethren, would more readily engage them in more ſettled occupations. Flax and hemp of the very beſt quality are raiſed in Chili; and if greater care were taken to gather the cotton of Peru, and more attention beſtowed on the art of packing, both that article, and the wool of the ſame country, might be ſent to Europe at a price that could not exclude them from the market. Cacao, coffee, dye-ſtuffs, and medical drugs, might alſo be exported in greater quantity.

The viceroyalty of Peru has peculiarities of climate, which are owing to its ſingular form. The mountains that are extended on the weſtern ſide of South America occaſion a diviſion into three parts, *viz.* the maritime plains or vallies, the mountains themſelves, and the high table land or upland plain, between the ridges of the Andes. Where we ſhould be led by theory to expect perpetual rain from the influence of the tropical ſun, in the lower part of Peru, on the contrary, rain is almoſt unknown; and it has been aſſerted, that in the part between 5° and 15° rain has never been known to fall. The chain of the Andes, at a mean height of 14,000 feet above the ſea, arreſts the clouds, except during the months of January, February, and March, when the ſummits are covered with ſnow. Theſe clouds diſſolve on the mountains in rain and vapours, accompanied with lightning and tremendous thunder. In the provinces unviſited by rain, the wind may be ſaid to blow conſtantly from the ſouth, along the courſe of the Andes, correſponding with our north wind, which is generally dry; the cold of the antarctic pole being equal, if not ſuperior, to the arctic. Vegetation is ſupported by liberal dew throughout this region, computed at a length of 10° of latitude, or 600 geog. miles, while the breadth may be from 12 to 15 leagues. Bouguer obſerves, that from the gulf of Guayaquil to the deſert of Atacama, a ſpace of 400 leagues, rain is unknown; and the houſes at Arica, like thoſe of Lima, may be ſaid to have no roofs, being only covered with mats, and a light ſprinkling of aſhes to abſorb the dew of the night. The high table land, called the "Sierra," or High Peru, preſents a more fertile aſpect, and from its height of 10,000 feet above the ſea enjoys a different climate. While the low lands are rather ſandy and barren, except along the courſe of the rivers, the uplands may be ſaid to enjoy a perpetual ſpring, united with a perpetual autumn. The height of the mountains inveſts them with perpetual winter.

In Low Peru, as that part of the country is called which lies between the Cordillera of the coaſt (thus diſtinguiſhing it from the Cordillera of the Andes) and the ſhore, the ſoil is dry and has no rain; and, therefore, the only ſpots capable of cultivation are the banks of the rivers, and the places ſuſceptible of being artificially irrigated. The Sierra, or High Peru, though at its greateſt elevation it conſiſts of barren mountains and rocks, is interſected with fertile and cultivated vallies. Its climate, though variable, is not inſalubrious, if we may judge from the longevity of its inhabitants. The climate of Lima, under the want of rain, is remarkable for the inconſiderable variations of its temperature. The thermometer at noon is never obſerved in winter below 60° Fahrenheit, and ſeldom riſes in ſummer above 85°. The hotteſt day ever known at Lima was in February 1791, when the thermometer roſe to 96°.

It is obvious, therefore, that the firſt object of attention in Peru ought to be, not its agriculture, but the improvement of its mines, and the amelioration of its roads and internal communications. In proportion as a market is opened for its productions, the attention of its inhabitants will be turned towards agriculture; and without ſuch inducement, it is fruitleſs for the government to attempt forcing their induſtry into that channel. So languid and backward is the agriculture of Peru at preſent, that Lima, and many other towns upon the coaſt, depend on Chili for their proviſions. This has been the caſe ever ſince the earthquake of 1693, which was followed by ſuch ſterility of the vallies of Low Peru, that the people ceaſed in many places to cultivate them; and though the country has ſince recovered, in a great meaſure, its former fertility, it ſtill remains uncultivated, and the maritime places continue to be ſupplied with proviſions by importation.

Deſerts of 20, 30, or 40 leagues in extent occur in every part of the coaſt from Tumbez to Atacama. The immenſe foreſts which clothe the maritime plains indicate that the population has been always ſcanty. Theſe foreſts conſiſt of acacias, mangle trees, brooms and ferns in prodigious variety, with tall aloes, and other ſucculent plants. Here we find the ferula or gigantic fennel, cedars of different kinds, cotton trees, many ſorts of ebony, and other woods. The talleſt tree is the "maria," uſed for maſts; and of the palm trees there are ten or twelve kinds. At the diſtance of ſeven or eight leagues from the coaſt the trees increaſe in ſize, and are often clothed with paraſitical plants. On paſſing the firſt chain of the Andes, the traveller finds the new region already deſcribed, and the face of the country as different as the climate.

As to the botany of this country, we know from the reports of travellers and navigators, that the vicinity of the coaſt produces many of the tropical plants and vegetables, ſuch as the cabbage-palm, the cocoa nut, the chocolate nut, the cotton ſhrub, the pine apple, the canna, amomum, turmeric, plantain, and ſugar cane; and, in the more temperate climate of the high plains, and upon the ſides of the Andes, it is natural to expect more hardy plants. The beſt and the moſt intereſting of theſe are the ſeveral ſpecies of cichona. Here are alſo found the cardana alliodora, which is a large timber tree, whoſe leaves and freſh wood emit a ſmell of garlic; and the coffæa racemoſa. Around the neighbourhood of Lima, the large-flowered jeſſamine and datura arborea diffuſe their evening fragrance. Among the Peruvian natives are reckoned no fewer than twenty-four ſpecies of pepper, and five or ſix of capſicum, beſides ſeveral eſculent kinds of ſolanum. Tobacco and jalap abound in the groves at the feet of the Andes, and many of the ornamental flowers of our Engliſh gardens and green-houſes owe their origin to theſe countries.

The zoology of Peru is little different from that of *La Plata;* which ſee.

In exploring the mineralogy of the Peruvian viceroyalty, it is found that, from the extreme province of Piura in the north to that of Canes and Canches in the ſouth, gold and ſilver follow the grand chain of the Alps; and though this country has loſt Potoſi and the ſouthern provinces, which have been annexed to the viceroyalty of La Plata, the amount of the coinage of Lima exceeds that of Potoſi. In Piura, at Hayabaca, muriate of copper has been found; and in the village called Amatape, 16 leagues from the town of Piura, is a celebrated mine of pitch or bitumen; and another mine has been more recently diſcovered, at the point of St Helena, in the juriſdiction of Guayaquil.

From the Mercurio Peruviano, cited by Mr. Pinkerton, we deduce an account of the chief mines, with the names of the new intendancies, the moſt modern diviſion of the viceroyalty, in which they are found. In the intendancy of *Lima,* with its dependency of *Guarachiri,* there are four mines of gold, 131 of ſilver, one of quickſilver, and four of copper; all of which were wrought in 1791, when this enumeration was taken. In the intendancy of *Tarma,* with its dependencies of *Paſco* and *Huallanca,* 227 mines of ſilver were actually wrought, 21 being neglected; and here were two lead mines, which furniſhed an abundant ſupply of this metal. In the intendancy of *Truxillo,* with its dependency of *Chola,* two of three gold mines, and 34 ſilver mines were worked, and 161 were abandoned. In the intendancy of *Guamanga,* with its dependency of *Lucanos,* 60 mines of gold, 102 of ſilver, and one of quickſilver, were wrought; three mines of the firſt metal and 63 of the ſecond having been abandoned. In the intendancy of *Cuzco*, with its dependency of *Curahuaſi*, 19 mines of ſilver were wrought. In the intendancy of *Arequipa*, with its dependency of *Cailloma*, one mine of gold, and 71 mines of ſilver were wrought; four of the former metal and 28 of the latter having been abandoned. In the intendancy of *Guantajaya*, with its dependency of *Tacna*, one mine of gold, and 20 mines of ſilver were wrought; 19 of the former metal and alſo 30 of ſilver having been abandoned. In the intendancy of *Guancavelica*, with its dependencies of *Caſtrovirayna* and *Lirca*, one mine of gold, 80 mines of ſilver, two of quickſilver, and ten of lead, were wrought; two of gold and 215 of ſilver having been abandoned. It is obſerved, that during a ſpace of ten years, from the commencement of 1780 to the end of 1789, the above mines yielded 35,359 marks of gold, 22 carats fine; and 3,739,763 marks of ſilver. In the year 1790, the ſilver mines yielded 412,117 marks of that metal; being an exceſs of 38,147 marks over the average produce of the ten antecedent years. If we eſtimate the mark of gold at 125 piaſtres, and that of ſilver at eight piaſtres, the whole amount, in ſterling money, of the produce of the mines, during the above ten years, will be found to have been 7,703,545 *l*. Among the mines of Peru the moſt celebrated ſeem to be thoſe of Cailloma, Paſco, Piedra-Parada, and Chota.

Peru produces a great number and variety of other minerals; ſuch as baſalt, the ſtone of the Incas, which is a compact marcaſite capable of a high poliſh, the piedra del gulinazo, or obſidian, rock ſalt, beſides curious ſtones of various colours. Ulloa's Voyage. Pinkerton's Geography, vol. iii. Mercuro Peruano. Edinb. Rev., No. 18.

Peru, a poſt-town of America, in Clinton county, New York, on the weſt ſide of lake Champlain; incorporated in 1791, and containing 1347 inhabitants.

Peru, *Balſam of*. See Balsam.

PERVENCHERES, in *Geography*, a town of France, in the department of the Orne, and chief place of a canton, in the diſtrict of Mortagne. The place contains 771, and the canton 9728 inhabitants, on a territory of 190 kiliometres, in 14 communes.

PERUGIA, anciently *Peruſin*, one of the moſt ancient and diſtinguiſhed cities of Etruria. The era of its foundation long preceded that of Rome, and, like the origin of "Cluſium, Cortona," &c. is almoſt loſt in diſtance of time. In conjunction with all the other Etrurian ſtates, it long reſiſted the Romans; and when ſubjected, or rather reconciled to them, it became a faithful and courageous ally. It defied the power of Hannibal, and flouriſhed in peace and opulence till the reign of Auguſtus, when unfortunately it engaged in the rebellion of Lucius Antonius, uncle of the triumvir, and under his command ſhut its gates againſt Auguſtus, who took it, and, as it is aſſerted, wiſhed to ſpare it; but one of its principal citizens ſetting fire to his own houſe, which he intended as a funeral pile for himſelf and his family, the flames communicated to the neighbouring buildings, and ſpreading rapidly, reduced the city to aſhes. Perugia, however, roſe immediately from its ruins; and, on its reſtoration, by a ſtrange inconſiſtency, choſe for its patron Vulcan, a divinity to whom it ſeems to have had very few obligations, as the god had ſpared his own temple only in the general conflagration. In the Gothic war it diſplayed much ſpirit, and ſtood a ſiege of ſeven years againſt theſe barbarians. It afterwards, with the whole Roman ſtate, ſubmitted to the pope; and, with ſome intervals of turbulent independence, has remained ever ſince attached to the Roman ſee.

Perugia is now a large, clean, well-built, and well-inhabited city. Seated on the ſummit of a mountain, it commands from its ramparts, and particularly from its citadel, an extenſive view over a vaſt range of country, fertile, covered with hill and dale, and enlivened with villages and towns. There are many churches, convents, and palaces in this city, moſt of which were adorned with the paintings of Pietro Perugino, the maſter of Raffaello: of theſe the French carried off a conſiderable number, and defaced others, particularly ſuch as were painted on walls, and could not be removed. The cathedral is in itſelf a very indifferent edifice, and its deformity is increaſed by the bad taſte that ſeems to have prevailed in its repair and decorations. Several other churches merit attention, particularly that of St. Pietro, belonging to a Benedictine abbey: it is ſupported by eighteen pillars of fine marble, and adorned with an altar of the ſame materials, very rich and well diſpoſed. Perugia has an univerſity ſupplied with able profeſſors, and ſeveral academies, all of which can boaſt of illuſtrious names; and it is upon the whole an intereſting city, capable of entertaining the curious and inquiſitive traveller for ſeveral days; 60 miles S.E. of Florence. N. lat. 43° 6′. E. long. 12° 17′.

PERUGIANO, a province of Italy, bounded on the north by the duchy of Urbino, on the eaſt by Umbria, on the ſouth by the Orvietan, and on the weſt by Tuſcany; its greateſt extent from north to ſouth, and alſo from eaſt to weſt, being 28 miles. It is croſſed from north to ſouth by the Tiber, and in it is a large lake, abounding in fiſh, called "Lacus Thraſimenus," near which Flaminius was defeated by Hannibal. The country is very fertile, and abounds in corn and wine. Its capital is *Perugia;* which ſee.

PERUGINO, Pietro, in *Biography*, whoſe real name was Pietro Vanucci, was born at Perugia in 1446, of parents very low in ſtation, but who finding in their ſon an inclination to painting indulged it, and placed him with an artiſt for inſtruction, under whoſe tuition he eagerly exerted himſelf, and acquired by his induſtry a degree of power very conſiderable among the earlier practitioners of the art.

He advanced ſtill more with the aſſiſtance of Andrea Verrochio, and his talents were repaid with very great reſpect, particularly for a picture he painted of St. Jerome devoutly praying before a crucifix, which ſo raiſed his reputation, that his works were eagerly ſought for through all the ſouth of Europe.

Though Perugino thus obtained diſtinction as a painter, and very honourable employment, having conſiderably improved upon the ſtyle of his maſters; yet he was very far indeed from ſucceſsful rivalry with the powers of Maſſaccio. He was dry and hard in deſign, and too laboriouſly minute in finiſhing. His greateſt glory ariſes from having been the firſt inſtructor of Raffaello; but his pupil, as ſoon as he beheld the grander ſtyle of Michael Angelo, L. da Vinci, and Fra. Bartolomeo, burſt the bonds of the meaner ſtyle in which he had been educated, and left his maſter at a very humble diſtance.

The moſt capital work of Pietro Perugino in oil colour, is in the church of St. Peter at Perugia. It is an altar piece, and the ſubject is the aſcenſion of our Saviour, with the diſciples obſerving and adoring. He died in 1524, aged 78.

PERVIGILIA, in *Antiquity*, an appellation given to nocturnal feſtivals, celebrated in honour of ſeveral deities, as Ceres, Venus, Fortune, &c. They were ſo called becauſe the nights were ſpent in waking.

PERVIGILIUM, in *Medicine*, exceſſive waking, or watching.

PERVINCA, in *Botany*. See VINCA.

PERUIPE, in *Geography*, a river of Braſil, which runs into the Atlantic, S. lat. 18° 20′.

PERVISE, or PARVISE, a term in our old *Law Books*, ſignifying, according to Selden in his notes on Forteſcue, an afternoon's exerciſe, or moot, which the pleaders held for the inſtruction of the younger ſtudents; bearing originally the ſame name with the parviſiæ in Oxford. See MOOT.

Mr. Somner ſays, that perviſe ſignifies *palatii atrium, vel area illa a fronte aulæ Weſtmonaſterienſis, hodie*, the *Palace-yard:* and Spelman thinks, that the lawyers turned thither to meet their clients, not to hold moots.

PERULA, in *Botany*, ſo altered by Schreber, from *Pera*, the name given by Mutis, which alludes to the form of the capſule, reſembling a little bag or ſatchel. Schreb. Gen. 703. Mart. Mill. Dict. v. 3. (Pera; Mutis in Stockh. Tranſ. for 1784. 299.)—Claſs and order, *Dioecia Polyandria*. Nat. Ord. *Tricoccæ*, Linn. *Euphorbiæ*, Juſſ.

Gen. Ch. Male, *Cal.* Perianth of two minute, oppoſite, oblong, rather concave, ſpreading leaves, the uppermoſt of which is twice the largeſt. *Cor.* of one petal, concave, hemiſpherical, dependent; heart-ſhaped at the baſe; ſcarcely emarginate at the ſummit. Nectary of ſeveral ſmall, many-cleft, ſomewhat plaited, erect membranes, inſerted into the receptacle between the two rows of ſtamens. *Stam.* Filaments numerous, (from 24 to 30,) diſpoſed tranſverſely in a double row, thickiſh, erect, the height of the nectary; anthers thickiſh, quadrangular, oblong, obtuſe, erect, riſing above the nectary. *Piſt.* Germens four, barren, minute, nearly globular, placed on very ſhort ſtalks at the angles of the receptacle above the nectary; ſtyle very ſhort, erect; ſtigmas three, in minute peltate ſegments, with prominent points.

Female, on a ſeparate tree, *Cal.* Perianth as in the male, deciduous. *Cor.* as in the male. Nectary as in the male, but its membranes are approximated, ſomewhat inflated, occupying all the diſk of the receptacle. *Piſt.* Germens four, fertile, inſerted into the receptacle as in the male, but rather larger, on ſhort ſtalks; ſtyle to each erect, ſhort, triangular; ſtigmas as in the male. *Peric.* Capſule obovate, ſlightly triangular, hanging out of the flower on its own elongated ſtalk, of three cells and three valves; the valves cloven, and finally divided to the very bottom. *Seeds* ſolitary, obovate, abrupt, ſmooth, ſmall.

Obſ. Mutis ſuſpects that what he has called calyx, may be bracteas. In this we readily concur. We would alſo call his corolla the calyx, concerning which point, if we are right as to the natural order, there can be no doubt. The part in queſtion is, according to him, globoſe before its expanſion, with a longitudinal ſuture, by the burſting of which the original or proper orifice becomes tranſverſe, the receptacle projects almoſt out of this corolla (or calyx), the flower becoming pendulous from the ſlightly drooping ſummit of the incurved flower-ſtalk. Under this view of the ſubject, we propoſe the following.

Eſſ. Ch. Male, Calyx concave, of one leaf. Petals none. Nectary a plaited membrane. Anthers quadrangular, ſimple. Germens four, abortive.

Female, Calyx concave, of one leaf. Petals none. Nectary a plaited membrane. Capſule ſtalked, obovate, of three cells and three valves. Seeds ſolitary.

1. P. *arborea*. (Pera arborea; Mutis as above, t. 8.)—Native of New Granada, about Mariquita, where it was found by Mutis. *Martyn.*

Our copy of the Stockholm Tranſactions being in this part defective, we have ſeen no figure of this plant, nor have we any ſpecimen.

PERUVIAN BARK. See CORTEX *Peruvianus*.

PERUVIAN *Emerald*. See EMERALD.

PERUVIAN *Maſtic Tree*. See SCHINUS.

PERUWELZ, in *Geography*, a town of France, in the department of the Jemmappe, and chief place of a canton, in the diſtrict of Tournay. The place contains 5302, and the canton 14,962 inhabitants, on a territory of 107½ kiliometres, in 14 communes.

PERUZZI, BALDASSARE, in *Biography*, was born at Accajano, in the territory of Sienna, in 1481, in poor and diſtreſſed circumſtances; his father having been reduced from a ſtate of comparative affluence, by the civil wars which ravaged Florence and its territory. Baldaſſare exhibited his genius at a very early age; firſt by imitation of the works of others, and afterwards by original productions in the city of Volterra, where his family reſided. Thence he went to Rome, and placed himſelf with the father of Maturino; and becoming conſpicuous for ability, was at length employed by pope Alexander VI., and alſo in many churches and convents in that city, in which he produced pictures juſtly entitled to exalted praiſe.

Together with painting, he ſtudied architecture; and practiſed it with conſiderable ſucceſs. He was alſo renowned for his knowledge of perſpective; and the works he produced in imitation of architectural projections, excited even the ſurpriſe and admiration of Titian. But his higheſt renown is founded upon works of a much more elevated claſs; *viz.* his paintings in freſco and in oil; in which he exhibited a taſte and ſtyle not unworthy of Raphael. There is at Wilton a picture of his of the four evangeliſts in glory, with their peculiar characteriſtic accompaniments, which bears ample teſtimony to the truth of this remark; and perhaps it is the only real ſpecimen of his pencil in England. He wrote a treatiſe upon the antiquities of Rome, and a commentary on Vitruvius, but did not live to publiſh them; being poiſoned by ſome who were probably envious of his reputation and talents. He died in 1536, aged 55.

PERWEZ, in *Geography*, a town of France, in the department of the Dyle, and chief place of a canton, in the diſtrict of Nivelles. The place contains 904, and the canton 9612 inhabitants, on a territory of 145 kiliometres, in 28 communes.

PERYGUA, in *Botany*, a name given by ſome authors to a plant of the caſſine kind, called the *caſſioberry* buſh, and by ſome the *Paraguay tea*.

PERYSIAS, a word uſed by authors to expreſs wine of the laſt year's vintage.

PERZAGNO, in *Geography*, a town of Albania, on the canal of Cattaro.

PERZENE, a town of Italy, in the department of the Reno; eight miles N.E. of Bologna.

PES, a long meaſure, in Engliſh called foot.

PES *Foreſtæ*. See FOOT *of the Foreſt*.

PES *Leonis*, in *Botany*, a name by which ſome authors expreſs the *alchemilla*, or lady's mantle.

PES *Monetæ*, in *Ancient Records*, ſignifies a true and reaſonable adjuſtment of the real value of all current coin.

PES *Anſerinus*, in *Botany*. See CHENOPODIUM and ATRIPLEX.

PES *Capræ*. See CONVOLVULUS and OXALIS.

PES *Columbinus*. See GERANIUM.

PES *Tigridis*. See IPOMÆA.

PES *Anſerinus*, in *Anatomy*, the diviſion of the trunk of the faſcial nerve into the ramifications, which ſpread over the face. See Nerve.

PESA, an old law-term for a weigh, or certain weight of cheeſe, wool, &c.

PESADE, or Pesate, in the *Manege*, that action taught a horſe, wherein he riſes with his fore feet, and bends them up to his body, without ſtirring the hind feet.

The peſade takes its name from the motion of the horſe, which, in this action, leans and lays all the weight of his body upon his haunches. To be perfect, the hinder feet, which ſupport the whole, ought to be fixed and immoveable, and the fore-part of the horſe more or leſs raiſed, according as the creature will allow; but the fore-legs, from the knee to the feet, muſt always be extremely bent and brought under him.

The peſade is the firſt leſſon taught a horſe, in order to bring him to curvets, &c.: unleſs he performs this well, he will never go well in any air; yet he is not to be taught it at the firſt riding.

This is the foundation of all the *airs*, (ſee Airs,) and is neceſſary to diſpoſe and prepare the horſe for all ſorts of maneges: however, great caution ſhould be uſed not to teach a horſe to riſe up, or ſtand upon his haunches, unleſs he is quite exact and obedient to the hand and heel: for in this caſe he would be thrown into diſorder, his mouth would be ſpoiled, the appui falſified, and he would become reſtive. When he is fit for this exerciſe, work him upon the walk, the trot, and the gallop; ſtop him in the hand, keep him firm and moderately together; aid with the tongue, the ſwitch, and your legs; and when he begins to comprehend what you would have him do, encourage and careſs him, working him gently and by degrees. Sluggiſh and heavy horſes require, in the beginning, ſtronger and ſharper aids. There are other horſes, which are apt to riſe of themſelves; this ſhould be prevented, by driving them forward. Berenger's Art of Horſemanſhip, vol. ii. chap. 16.

PESAGE, Pesagium, a cuſtom or duty paid in certain markets, &c. for weighing of merchandiſes, or wares.

PESAGOONDAN, in *Geography*, a town on the W. coaſt of Borneo. N. lat. 2° 12′. E. long. 109° 58′.

PE-SAN, a ſmall iſland near the coaſt of China. N. lat. 26° 52′. E. long. 120°.

PESARO, or Pezaro, a town of Italy, in the duchy of Urbino, at the mouth of the Fogna, on the Adriatic; the ſee of a biſhop, ſuffragan of Urbino; containing eight churches, and twelve convents. In its environs are figs and olives, which are much valued. Its ancient name was "Piſaurum:" it was made a Roman colony about A.U.C. 568; and a temple was built here to Jupiter Piſaurus. According to Plutarch, it was ruined by an earthquake, and rebuilt by order of Auguſtus. Totila, king of the Goths, took and ruined it; but it was afterwards rebuilt by Beliſarius, general to the emperor Juſtinian. It became ſucceſſively ſubject to the dominion of the Malateſta, Sforza, and Borgia families, and laſt of all, of the popes. It is ſituated upon a ſmall eminence near the Adriatic ſea, and pretty well fortified; 15 miles N.E. of Urbino. N. lat. 43° 56′. E. long. 12° 52′.

PESATE, in the *Manege*. See Pesade.

PESCA Pagani, in *Geography*, a town of Naples, in Baſilicata; ſix miles N.W. of Muro.

PESCARA, a town of Naples, in Abruzzo Citra, at the mouth of a river of its name, which runs into the Adriatic at this place; it is fortified and defended by a caſtle; 10 miles N. of Civita di Chieti. N. lat. 42° 27′. E. long. 14° 6′.

PESCAROLO, a town of Italy, in the department of the Upper Po; nine miles N.E. of Cremona.

PESCE Vacca, the *Cow-fiſh*, in *Ichthyology*, a name given by Auguſtino Scilla to a kind of dog-fiſh, not deſcribed by any author before his time, but accurately drawn by him in his book on petrifactions, on occaſion of its teeth: many ſpecies of the gloſſopetræ of the iſland of Malta, and other places, being plainly the ſame with the teeth in the jaws of this fiſh.

PESCHIERA, in *Geography*, a town of Italy, in the department of the Benaco, on the S. coaſt of the lake Garda. This ſmall, but important fortreſs, was built by the Venetians in 1549. Its houſes are few, and on the ſide of the lake it has an arſenal for ſome light gallies; 15 miles W. of Verona. N. lat. 45° 7′. E. long. 10° 42′.

PESCHISE, a town of Naples, in Capitanata; 11 miles N.W. of Vieſte.

PESCIA, a town of Etruria, the ſee of a biſhop; containing three parochial, and ſeven other churches, and five convents. It has a manufacture of oil, which is much eſteemed; 10 miles S.W. of Piſtoya.—Alſo, a town of Italy, in the Treviſan; ſeven miles S. of Trevigio.

PESCINA, a town of Naples, in Abruzzo Ultra; five miles S.E. of Celano.

Pescina *Pompeia*, a town of Naples, in the province of Bari; nine miles N. of Matera.

Pescina *di Fratri*, a town of Naples, in Capitanata; eight miles W. of Vieſte.

PESCO Castraro, a town of Naples, in Abruzzo Ultra; 11 miles N.E. of Aquila.

Pesco *Coſtanzo*, a town of Naples, in Abruzzo Citra; ſeven miles S.E. of Sulmona.

Pesco *Laurino*, a town of Naples, in Principato Citra; 18 miles N.W. of Policaſtro.

Pesco *Pagano*, a town of Naples, in the province of Otranto; 11 miles N.E. of Tarento.

Pesco *Verraro*, a town of Naples, in Principato Ultra; 12 miles from Benevento.

PESEQUEIRO, a ſmall iſland in the Atlantic, near the coaſt of Portugal. N. lat. 37° 40′. W. long. 8° 52′.

PESHWA, or Paishwa, the hereditary title of the head of the Poona or weſtern Mahrattas. The word has a meaning analogous to our firſt or prime miniſter; but has been retained by the perſons who, for ſeveral generations, have hereditarily ſucceeded to the ſovereignty. The hiſtory of the peſhwas, according to the beſt authorities, is briefly this. About the year 1740, the peſhwa and bukſhi, miniſter and paymaſter-general to the ram raja, acknowledged ſovereign of the whole Mahratta empire, threw off their allegiance to the weak ſucceſſor of the great Sevaji, and divided his extended empire between them. (See Mahrattas.) The bukſhi was of the military tribe, out of which, in ſtrictneſs of Hindoo law, all ſovereigns muſt ſpring, and he aſſumed the title and authority of raja of Berar, and fixed his capital at Nagpour, where, with that title, his ſucceſſors continue as ſovereigns of the Berar, or eaſtern Mahratta ſtate. (See Berar and Nagpour.) The peſhwa was a Brahman, to which tribe ſovereignty is poſitively prohibited by the laws of Menu. (See Menu.) And in obedience no Brahman hath ever become a king; for although the peſhwa have, in fact, the power, he by a political fiction profeſſes to be only peſhwa to the reigning family at Sattara, where the deſcendant of Sevajee is kept a ſtate pageant, whoſe patent and dreſs of inveſtiture are ſtill thought or feigned to be eſſential to the peſhwa's authority, though that authority has been hereditary for ſeveral generations,

rations, each of which has kept the raja in honourable thraldom at his ancient capital.

At the time of the above-mentioned violent partition of the empire, Balaji, ſon of Viſwanatha, was peſhwa, he was ſucceeded by his ſon Bajy Rao, or Bajerow. He was ſucceeded by his ſon Balaji Baji Rao, who died in 1761, when his ſon and ſucceſſor Mhadu Rao was but fifteen years old. Raganath Rao, the brother of the late peſhwa, aſſumed the guardianſhip of the minor, and retained the power of a regent to an undue period, which involved the ſtate in ſome troubles, and himſelf in impriſonment. He was, however, releaſed by his nephew, who ſoon after died, in 1772, leaving the peſhwaſhip to his brother Narayan Rao, and confiding him to the eſpecial care of the uncle Raganath. It may be noted here, that the widow of Mhadu Rao burnt herſelf on the pile with her huſband's corpſe. Her name was Rama Bye. (See SATI). Raganath Rao, better known in the ſubſequent troubles of the weſtern ſide of India by the name of Ragoba, pledged himſelf to the protection of the young peſhwa Narayan Rao, whom he cauſed to be murdered the following year. His widow Gangabye was deſirous of becoming a ſati, or ſelf-devoted victim to the flames, but ſhe was found to be pregnant, and the Brahmans foretold a future peſhwa, and the ſacrifice was not permitted.

The Mahratta nation was indignant at the atrocious murder of the peſhwa, and Ragoba was compelled to flee from its juſt reſentment. After various attempts to obtrude himſelf on the nation, he was forced to yield, and was with his family impriſoned, and he died in confinement. He had two ſons, Baji Rao, and Chimnaji Appah; and he had, before their birth, in deſpair of male iſſue, adopted a lad named Amrit Rao. Theſe three were alſo kept in confinement.

The widow of the murdered Narayan Rao was delivered of a ſon, who was acknowledged as the rightful peſhwa, and Nanna Furnaveeſe, as dowan, or miniſter; and during the minority, the latter great man ruled the empire. The poſthumous ſon of the late Narayan Rao was named Mhadu Rao, and he was killed by a fall from his palace at Poona in 1795, leaving no ſon. Nanna Furnaveeſe, the ſole miniſter, during a long minority, unwilling to reſign his power, endeavoured to obtain another minority, by cauſing the widow of the deceaſed to adopt a child; but finding his political opponents determined on fruſtrating his views by an act of juſtice, he reſolved on anticipating them in that point, and brought the family of Ragoba from their impriſonment, and placed the eldeſt, Baji Rao, in the peſhwaſhip, to which he had the hereditary right. In conſequent troubles and contentions of parties, he has been more than once depoſed and forced to flee his capital, and latterly his country; to both of which he was reſtored by the interpoſition of a Britiſh force under general Welleſley, (now field marſhal Wellington), and it ſeems likely, that under the preſent government, guaranteed and protected by the Engliſh, the Mahratta empire will enjoy a ſeries of peaceful years, which it has hitherto never known. It may be noticed, that Amrit Rao has been ſuſpected of fomenting the troubles that have of late years convulſed the Mahratta ſtates. Diſappointed in his views on the peſhwaſhip for himſelf or his ſon, he has contrived to obtain Britiſh ſecurity for about 70,000*l.* ſterling *per annum*, and under Britiſh protection has retired to Benares, the uſual refuge with Hindoos of diſcontentment and diſappointed ambition.

PESINGAN, in *Geography*, a town of Candahar; 90 miles S.E. of Candahar.

PESMES, a town of France, in the department of the Upper Saone, and chief place of a canton, in the diſtrict of Gray; 10 miles S. of Gray. The town contains 1688, and the canton 15,188 inhabitants, on a territory of 282½ kiliometres, in 37 communes. N. lat. 47° 17'. E. long. 5° 39'.

PESÒLA, a lake of Naples, in Baſilicata, at the foot of the Apennines.

PESQUERA, a town of Spain, in the province of Leon, near the Duero; 28 miles S.E. of Leon.

PESSAC, a town of France, in the department of the Gironde, and chief place of a canton, in the diſtrict of Bourdeaux. The place contains 1336, and the canton 7686 inhabitants, on a territory of 505 kiliometres, in 8 communes.

PESSARY, an inſtrument, machine, or contrivance, invented for the purpoſe of reſtraining the uterus, and preventing it from deſcending into the vagina, of paſſing the external orifice, and appearing externally. This complaint, a deſcent of the uterus, is in a particular manner incident to women who have had ſeveral children, eſpecially ſuch as have had difficult labours, or who have ſuffered from laceration of the perinæum. It is not, however, entirely confined to ſuch ſubjects. Some women who have never been pregnant, of feeble habit of body, or who have long ſuffered from fluor albus, are ſubjected to this accident; alſo waſher-women, laundreſſes, and thoſe whoſe occupations oblige them to be much on their feet, or to carry heavy loads.

Reſt, cold aſtringent injections into the vagina, and bracing or ſtrengthening medicines, may aſſiſt ſomewhat in the cure, but it is only to be completely effected by wearing a peſſary. See *Bearing down of the* WOMB.

Peſſaries are of various forms; but that in moſt frequent uſe, and which is generally found to anſwer the purpoſe, is the ring peſſary; a circular piece of box, or other light wood, two, three, or four inches in diameter, and about a third of an inch in thickneſs, with a hole cut through its centre to allow a paſſage for the menſtrual flux. Some prefer them of an oval ſhape, and made of cork, but they are not ſo eaſily retained in the paſſage. Others make uſe of a globular ball; but theſe, for obvious reaſons, can only be uſed by women who have no huſbands. Women ſometimes conceive while wearing a ring peſſary. In ſuch caſes, the peſſary muſt be taken away when they are about five months advanced in pregnancy.

When a peſſary is intended to be introduced, the woman ſhould confine herſelf to her room for a day or two, and principally in a recumbent poſture, and take an opening medicine, that the uterus may have an opportunity of retracting or returning to its natural ſituation, and may be reduced in bulk. Theſe preliminary ſteps being taken, ſhe muſt be laid on a bed, on her left ſide, her head only raiſed on a pillow, her knees drawn up to her belly. The ſurgeon will then open the labia of the pudenda with the forefinger of his left hand, which he will paſs through the external orifice, to enlarge it a little, then taking a peſſary, of a proper ſize, anointed with lard, in his right hand, he will introduce it edgeways. When it is completely within the vagina, he will turn it, that it may lie horizontally, one face of it oppoſite to the os uteri, the other looking downward to the os externum.

The peſſary ſhould be ſo large as to paſs the os externum with difficulty, otherwiſe it will fall out again when the woman is on her legs. The hole in the centre ſhould be large, that if the os uteri ſhould enter it, it may not be ſtrangled, which might occaſion pain, and perhaps ſome ſerious miſchief.

PESSOMANTIA, Πεσσομαντεια, in *Antiquity*, the ſame with cleromancy.

PEST, or Pesth, in *Geography*, a royal and free town of Hungary, on the E. ſide of the Danube, oppoſite to Buda. See Buda.

PESTDON, a town of Pruſſia, in Pomerelia; 10 miles S. of Marienburg.

PESTERABLE, in our *Old Writers*, an epithet for ſuch wares as *peſter*, or take up much room in a ſhip. Stat. 32 Hen. VIII. cap. 14.

PEST-HOUSE, a lazaretto, or infirmary, where goods, perſons, &c. infected, or ſuſpected to be infected with ſome contagious diſeaſe, are diſpoſed, and provided for. See Lazaretto.

PESTI, in *Geography*, a town of Naples, in Principato Citra, ſituated near the ruins of the ancient *Pœſtum;* which ſee.

PESTICCIA, a town of Naples, in Baſilicata; 9 miles N. of Turſi.

PESTILENCE, formed from *peſtis*, which ſignifies the ſame, in *Medicine*, an epidemical, malignant, and contagious diſeaſe, uſually mortal, popularly known under the name of *plague;* which ſee.

Pestilence-*Wort*, in *Botany*. See Tussilago.

PESTILENTIAL Carbuncle. See Carbuncle.

Pestilential *Diſeaſes*. See Disease.

Pestilential *Fevers*, among *Phyſicians*, are ſuch as do not only afflict the patient with a vehement heat, but alſo with ſome malignant and venomous quality, and in ſome approach to the nature of the plague.

PESTIVIEN, in *Geography*, a town of France, in the department of the North coaſt; 9 miles S.S.W. of Guingamp.

PESTOVSKOI, a town of Ruſſia, in the government of Viatka, on the Suran; 48 miles N.N.E. of Slobodſkoi.

PESU, or Siu, a city of China, of the ſecond rank, in Kiang-nan, on the river Hoang. N. lat. 34° 10′. E. long. 117°.

PESVER, a town of Perſia, in the province of Irac; 60 miles W. of Kermanſha.

PESUNSCUT, a river of America, in Cumberland county, Maine, which purſuing a winding courſe of 20 miles, carries off the ſurplus water of Sebacook pond into Portland bay.

PETACCIATA, a town of Naples, in Abruzzo Citra; 22 miles S.E. of Civita Borella.

PETAGUIL, a territory of South America, in Brazil; bounded N. by Dale, E. by the South Atlantic ocean, S. by the captainſhip of Rio Grande, and W. by Tupuy: it contains mines of ſilver.

PETAJA, a town of Sweden, in Tavaſtland; 22 miles N. of Jamſio.

PETALIONS, a cluſter of ſmall iſlands in the Grecian archipelago, near the S.W. coaſt of the iſland of Negropont. N. lat. 37° 59′. E. long. 24° 16′.

PETALISM, Petalismus, πεταλισμος, in *Antiquity*, a kind of exile or baniſhment, for the term of five years.

The petaliſm at Syracuſe was nearly the ſame thing as the oſtraciſm at Athens, except that the latter was for ten years, and the former only for five.

The petaliſm was performed by the people's writing the name of the perſon condemned, on a leaf; whence the term from πεταλον, *leaf*.

PETALODES, πεταλιωδης, a name given to urine, when it ſeems to have little leaves, flakes, or ſcales in it.

PETALOMA, in *Botany*, a new Weſt Indian genus, eſtabliſhed by Swartz, and named by him, from πεταλον, *a petal*, and λωμα, *a border;* becauſe the petals are inſerted into the margin of the calyx, between its teeth. Swartz Prodr. 73. Ind. Occ. v. 2. 831. Schreb. 802. Willd. Sp. Pl. v. 2. 542. Mart. Mill. Dict. v. 3. (Mouriria; Juſſ. 320. Lamarck Illuſtr. t. 360. Mouriri; Aubl. Guian. v. 1. 452.)—Claſs and order, *Decandria Monogynia*. Nat. Ord. *Calycanthemæ*, Linn. *Onagræ*, Juſſ.

Gen. Ch. *Cal.* Perianth ſuperior, of one leaf, cup-ſhaped, permanent, with five acute, equal, ſlightly ſpreading teeth. *Cor.* Petals five, oblong, ſpreading, their claws inſerted between the teeth of the calyx, deciduous. *Stam.* Filaments ten, inſerted into the rim of the calyx, longer than the corolla; anthers oblong, incumbent, opening by two pores at one end. *Piſt.* Germen inferior, ovate; ſtyle elongated, awl-ſhaped; ſtigma ſimple, acute. *Peric.* Berry globoſe, fleſhy, crowned by the calyx, of one cell. *Seeds* from one to four, angular on one ſide, convex on the other.

Eſſ. Ch. Calyx pitcher-ſhaped, five-toothed. Petals five, inſerted between the teeth of the calyx. Stamens inſerted into its border. Berry of one cell.

1. P. *myrtilloides*. Sw. Ind. Occ. 833. Willd. n. 1. (Myrti folio arbor, cortice argenteo, foliis oblongis ad baſin latioribus, acuminatis, inodoris, ex adverſo ſitis, flore pentapetaloide pallide albicante; Sloane Jam. v. 2. 78. t. 187. f. 3.)—Stalks ſolitary, ſingle-flowered. Leaves nearly ſeſſile, ovate, taper-pointed, oblique at the baſe.—Native of Hiſpaniola and Jamaica, in low woods; being known in the laſt-mentioned iſland by the name of Silver wood. Swartz deſcribes it as a *ſhrub*, two or three feet high; Sloane ſays the *trunk* is twenty feet in height, ſtraight and undivided. Both agree that the *bark* is ſpotted with white, whence aroſe the Engliſh name. The *leaves* are oppoſite, entire, thin, ſmooth, and inodorous, one and a half or two inches long. *Flowers* axillary, ſolitary, rarely oppoſite, on ſhortiſh ſtalks, white, ſmaller than a currant bloſſom, but with long projecting *ſtamens* and *ſtyle*. *Berry* ovate, crowned with the *calyx*, black and ſhining when ripe, with ſeldom more than one *ſeed*. The aſpect of the whole plant is like ſome ſpecies of myrtle, but it wants the ſtrong taſte and ſmell of that genus, and the ſtructure of the *flowers* is totally different.

2. P. *Mouriri*. Sw. Ind. Occ. 835. Willd. n. 2. (Mouriri guianenſis; Aubl. Guian. v. 1. 453. t. 180.)—Stalks cluſtered. Leaves ſtalked, broad-ovate, pointed. Berries with four ſeeds—Native of woods in Guiana, near the river of Sinemari, where Aublet found it flowering in November, and bearing ripe fruit in January. The *trunk* of this tree is thirty or forty feet high, and eighteen inches in diameter, bearing at the top numerous *branches*, ſpreading in every direction. The *bark* is grey; the *wood* whitiſh, hard and cloſe-grained. *Leaves* longer, and much broader than thoſe of the foregoing, as well as of a firmer texture, paler underneath, but ſmooth and ſhining on both ſides. *Footſtalks* ſhort and thick. *Flower-ſtalks* axillary, cluſtered, and ſomewhat umbellate, with ſmall, oppoſite, acute *bracteas*. *Flowers* yellow. *Anthers* with a ſort of ſpur at their baſe. *Berry* yellow, minutely dotted with red, containing four *ſeeds*. Nothing is recorded of the qualities or uſe of this tree, but the inhabitants of the country where it grows name it *Mouririchira*.

PETALOSTEMUM, ſo called by Michaux, from πεταλον, *a petal*, and στημων, *a ſtamen*, on account of the union of thoſe two parts of the flower into a tube. Michaux Boreal-Amer. v. 2. 48. t. 37. See Dalea.

PETALUM, the petal, or leaf of the flower, πεταλον of the Greeks, is either ſimple, as in the Primroſe and Jaſmine, or compound, as in the Roſe. The two former are termed monopetalous flowers, the latter polypetalous. Linnæus obſerves, that when the nectary is a diſtinct organ from the petals, flowers ſo conſtructed are to be ſuſpected as poiſonous. Both together conſtitute the COROLLA; ſee that article, as well as NECTARIUM, and FECUNDATION *of Plants*.

PETAMINARIUS, in *Antiquity*, a name given to certain perſons who performed extraordinary feats of activity; took perilous leaps, vaults, &c.

The word is formed from the Greek, *πεταμαι*, *volo*, *I fly*. Some authors write it *petiminarius*: and derive it from *petimen*, which, according to Servius, ſignifies the hunch of a camel: alluding to the manner in which theſe operators bend the body, in exhibiting poſtures, &c.

PETAPA, in *Geography*, a town of Mexico, in the province of Culiacan, on a river of its own name; 120 miles N.W. of Culiacan. N. lat. 25° 30'. E. long. 104° 34'.

PETAPOLLY, a town of Hindooſtan, in the circar of Rajamundry; 26 miles N.E. of Rajamundry.

PETARD, in *War*, a kind of engine of metal, ſomewhat in ſhape of a high crowned hat, or truncated cone; ſerving to break down gates, barricades, draw-bridges, or the like works which are intended to be ſurpriſed.

The petard may be conſidered as a piece of ordnance, very ſhort, narrow at the breech, and wide at the muzzle, made of copper mixed with a little braſs; or of lead with tin; uſually about 8.5 inches within at the bottom; the diameter at the beginning of the round part is ſix, and diſtant from the lower baſe nine inches: the circular part is deſcribed from the point where the perpendicular to the ſides meets the middle line or axis; the thickneſs of metal is 1.6 inches; there is a brim at the bottom, that projects the metal by two inches, and is one inch thick, in which are ſix holes of half an inch diameter, which ſerve for ſcrews to faſten the petard on a board in a firm manner; there is a cavity within at the bottom, half an inch deep, and as much in height, to fix a board, in order to keep the charge in the petard before it is fixed to the board or plank. There are likewiſe two handles, of about three inches from the flat ring, five inches long, $\frac{7}{10}$ thick, and 1.8 from the outſide of the metal. Laſtly, a hole of an inch diameter is made either at the top, or on the ſide, to ſcrew in an iron fuſe, by which the powder is fired, which fuſe is filled with a ſlow compoſition, in order that when it is lighted, the petardier may have time to retire out of danger. See the ſection of a petard in *Plate* I. *Gunnery*, *fig.* 4.

In Groſe's "Military Antiquities," vol. i. we have a plate, with figures, repreſenting the petard, and the boards, &c. to which it is fixed, and alſo two different methods of applying it.

Petards are made of various dimenſions: but the biggeſt ſhould not weigh above ſeventy pounds when loaded and fixed to its plank, and the leaſt not leſs than forty-five or fifty. The common and beſt way of loading the petard is to fill it gradually with powder, and between every layer of two or three inches thick, to put a wooden mould into the petard, which ſhould be beat upon with a mallet, ſo as to preſs the powder as cloſe together as poſſible, without bruiſing the grains; and when it is quite full, the board is put upon the powder, and over this a cloth with roſin, and bound round the brim with packthread, to keep the charge and board together till the petard is ſcrewed on the plank or board, called the "madrier;" then the part that exceeds the brim is cut off, and the other being preſſed by the brim, prevents any air from coming to the powder. The board to which the petard is fixed has two iron bands on the back, placed croſs-ways, and a hook to hang it up againſt the gate or door, by means of a ſcrew, when it is to be uſed. Some moiſten the powder with ſpirits of wine, and dry it in the ſun, in order to make it ſtronger, and then ſprinkle every layer of powder of two inches in thickneſs with mercury, upon which they lay powder again, and preſs it down, ſprinkling it with mercury, till the petard is filled.

Its uſe is in a clandeſtine attack, to break down gates, bridges, barriers, &c. to which it is hung: which it does by means of the wooden plank. It has been alſo uſed in countermines, to break through the enemies galleries, and give vent to their mines; but in later years the uſe of petards has been diſcontinued.

Petards are ſometimes alſo made of wood, bound round with iron hoops.

The invention of petards is aſcribed to the French Huguenots, in the year 1579. Their moſt ſignal exploit was the taking of the city of Cahors by means of it, as we are told by d'Aubigne. In December 1641, Arundel caſtle was taken by the parliamentary forces, under ſir William Waller and Col. Browne, who coming unexpectedly, and finding the caſtle-gate ſhut, blew it open with a petard.

PETARDIER, in the *Military Art*, is he who loads, fixes, and fires the petard.

PETASITES, in *Botany*, πετασιτες of the Greeks, the Butter-bur, owes that name to its large round leaf, reſembling a very broad hat or umbrella, πετασος. See TUSSILAGO.

PETASUS, among the Romans, a covering for the head, not unlike our hats; it had a broad brim, and was uſed in journies, to ſave the face from being ſun-burnt.

The pileus differed from the petaſus, as having no brim.

The petaſus is obſerved upon the head of ancient figures of Mercury; who wore it in the quality of the god of travellers and merchants.

PETATLAN, in *Geography*, a town of Mexico, in the province of Culiacan, on a river of the ſame name, which runs into the Pacific ocean, N. lat. 25° 30'. The town is diſtant 120 miles N.W. from Culiacan. N. lat. 25° 30'. W. long. 104° 34'.—Alſo, a town of Mexico, in the province of Mechoacan; 70 miles S.E. of Zacatula. N. lat. 18°. W. long. 102° 6'.

PETAWONTAKAS, an Indian nation of America, formerly in alliance with the Hurons.

PE-TA-YANG, a ſmall iſland in the Chineſe ſea. N. lat. 26° 2'. E. long. 119° 49'.

PE-TCHE-LI, or PE-CHE-LEE, called alſo *Tcheli*, or *Li-pa-fou*, the principal province of China, which approaches to the form of a right-angled triangle, and is bounded on the N. by the great wall and part of Tartary, on the E. by the ſea of Corea, on the S. by the provinces of Chang-tong, and Ho-nan, and towards the W. by the mountains of Chan-ſi. It contains nine cities of the firſt claſs, with their reſpective juriſdictions, which comprehend a great number of other cities, leſs conſiderable, but all ſurrounded with walls and ditches. Cities of the firſt rank are diſtinguiſhed by the appellation *fou*; thoſe of the ſecond rank by *tcheou*; and thoſe of the third rank by *kien*. The capital of this province is Pekin; which ſee. Pe-tche-li is very much a level country, and has few mountains; and therefore it allows of the uſe of a ſingular kind of carriage, with one wheel, and conſtructed ſo that there is room in the middle for only one perſon, who ſits as if he were on horſeback; the driver puſhes behind, and by means of wooden levers, makes the carriage, which is a ſort of chariot, advance with ſafety and expedition. The ſoil of this province is ſandy, and produces very little rice; but all other kinds of grain are abundant, as well as moſt of the fruit-trees which we have in Europe. The rivers ſupply abundance of fiſh, and the mountains have mines of coal. The temperature does not ſeem to agree with its latitude. Although it extends no farther than to 42° N. lat., yet all the rivers are frozen, during four months in the year, from the middle of November to the middle of March, to ſuch a degree, that horſes and waggons, with the heavieſt load, may ſafely paſs over them. It is remarked, as a ſingular circumſtance, that the whole body of ice is formed in one day, and that ſeveral days are requiſite to thaw only the ſurface. The rainy ſeaſon occurs towards the end of July, and the beginning of Auguſt: there is little rain at any other time, but the night dew ſupplies the want of it. It is obſerved by Groſier that the people of this province have not the ſame aptitude for acquiring literature and ſcience, as thoſe who inhabit the ſouthern provinces of the empire; but they are more robuſt and warlike, and better fitted for enduring the hardſhips and fatigues of war. The ſame obſervation applies to the Chineſe of all the other northern countries. This province is diſtinguiſhed from all others, by being, as it were, the depot of the richeſt productions of the whole empire. According to the ſtatement of ſir George Staunton, in the appendix to the ſecond volume of the "Embaſſy to China," this province contains 58,949 ſquare miles, or 37,727,360 acres, and 38,000,000 of people. The revenue which it remits into the imperial treaſury at Pekin, amounts to 3,036,000 takels, or ounces of ſilver, *viz.* 2,520,000 land, 437,000 ſalt, and 79,000 other taxes.

PETCHORA, or Petshora, a river of Ruſſia, called alſo *Bolſkaia*, or great *Petchora*, by way of diſtinction from the Viſhera, which the Siryanes call Petſhoyra, whence originates the name, takes its riſe on the weſtern ſide of the Ural mountains, in the government of Vologda, follows a N.W. courſe, and falls into the Frozen ocean, in the government of Archangel, after dividing into ſeveral powerful arms. It now flows through a low, foreſty, and almoſt uninhabited country. At firſt, when Siberia was conquered, the way thither was generally by the Petchora. Thoſe who viſited that country, ſailed up the Duina, the Vichegda, and the Vim, then went a ſhort ſpace by land to the Petchora, then up that river, and by land over the Ural mountains to the Soſva; hence into the Tavda, the Tobol, the Irtyſh, the Oby, the Ket, and from the Ket into the Yeniſſey, &c.

PETECHIÆ, in *Medicine*, otherwiſe called *Peticulæ*, *Puncticula*, *Senticulæ*, &c., are ſmall purple, reddiſh, livid, or blackiſh ſpots upon the ſkin, occaſioned by the effuſion of a minute portion of blood under the cuticle, or ſcarf-ſkin. When theſe ſpots are very minute, like ſmall points, they are called *ſtigmata*; when they are large, and ſpread into broad irregular patches, like the effuſions occaſioned by a bruiſe, they are called *ecchymoſes* and *ecchymomata*; and when they occur in ſtripes, like the effects of the ſtrokes of a whip, they are denominated *vibices*.

Petechiæ occur under various circumſtances, but are moſt frequently ſeen in ſevere fevers, of a dangerous and malignant character, eſpecially in typhus, when it exiſts in gaols, hoſpitals, and the ill-ventilated habitations of the poor; they are occaſionally ſeen intermixed with the puſtules of ſmall-pox, eſpecially of the confluent kind, and with the worſt ſpecies of ſcarlet fever. Whence they have generally been accounted indications of great danger, and have been conſidered as ſigns of the general putreſcency of the circulating fluids, and as demanding the exhibition of the moſt powerful ſtimulants and antiſeptics, whenever they appear.

On the contrary, however, petechiæ of the largeſt dimenſions, and even extenſive ecchymoſes and vibices, together with actual hæmorrhages, are occaſionally ſeen, unaccompanied by fever, and ſometimes with but little derangement of the health. Whence authors have written of "Petechiæ ſine febre" as a diſtinct diſeaſe, which has been alſo called Purpura, Hæmorrhæa *Petechialis*, &c. See the former of theſe words, where this chronic petechial diſeaſe will be found deſcribed at length.

It is but too obvious, that the nature of theſe petechial ſpots is not yet ſufficiently underſtood: but ſome recent light has been thrown upon the ſubject by medical obſervers, which bids fair to lead both to a more ſatisfactory theory and practice in reſpect to them, as will be ſtated in the article juſt referred to.

PETECHIAL Fevers are thoſe varieties of typhus, in which petechiæ occur in conſiderable numbers, conſtituting one of the moſt prominent features of the diſeaſe. See Typhus and Fever.

PETELMA, in the *Turkiſh Military Orders*, is the procurator-general of the effects of the Janizaries. When any one dies under the protection of this body, he ſeals up their houſes, to ſecure the tenth part of their effects; which is due to the Janizaries.

PETER, Simon, in *Scripture Biography*, whoſe ſurname Cephas, or Petrus, Peter, ſignifies a ſtone or rock, was born at Bethſaida, upon the banks of the ſea of Galilee; and his occupation was that of a fiſherman upon this lake, as was alſo, in all probability, that of his father Jonas, Jonah, or John. He had a brother, whoſe name was Andrew, ſuppoſed by ſome writers to have been older, but more generally, younger than himſelf. Andrew, as we learn from the goſpel of St. John (ch. i. 35—42.), firſt introduced his brother, Peter, to an acquaintance with our Saviour; and as he had received Jeſus as the Meſſiah, Peter readily concurred in the ſame belief and profeſſion. From the teſtimony of John, by whom they had been probably baptized, and from perſonal converſation with our bleſſed Lord, they were convinced that he was the promiſed Meſſiah; and it is likely that from this time they had frequent intercourſe with him, and were witneſſes of ſome of the miracles which were wrought by him, and particularly of that performed at Cana in Galilee. (John, ii. 1. 2.) The call of Andrew and Peter to a ſtated attendance on Jeſus is recorded by three evangeliſts; after which event they became his intimate companions, and when he completed the number of his apoſtles, they were included among them. At the time of Simon Peter's being called to attend upon our Lord, he was married, and upon occaſion of that alliance, he ſeems to have removed from Bethſaida to Capernaum, where his wife's family reſided. It appears alſo, that when our Lord "left Nazareth, and came and dwelled at Capernaum" (ſee Matt. iv. 13.), he took up his occaſional reſidence in Peter's houſe, and hither the people reſorted to him in the evening, as we read in Luke, iv. 40. Matt. viii. 16. Mark, i. 32. 34. See alſo Matt. xvii. 24—27. In the evangelical hiſtory of this apoſtle, the diſtinguiſhing features of Peter's character are very ſignally pourtrayed; and it redounds in no ſmall degree to the credibility of the hiſtorians, that they have blended, without diſguiſe, ſeveral traces of his precipitance and preſumption with the honourable teſtimony which their narration of facts affords to the ſincerity of his attachment to Chriſt, and the fervour of his zeal in the cauſe of his bleſſed maſter. Of his modeſty and humility we have a memorable inſtance in the account which St. John has given of our Saviour's waſhing the feet of his diſciples (ch. xiii. 1—10.); and the ardour of his ſpirit is ſtrikingly evinced in his conduct towards the ſervant of the high prieſt, whom he ſmote with his ſword, and whoſe right ear he cut off, when the Jewiſh officers were about to apprehend our Lord. (John, xviii. 10, 11. Matt. xxvi. 51—54. Mark, xiv. 46, 47. Luke, xxii. 50, 51.) In the ſubſequent ſcene, however, his reſolution, notwithſtanding the vehemence with which he had avowed his invincible attachment to his maſter, and the caution which he had received, unhappily failed him. Although he followed his maſter afar off unto the high prieſt's palace, an anxious witneſs of the event, when the reſt of the diſciples forſook him and fled, he thrice diſowned him, peremptorily denying that he was one of his diſciples, or had any knowledge of him. This dereliction and denial of Chriſt, in circumſtances of peculiar trial, ſoon after humbled and grieved him, and he wept bitterly. It does not appear, that Peter followed our Lord any farther, or that he at all attended the crucifixion. It is likely, that he was too deeply affected with ſorrow and ſhame to appear in public, and that he choſe retirement, as moſt ſuitable to his preſent temper and circumſtances. In the ſequel of his hiſtory, our bleſſed Lord manifeſted, in the moſt amiable and impreſſive manner, the ſingular ſympathy and condeſcending benevolence of his temper; for he ſingles out Peter by name as one of the diſciples to whom the report of his reſurrection was to be announced; and on the ſame day on which he aroſe from the dead, he appeared to this apoſtle, though the circumſtances of this appearance are no where related. (See Luke, xxiv. 33, 34. 1 Cor. xv. 4, 5.) Hence it has been obſerved, to the honour of our Lord's philanthropy and compaſſion, that as Mary Magdalene was the firſt woman, ſo Peter was the firſt man to whom Jeſus ſhewed himſelf after he was riſen from the dead. On another occaſion, recorded in the 21ſt chapter of St. John's goſpel, our Lord affords Peter an opportunity of making a three-fold profeſſion of love for him; and notwithſtanding his late unſteadineſs, he encouraged this diſciple to hope, that in his future conduct he would ſet an example of reſolution and fortitude under great difficulties, and at length glorify God by his death, in the ſervice to which he had been appointed.

Dr. Lardner has ſelected from the four evangeliſts ſeveral particular inſtances, which ſerve to indicate the peculiar diſtinction of St. Peter, and that redound in no ſmall degree to his honour. He concludes this detail with obſerving, that as our ſacred hiſtorians were not envious, and that Peter was not aſſuming and arrogant among his brethren, ſo neither were they fond and partial. The ſeveral advantages and virtues of Peter are recorded by ſome only; but his fault in denying Chriſt, when under perſecution, is related by all.

Soon after our Lord's aſcenſion, Peter, who ſeems to have preſided in the college of the apoſtles, propoſed a ſucceſſor to Judas; and he ſeems to have had a primacy of order among the apoſtles, being named firſt when ſeveral of them are mentioned; although there is not the leaſt foundation, either in the goſpels, or the Acts, for aſcribing to Peter any juriſdiction over his brethren. On the day of the enſuing pentecoſt, Peter diſtinguiſhed himſelf by a diſcourſe delivered to a very numerous audience, in which he aſſerted the reſurrection of Chriſt, with ſuch commanding energy, that about 3000 were converted and baptized. (Acts, ii. 14—47.) On another occaſion he accompanied a miracle, wrought by himſelf and John, with an addreſs to the people, by which many were awakened and convinced; and in a ſhort time after this, the number of believers at Jeruſalem was about 5000. (Acts, iii. and iv. 4.) But the Jewiſh prieſts and rulers were much offended; and whilſt Peter and John were ſpeaking to the people, the officers, whom they had commiſſioned for this purpoſe, laid hold on them and put them in priſon till the next day, when they were examined, and at length diſmiſſed, with a ſtrict charge, enforced by a ſevere menace, not to preach any more in the name of Jeſus.

Peter and John, after a viſit to Samaria, returned to Jeruſalem; and in their way thither preached the goſpel in many villages of the Samaritans. (Acts, viii. 1—25.) During the tranquil ſtate of Judea, Galilee and Samaria, which commenced in the year 40, and continued a year or more, Peter paſſed through all parts of the country, availing himſelf of the opportunity that was thus afforded him of diſſeminating the knowledge of Chriſtianity, and confirming the faith of thoſe who had embraced it. Whilſt on this peregrination he remained at Joppa, where he reſtored to life a Chriſtian woman of excellent character, named Tabitha, and where a meſſage was ſent to him from Cornelius, an inhabitant of Cæſarea, by the ſea-ſide, which was a city where the Roman governor reſided, requeſting a viſit from him, for the purpoſe of farther inſtruction on the ſubject of religion. At Cæſarea his preaching was attended with ſignal ſucceſs; and thus the door of faith, or the kingdom of heaven, or of the Meſſiah, was opened to Gentiles, and they were received into the church of God. Upon his return to Jeruſalem, he gave an account to the Jewiſh Chriſtians of the event of his miſſion, and ſatisfied them with regard to the propriety of his conduct in preaching the goſpel to the uncircumciſed Gentiles, and receiving them into communion by baptiſm without circumciſion according to the law of Moſes. From this time the goſpel was freely preached to Gentiles as well as Jews, and the ſucceſs correſponded to the zeal of thoſe who were engaged in this intereſting cauſe. Soon after the converſion of Cornelius the tranquillity of the churches was interrupted; nevertheleſs Peter, and the other apoſtles, ſtill continued in Judea; and as far as circumſtances allowed, employed themſelves in confirming the believers and making additions to their number. Towards the end of his reign, Herod Agrippa became an open perſecutor of the believers; and not only put to death James the brother of John, but committed Peter to priſon. This was at the Eaſter, or paſſover, of the year 44. After a miraculous deliverance from confinement, he lived privately at Jeruſalem, till the death of Herod Agrippa, which happened before the end of that year. Some have thought that Peter now went to Antioch, or Rome; but Dr. Lardner thinks that there is no good evidence of either of theſe opinions. When the council of Jeruſalem was aſſembled in the year 49 or 50, Peter was preſent, and in the debate, which had occaſioned this aſſembly, he clearly declared his opinion, that *the yoke of the law ſhould not be laid upon the neck of the diſciples* from among the Gentiles. Some ſhort time after this council, Peter was at Antioch; where at firſt he converſed freely with the Gentile converts; but when ſome Jewiſh believers, who were zealous for the law, came thither from Judea, *he ſeparated himſelf, fearing them of the circumciſion;* thus acting in a manner contrary to his own judgment and declared opinion, through fear of the diſpleaſure of others. St. Paul reſented his conduct, as chargeable with diſſimulation or hypocriſy; and convinced him that he was blameable. It was at this time, *viz.* in the year 50, that Peter firſt went from Judea into Gentile countries, never more deviating into that duplicity, for which he had been juſtly cenſured, but maintaining a firm and conſiſtent conduct. This is the laſt time that Peter is expreſsly mentioned in the New Teſtament,

ment, except in his own epiſtles, and in 1 Cor. i. 12. and ch. iii. 22.

We have no where any very diſtinct account of this apoſtle's travels. From Antioch he might return to Judea. Epiphanius ſays, that he was often in the countries of Pontus and Bithynia; and Origen, according to Euſebius, expreſsly declares, that "Peter is ſuppoſed to have preached to the Jews of the diſperſion in Pontus, Galatia, Bithynia, Cappadocia, and Aſia: who, at length, coming to Rome, was crucified with his head downwards, himſelf having deſired it might be in that manner." As to the time of Peter's coming to Rome, no ancient writer is more regarded by learned moderns than Lactantius, or the author of the book of the Deaths of Perſecutors, whoever he be; and this author ſays, that Peter came thither in the time of Nero. But allowing that he came to Rome in the reign of Nero which began in the year of Chriſt 54, the preciſe time is not aſcertained. To Dr. Lardner it appears very probable, that St. Peter did not come to Rome before the year of Chriſt 63 or 64, nor till after St. Paul's departure thence, at the end of his two years' impriſonment in that city: and this author, who is no leſs induſtrious in his reſearches than impartial in his reports, ſuppoſes, that he obtained the crown of martyrdom in the year 64 or 65; conſequently St. Peter could not have reſided very long at Rome before his death. The learned Cave is of opinion that the apoſtle died a martyr at Rome in the year of Chriſt 64, at the beginning of Nero's perſecution. Jerom concludes his article of St. Peter, with ſaying, "He was buried at Rome in the Vatican, near the triumphal way, and is in veneration all over the world." Caius alſo, about the year 212, ſpeaks of the tombs of the two apoſtles, Peter and Paul, at Rome; and Chryſoſtom ſuppoſes St. Peter to have been buried in that city. Some have aſſerted, but without ſufficient authority, that he travelled into Perſia or Parthia. Several other circumſtances are mentioned with regard to St. Peter, which are equally deſtitute of foundation: ſuch as his epiſcopate at Antioch, and his having been twenty-five years biſhop of Rome, which is altogether inconſiſtent with his hiſtory in the Acts. Several ancient writers mention his having children, and the martyrdom of his wife about the ſame time with himſelf. Some have alſo ſaid that he eſcaped from priſon, and endeavoured to ſave his life by flight; but that in paſſing through the gates of the city, he ſaw Chriſt entering into it; and that in conſequence of this interview, and a converſation that occurred, he turned back, and being ſoon after taken up, he was crucified. But this account ſeems to have been fabulous. As to the manner of his crucifixion, we have already given Origen's account of it. St. Jerom alſo ſays "that he was crucified by order of Nero, and ſo crowned with martyrdom, his head downward, and his feet lifted up, ſaying, he was unworthy to be crucified as his maſter was." Chryſoſtom alſo ſeveral times ſpeaks of Peter's being crucified with his head downwards. It ſeems to me, ſays Dr. Lardner, that Peter might be crucified in that manner, and that it might be owing to the ſpite and malice of thoſe who put him to death. The ſaying, that it was at his own deſire, may have been at firſt only the oratorical flight of ſome man of more wit than judgment. But the thought was pleaſing, and has therefore been followed by many.

We may add, that ſome learned men have denied that Peter ever was at Rome; among them are Scaliger, Salmaſius, and Frederick Spanheim. Mr. Bower has adopted this opinion. However, many learned men, among the Proteſtants, as well as Romaniſts, whoſe impartiality has never been queſtioned, have believed and argued that Peter was at Rome, and ſuffered martyrdom there. To this claſs we may refer Cave, Pearſon, Le Clerc, Baſnage, Barratier, and Lardner. Among the ancient writers, who teſtify to the ſame fact, we may enumerate Clement of Rome, in his epiſtle to the Corinthians, written before the year of Chriſt 70, or, as ſome think, about the year 96, Ignatius about 108, Dionyſius about 170, Irenæus about 178, Clement of Alexandria about 194, Tertullian about 200, Caius about 212, Origen about 230, Cyprian about 248, Lactantius about 306, Euſebius, Athanaſius, Ephrem the Syrian about 370, Epiphanius, Jerom, Chryſoſtom, Sulpicius Severus about 401, Prudentius about 405, Oroſius about 416, Theodoret about 423, Auguſtine, &c. &c. The preaching of Peter, or of Peter and Paul, quoted by ſeveral ancient writers, though not as a book of authority, compoſed about the middle of the ſecond century, or ſooner, makes mention of Peter's being at Rome.

For an account of the epiſtles of St. Peter, we refer to the articles Epistle and Canon, adding here ſome particulars reſpecting their genuineneſs. The firſt of theſe two epiſtles has been always received by Catholic Chriſtians as authentic and genuine. This epiſtle ſeems to be referred to by Clement of Rome; is plainly referred to ſeveral times by Polycarp; alſo referred to by the martyrs at Lyons: it was received by Theophilus, biſhop of Antioch, and quoted by Papias, Irenæus, Clement of Alexandria, and Tertullian. But the ſecond epiſtle, mentioned as doubtful by Jerom and Origen, is not cited by Papias, Irenæus, Tertullian, or Cyprian. However both theſe epiſtles were generally received in the 4th, and following centuries, by all Chriſtians, except the Syrians. For they were received by Athanaſius, Cyril of Jeruſalem, the council of Laodicea, Epiphanius, Jerom, Ruffin, Auguſtine, and others. Such are the teſtimonies of ancient writers concerning theſe two epiſtles; and if we conſult the epiſtles themſelves, and endeavour to form a judgment by internal evidence, it will appear very probable that both belong to the ſame author. Allowing the firſt to be St. Peter's, the following arguments may be alleged in favour of the other. It bears in the inſcription the name of the ſame apoſtle. From chap. i. 16, 17, 18, it appears, that the writer was one of the diſciples who were with Jeſus in the mount at the time of our Lord's transfiguration, which leads us to St. Peter, who was there.

In ch. iii. 1. there is an expreſs reference to the former epiſtle, which has been always acknowledged to be St. Peter's. (See alſo ch. i. 12—15.) In ch. iii. 15, 16, the writer calls Paul brother, and otherwiſe ſo ſpeaks of him and his epiſtles, as muſt neceſſarily be reckoned moſt ſuitable to an apoſtle. The writer therefore is the apoſtle Peter, whoſe name the epiſtle bears in the inſcription. The opinion advanced by Grotius, that this ſecond epiſtle was written by Simeon, biſhop of Jeruſalem, after James, the Lord's brother, is deſtitute of all authority from antiquity, and is inconſiſtent with the whole tenour of the epiſtle itſelf, or at leaſt with many things that occur in it. Jerom, already cited, ſays that Peter wrote two epiſtles, called Catholic; the ſecond of which was by many denied to be his, becauſe of its differing in ſtyle from the former. But Baſnage ſays, he is not able to diſcern ſuch difference of ſtyle in the two epiſtles. However Dr. Sherlock, biſhop of London, in his "Diſſertation concerning the Authority of the Second Epiſtle of St. Peter," obſerves, that the firſt and third of the three chapters, into which this epiſtle is now divided, agree in ſtyle with the firſt epiſtle. The only difference is in the ſecond chapter, the ſtyle of which is no more like to that of the other two than it is to that of the firſt epiſtle. The occaſion of this difference ſeems to be, that in the ſecond chapter there is a deſcription of the falſe prophets and teachers, who infeſted the church, and perverted the doctrines of the goſpel. Some ancient Jewiſh writer had left behind him a deſcription of the falſe prophets of his own, or perhaps earlier times; which deſcription is applied both by St. Peter and St. Jude to the falſe teachers of their own times. His lordſhip adds, St. Jerom ſuppoſed, and others have followed his opinion, that St. Peter made uſe of different interpreters, to expreſs his ſenſe in his two epiſtles. But if that had been the caſe, the difference of ſtyle would have appeared in the whole, and not in one part of it only; which is the preſent caſe: and he ſees no reaſon for thinking, that St. Peter did not write both his epiſtles himſelf. Some, however, may think, that this difference of ſtyle ariſes from the ſubject treated of in the ſecond chapter. Dr. Lardner concludes, upon the whole, that the two epiſtles, generally aſcribed to the apoſtle Peter, were indeed his. Theſe epiſtles were ſent to all Chriſtians in general, both Jews and Gentiles, living in Pontus, Galatia, Cappadocia, Aſia and Bithynia, but chiefly thoſe of Gentile ſtock and original: who were for the moſt part the converts of the apoſtle Paul.

There has been a conſiderable difference of opinion concerning the place where theſe epiſtles were written: and more eſpecially about the place called Babylon, at the cloſe of the firſt epiſtle. Some have thought this to have been Babylon in Aſſyria, or Babylon in Egypt, and others interpreting the paſſage figuratively, ſuppoſe that it denoted Jeruſalem or Rome. It is the opinion of Grotius, Whitby, Valeſius, and all the learned writers of the Roman communion in general, that by Babylon St. Peter figuratively means Rome; and this opinion is the more probable, as it is uncertain whether St. Peter ever was at Babylon in Chaldæa, or in Egypt, and altogether improbable, that he made any conſiderable ſtay there, if he ever viſited either of theſe places. As to the time of writing theſe epiſtles, Dr. Lardner thinks it to have been the year 63 or 64, or at the lateſt 65. Lardner's Works, vol. vi.

Peter, in *Biography*, a ſaint in the Roman calendar, and one of the moſt illuſtrious prelates of his time, was educated, and probably born, at Alexandria. Here he acquired a high character for his proficiency in ſacred literature, and alſo for his exemplary manners and diſtinguiſhed piety. On the death of Theonas, in the year 300, he was choſen his ſucceſſor, and according to Euſebius he obtained great honour during his epiſcopate, which laſted twelve years. He was an excellent teacher of the Chriſtian doctrine: an ornament to the epiſcopal character, both for the holineſs of his life, and his laborious application in ſtudying and explaining the ſacred ſcriptures. He governed the church three years before the perſecution. The reſt of his time he paſſed in a more ſtrict and mortified courſe of life, but without neglecting the common good of the churches. It is probable, that during a conſiderable part of that diſtreſſing period he reſided in ſome private place, unknown to the inſtruments of perſecution, where, however, the Chriſtians had acceſs to him, and received his advice and inſtructions. After this, according to Euſebius, he was, without any crime, of any kind, being laid to his charge, on a ſudden, for no other reaſon but the will of Maximin, taken into cuſtody, and beheaded. This martyrdom took place in the year 311. He is the reputed author of “A Book of Penance,” of which thirteen canons are inſerted, in Greek and Latin, in the firſt volume of the Collect. Concil. Some fragments of another treatiſe attributed to him “Concerning the Divinity,” are to be met with in the third and fourth volumes of the ſame collection. Gen. Biog.

Peter, ſurnamed *Chryſologus*, a ſaint in the Roman calendar, and a celebrated prelate in the fifth century, was of noble extraction, and born at Imola, anciently known by the name of Forum Cornelii. He was educated by Cornelius, biſhop of his native city, who admitted him into holy orders, and appointed him to the office of his deacon, which he retained many years. He was elected biſhop of Ravenna in the year 433, and died before 451. His eloquence was greatly admired, whence he had the ſurname of Chryſologus, or the golden preacher. What remains of his productions conſiſt chiefly of “Sermons,” or “Homilies,” containing ſhort explanations of portions of the ſacred ſcriptures, accompanied with moral reflections. They are ſaid to be drawn up in a perſpicuous and pleaſing ſtyle; and are diſtinguiſhed by a happy union of conciſeneſs and elegance. They were collected 250 years after his death, by Felix, one of his ſucceſſors in the ſee of Ravenna, and were firſt printed at Cologn, in the year 1541. Afterwards they underwent repeated impreſſions at the ſame place, Antwerp, Paris, Lyons, Venice, and Bologna, and were inſerted in the ſeventh volume of the Bibl. Patr. Six others, on the Lord's Prayer, are gived by Father A'Achery, in his “Spicilegium.” There is alſo ſtill extant “A Letter to Eutyches the Archimandrite,” from our prelate, in which he declares againſt the ſentiments of that monk, and expreſſes his approbation of the conduct of the patriarch Flavianus. Moreri.

Peter, ſurnamed the *Cruel*, king of Caſtile, was the only legitimate ſon left by Alphonſo XI., whom at the age of ſixteen he ſucceeded in 1350. He was at firſt under the influence of his mother and Don Juan de Albuquerque, her favourite; and to the queen dowager is to be attributed the treacherous execution of Leonora de Guzman, the late king's miſtreſs, by whom he had three ſons. Peter, at an early period, diſplayed a diſpoſition equally perfidious and ſanguinary. He cauſed the objects of his diſpleaſure to be murdered without trial, and ſcrupled no means to get into his power thoſe whom he feared or ſuſpected. In 1352 Albuquerque, with a view of confirming his own authority, introduced the young king to the Maria de Padilla, of whom he became ſo much enamoured, that her influence over him was attributed even to witchcraft. At the ſame time a marriage was negociating for him with Blanca, daughter of the duke of Bourbon. It took place in 1353, but he remained with his bride only three days, and then returned to his miſtreſs. Soon after he put his wife in priſon, and then divorced her, in order that he might marry Joanna de Caſtro, whom he alſo abandoned, after a very ſhort cohabitation. Donna Blanca was ſent to Toledo, the citizens of which revolted in her favour, but they paid dearly for their attachment to a much injured lady. In 1356 a trifling quarrel produced a war between him and Peter king of Arragon, in which the king's natural brother, Henry de Traſtamare, who had, to avoid danger, retired into France, had a command under the latter ſovereign. His wife, who was left in the power of Peter, was fortunately reſcued from his vengeance. This eſcape ſo much excited his rage and ſuſpicion, that he cauſed another natural brother, Frederic, to be murdered in his preſence, and ſhewed his ſavage diſpoſition by dining in the ſame apartment before the dead body was removed. He afterwards put to death his couſin, Juan of Arragon, and poiſoned his widow, and his own aunt the queen-dowager of Arragon. His cruelties having driven many of the diſaffected nobles to take refuge in Portugal, he entered into a negociation with the king of that country, alſo called Peter the Cruel, to deliver them up, upon condition that, on his part, he ſhould deliver up thoſe Portugueſe who had been concerned in the death of Agnes de Caſtro. This was punctually performed on both ſides, and was the cauſe of many bloody executions. In 1361 he completed the meaſure of his domeſtic cruelties by the murder of his firſt queen, Donna Blanca, then confined in the fortreſs of Xeres. A ſhort time after this he perfidiouſly put to death the Mooriſh prince of Grenada, Mahomet Barbaroſſa, with all his ſuite, who had attended on him at Seville, on the ſecurity of a ſafe conduct. His enormities at laſt produced a confederacy againſt him between the kings of Arragon and Navarre, and Henry de Traſtamare, at the head of the emigrant Caſtilian nobility. Peter had, by no means, been deficient in vigour or ſucceſs in carrying on the war againſt the king of Arragon, and his depoſition was therefore much deſired by that monarch, who, in fact, was nearly as perfidious and ſanguinary as himſelf. A band of mercenaries, ready to fight in any cauſe, was brought out of France, under the command of Bertrand de Gueſclin, and others; and Henry entering Caſtile was admitted into Calahorra, and proclaimed king. Advancing to Burgos, he received the homage of the nobles of Caſtile, and was ſolemnly inaugurated; while Peter retired to Portugal, and thence to Guienne, to the court of Edward the Black Prince. The treaſures which he carried with him made him welcome to the prince and his barons, and the offer of Biſcay, together, probably, with the notion of the duty of aſſiſting the rightful ſovereign, induced the gallant Edward to undertake his reſtoration. This he effected by an entire defeat which he gave to Henry and his party at the battle of Najara, in 1367. Peter would gladly have put to death his natural brother Sancho, and all his priſoners on this occaſion, but was reſtrained by the humanity of the prince of Wales. He now paid no ſort of regard to his promiſe of recompence to his victorious allies, and after reſuming his crown, he indulged the ſeverity of his nature by numerous ſavage executions.

Henry was not, however, diſheartened by his misfortunes, but, after the departure of the Engliſh, collected his forces and engaged again the aſſiſtance of du Gueſclin, and his men at arms. He entered Spain, and advanced to the plains of Monteil, where he met Peter at the head of a more numerous army, but compoſed of a very motly aſſemblage, there being among them many Jews and Moors. A battle enſued, in which Peter was completely defeated, and he was forced to take refuge in Monteil. He was, for want of proviſions, ſoon obliged to quit this place, which he did at midnight with eleven companions, but was ſtopped and carried to the tent of his captor. His brother Henry, informed of the fact, arriving, words of reproach paſſed between them, and Peter caught Henry in his arms, threw him on the ground, and attempted to kill him. In the ſtruggle, Henry was aſſiſted by his attendants, and they diſpatched the cruel Peter with their poniards. This happened in the year 1369, when he was only in the 36th year of his age, and in the 19th of his reign. He left a name juſtly execrated, though it is not unlikely that his crimes have been exaggerated, and it is quite certain that ſeveral of his contemporaries deſerved the opprobrious title as well, and nearly as much as himſelf. Univer. Hiſt.

Peter *of Sicily*, ſo called from the iſland which gave him birth, was a man of noble deſcent, who flouriſhed at the cloſe of the ninth century. He was taken into the ſervice of the emperor Baſil, who, in the year 870, ſent him into Armenia for the purpoſe of negociating an exchange of priſoners. This buſineſs, which he performed to the ſatisfaction of the emperor, having occaſioned him to ſpend nearly nine months at Tibrica, the capital of Armenia, he embraced ſeveral opportunities of holding conferences with the Paulicians, a branch of the Manichæans, who were numerous in that country, and undertook the taſk of drawing up in Greek "A Hiſtory of the Riſe and Progreſs, and Decline of that Sect." The work to which he gave this title was dedicated by him to an archbiſhop of Bulgaria. Part of it was tranſlated into Latin, and inſerted by cardinal Baronius in his "Annals." It was afterwards publiſhed with the original, under the title of "Hiſtoria de varia et Stolida Manichæorum Hæreſi." This work is an object of curioſity, as it preſents us with a view of the ſentiments of the Paulicians at the time in which Peter lived.

Peter *of Blois*, a learned French eccleſiaſtic in the 12th century, was a native of the city on the Loire, whence he derived his ſurname. Having been inſtructed in the claſſics and polite learning at Paris, he went to the univerſity of Bologna, where he acquired great reputation by the proficiency which he made in the ſtudy of civil and canon law, and the various branches of profane literature. He then returned to France and devoted himſelf wholly to the ſtudy of divinity, under the celebrated John of Saliſbury, biſhop of Chartres, of whoſe church it ſeems probable that he was made a canon. In 1167 he travelled into Sicily with Stephen, ſon of the count of Perche, and couſin to the queen of that iſland, where he was appointed tutor, and afterwards ſecretary to William II. king of Sicily. When Stephen, who had been made chancellor of the kingdom, and archbiſhop of Palermo, was ſent into baniſhment, Peter was involved in his fortune, and found it neceſſary to take refuge in his native country. Hence he was invited into England by king Henry II., at whoſe court he continued ſome time, and was nominated archdeacon of Bath. He next entered into the ſervice of Richard archbiſhop of Canterbury, who appointed him his chancellor, and ſent him to negociate buſineſs of importance relating to the metropolitan ſee with king Henry II., and popes Alexander III. and Urban III.

After the death of king Henry, he reſided for a time at the court of queen Eleanor. At a late period of his life he was deprived of his archdeaconry of Bath, though he was afterwards compenſated for his loſs by obtaining that of London, the duties of which he diſcharged with the utmoſt fidelity. He died in England in the year 1200. He is ſaid to have been the firſt perſon who made uſe of the word *Tranſubſtantiation*, to expreſs the doctrine of the Catholic church on the ſubject of the euchariſt. His remains chiefly conſiſt of "Letters," 183 in number, which he formed into a collection by order of king Henry II., and which will be found uſeful in illuſtrating the civil and eccleſiaſtical hiſtory of the period in which he flouriſhed. Moreri.

Peter, ſurnamed *Comeſtor*, or the Eater, another French eccleſiaſtic, was a native of Troyes in Champagne. Having embraced the clerical profeſſion, he became canon, and afterwards dean of the cathedral in that city. Here he acquired ſuch celebrity, that he was invited to Paris, where he was appointed dean of the metropolitan church. Some time after this, he reſigned his benefices, renounced the world, and entered among the canons regular of St. Victor, at Paris, where he gave himſelf up entirely to ſtudy and devotion. He died in 1198. He was eſteemed a man of learning for the age in which he lived, and he had the fortitude publicly to condemn ſome of the abuſes and corruptions of the Romiſh church, particularly the celibacy of the clergy.

The following epitaph upon his tomb has been thought not unworthy of preſervation.

> " *Petrus* eram, quem Petra tegit, dictuſque *Comeſtor*
> Nunc comedor. Vivus docui, nec ceſſo docere
> Mortuus; ut dicant, qui me vident incineratum,
> Quod ſumus, iſte fuit, erimus quandoque quod hic eſt."

He was author of "Hiſtoriæ Eccleſiaſticæ, lib. xvi.," containing a ſummary of ſacred hiſtory, from the beginning of Geneſis to the end of the Acts of the Apoſtles. To his pen has been attributed a work entitled "Catena Temporum," &c. conſiſting of a compilation of univerſal hiſtory, publiſhed at Lubeck in 1475, in two vols. folio, of which a tranſlation into French was publiſhed in 1488, under the title of "Mer des Hiſtoires."

PETER NOLASQUE, a ſaint of the Roman calendar, was founder of the order for the redemption of captives, commonly called *the order of* MERCY; which ſee. He was of noble deſcent, and born about the year 1189. Having loſt his father when he was only fifteen years of age, he attached himſelf to Simon, count de Montfort, who placed him in the ſervice of James, king of Arragon. By his talents and virtues, he recommended himſelf to the favour of that prince, a circumſtance of conſiderable importance to him when he afterwards undertook the foundation of his order. The firſt deſign of it was ſuggeſted to him by a private ſociety of gentlemen at Barcelona, who made a common purſe for the expreſs purpoſe of redeeming Chriſtian captives, and relieving the ſick. Struck with the generoſity of their undertaking, he meditated a plan for converting this private ſociety into a religious and military order. He laid his plan before the king, who ſanctioned it with his approbation, and the order was eſtabliſhed in 1123, under the title of "The Confraternity of Mercy;" at firſt it conſiſted of ſix prieſts and ſeven laymen, who, beſides the cuſtomary vows, bound themſelves to devote their perſonal exertions to the taſk of redeeming captives from Mahometan ſlavery. Peter Nolaſque was appointed the firſt ſuperior-general; but this office did not exempt him from engaging in the common duties of the ſociety. He is ſaid to have been ſo ſucceſsful in his two firſt expeditions into the kingdoms of Valentia and Grenada, as to redeem upwards of four hundred captives from their moſt oppreſſive bondage. He afterwards paſſed over into Africa, where he met with much ill treatment, while employed in zealouſly purſuing the object of his benevolent miſſion. In 1249 he reſigned the office of ſuperior-general, and he died in 1256. Peter Nolaſque was canonized by pope Urban VIII. in 1628. Several houſes of his order have been founded in France and other countries; but its principal eſtabliſhments have always been in Spain. Moreri.

PETER, the Hermit, a celebrated perſon, to whom we have frequently, in the courſe of our volumes, referred, was born in the 11th century at Amiens, in Picardy. He entered into the army, and ſerved under the counts of Bologne, but having imbibed the holy zeal of the age, he quitted the world, and devoted himſelf to a life of religious ſolitude and auſterity. About the year 1095 he made a pilgrimage to Jeruſalem, then in the hands of the Turks, and was deeply impreſſed with the oppreſſions ſuſtained by the Chriſtian inhabitants, and the viſitors of that memorable city. In the warmth of his emotions, he promiſed the Greek patriarch to uſe his endeavours to rouſe the weſtern nations to arms in his behalf; and, upon his return, he waited upon pope Urban II. with letters from the prelate. The appearance of Peter was mean, his ſtature ſmall, his body meagre, his countenance ſhrivelled, but he had a keen and lively eye, and a ready eloquence. The pope received him as one who had a call from heaven, and encouraged him to proceed in his deſign; and Peter immediately ſet out on his travels as a miſſionary through the provinces of Italy and France. He rode on an aſs, his head and feet being naked, and bearing a weighty crucifix; he prayed frequently, fed on bread and water, gave away in alms all that he had received, and by his ſaintly demeanour, and fervid addreſs, drew innumerable crowds of all ranks to liſten to his preaching. When he painted the indignities offered to the true believers at the birth-place and ſepulchre of their Saviour, every heart was melted to compaſſion, and animated to revenge. His ſucceſs in raiſing recruits for the holy war, was ſuch as might have been expected from the rude enthuſiaſm and martial ſpirit of the age. (See CROISADE and GODFREY.) Collecting above 60,000 perſons of both ſexes, and of the loweſt ranks in life, from the borders of France and Lorraine, he proceeded with them along the banks of the Rhine and Danube. The progreſs was marked by pillage and diſorders of all kinds, and by the maſſacre of all the Jews that came in their way. As they approached the confines of Hungary and Bulgaria, the fierce natives of thoſe countries aroſe upon them, and cut them off in ſuch numbers, that only a third part, with Peter himſelf, eſcaped into Conſtantinople. Almoſt all theſe were afterwards ſlain by the Turks in the plain of Nice, while Peter had prudently withdrawn from the camp, and remained in the Greek capital. He was, after this, in 1097, at the ſiege of Antioch, but his ardour was conſiderably cooled, and he would gladly have made his eſcape, but Tancred cauſed him to ſwear that he would never deſert an expedition of which he had been the prime mover. He afterwards diſtinguiſhed himſelf at the ſiege of Jeruſalem, and has been celebrated in the verſe of Taſſo. After the capture of that city, he was appointed by the patriarch, during his abſence in Godfrey's army, to act as his vicar-general. Peter died at the abbey of Neumoutier, near Huy, of which place he was the founder. Gibbon, vol. xi.

PETER I. ſtyled the Great, emperor of Ruſſia, was the third ſon of the czar Alexis Michaelovitch. He was born at Moſcow in the year 1672, and on the death of his eldeſt brother, in 1682, he was nominated to the ſucceſſion, in excluſion of his other brother Iwan, who was ſet aſide on account of incapacity. Shortly after, a terrible mutiny of the guards, fomented ſecretly by the princeſs Sophia, the adult ſiſter of Iwan and Peter, effected a revolution at court, and the two princes were nominated joint czars, under the tutelage of Sophia. Iwan was a mere cypher, but Peter early diſplayed a ſpirit which ſhewed that he was not formed to be under controul. His education was much neglected, and early habits of intemperance inflamed the violence of his temper, and augmented a diſpoſition to convulſive or epileptic fits. It was not long before he attempted to put himſelf beyond the influence of Sophia; he married againſt her will, in his 18th year, and claimed a ſeat at the council board, from which ſhe procured his excluſion, and an open rupture was the conſequence. Peter took the bold reſolution of arreſting and impriſoning his ſiſter, who, on her part, is ſaid to have formed a conſpiracy againſt her brother's life, or, at leaſt, againſt his liberty. Peter prevailed, confined his ſiſter to a nunnery for life, and aſſumed the reins of government in 1689. Although he had given way to the ſenſuality natural to a young prince in a rude and diſſolute court, yet he appears early to have had juſt ideas of theſe ſtate reforms, of which former ſovereigns in Ruſſia, and eſpecially his father, had given ſome examples. He had been employed in training a ſmall body of troops in the German or foreign diſcipline, and he now began to diſplay that attachment to maritime affairs which afterwards ſo much diſtinguiſhed his reign. His great fondneſs for navigation is dated from the year 1691, when accidentally taking notice of a decayed ſloop near Moſcow, and being informed that it was of foreign conſtruction, and built to go againſt the wind, he cauſed it to be repaired by a Dutch ſhipwright, whom his father had invited into Ruſſia, and was highly pleaſed by obſerving its manœuvres. He ſoon learnt to manage it himſelf, and afterwards had ſeveral ſmall veſſels built, with which he made excurſions on the lake of Periſlaf. The paſſion for ſailing gained ſo much upon him, that in 1693 he went to Archangel, and took a ſhort voyage on the White ſea, attended by all the merchant-ſhips in that harbour, and in the following year he ſpent ſeveral months in ſimilar expeditions.

A quarrel with the Turks, in 1694, opened to the czar views of aggrandizement on the Black ſea, and in the following year an army was marched to lay ſiege to Azof. He was with it in perſon, but only in the capacity of a volunteer, for he was fully ſenſible of the neceſſity of inſtruction as a preliminary to command. The failure of the firſt attempt to reduce the place, through want of ſhips to block up the harbour, coincided with his paſſion for navigation in ſtimulating him to create a fleet. He immediately gave orders for the equipment of a flotilla; which was effected with ſo much celerity, that during the next ſummer his ſquadron appeared before Azof, defeated the Turkiſh gallies ſtationed there, and the town ſurrendered. Of this conqueſt he was very proud, and cauſed his army to make a triumphal entry into Moſcow, in which his generals and admiral took the precedence over himſelf, as well as over his principal nobility. In the mean time he had left orders for a large addition to his fleet on the Black ſea, in which were included ſeveral ſixty-gun ſhips. His brother Iwan dying about this time, he became in title, as well as in effect, ſole ſovereign of Ruſſia. But as his mind expanded, he was rendered more ſenſible of the barbariſm of this vaſt empire, and of his own deficiency in knowledge to improve and civilize it. The firſt plan that ſuggeſted itſelf was to ſend abroad a number of the young nobility, in order that they might learn, in various countries, the arts which he thought eſſential to the ſtate, eſpecially naval and military tactics. His own improvement was what he had moſt at heart, and he was reſolved to purſue it by foreign travel, and a continued reſidence in thoſe countries which he thought likely to afford that kind of knowledge of which he chiefly ſtood in need. He was not at preſent ſufficiently enlightened to make a proper eſtimate of the relative value to a ſovereign of different branches of knowledge, and his paſſion for maritime affairs took too great a lead in marking out his objects. It was, however, an intereſting and extraordinary circumſtance in the hiſtory of the world, that the deſpotic monarch of a mighty dominion ſhould deſcend from his throne, and travel in the train of his own ambaſſadors as a private perſon, rejecting all the pageantry of ſtate, and diſdaining no means which appeared neceſſary to perfect himſelf in thoſe arts which he thought of eſſential importance to his country. He ſet out on his travels in 1697, and the firſt country in which he made any ſtay was Holland. At Amſterdam he took up his quarters in the admiralty yard, in order that he might have a conſtant eye upon all that was paſſing. In the diſguiſe of a Dutch ſkipper he went to the famous ſhip-building village of Sardam, where he actually laboured as a common carpenter and blackſmith, clad and fed like his fellow workmen. He did not, however, confine himſelf to the mechanic arts. He frequently went to Amſterdam to attend the anatomical lectures of the celebrated Ruyſch. He ſtudied natural philoſophy, aſtronomy, and geography, and he ſought out able men in various profeſſions, whom he ſent to Ruſſia. At the ſame time he was exceedingly attentive to what was paſſing in the world, with reſpect to war and politics. He engaged to ſupport the election of Auguſtus of Saxony to the throne of Poland, and iſſued orders to his armies on the Turkiſh frontier. In 1698 he came over to England, where he was treated with great attention by king William. He took lodgings at the King's-yard, Deptford, and continued to devote his time principally to obtaining inſtruction in naval affairs, but without neglecting other objects of uſeful curioſity. It is ſaid that the variety of religious ſects attracted his notice both here and in Holland, and probably gave him thoſe ideas of religious toleration upon which he always acted in his intercourſe with foreigners. At his departure the Britiſh monarch made him a preſent of a fine yacht completely equipped. He returned in it to Holland, carrying with him a number of naval officers, and other perſons illuſtrious in various arts and profeſſions. Thence he proceeded with his ambaſſadors to Vienna, for the purpoſe of viewing the military diſcipline of the Auſtrians, and ſtrengthening his alliance with that court againſt the Turks. The return of the czar to his own country was haſtened by the news of a formidable rebellion, excited with the view of placing on the throne the princeſs Sophia. Peter paſſing through Poland, had an interview with Auguſtus, in which they laid the plan of co-operation againſt the king of Sweden, and he then unexpectedly appeared at Moſcow. He inſtantly enquired into the cauſes and effects of the revolt, and was prompt in puniſhing the aggreſſors with the moſt unrelenting ſeverity. Many of the leaders in the conſpiracy he cauſed to be tortured and hung before the windows of the apartments of Sophia. And her he obliged to take the veil, and to paſs the remainder of her life in ſtrict confinement. He now formed new regiments after the German model, and the dreſs and diſcipline of the reſt of Europe were introduced into the Ruſſian army. Peter proceeded with his characteriſtic rigour in his other meditated reforms. The eſtabliſhed church in Ruſſia had almoſt obtained an independence of the civil power, and the patriarchs had often been formidable to the czars. Peter, who had ſeen in England that the king was head of the church, though he did not follow his example, yet on the death of the patriarch in 1699, he ſuffered that office to remain vacant till its final abolition in 1721; and he obliged the eccleſiaſtical ſynod to take a ſtrict oath of allegiance to himſelf and his ſucceſſors. He introduced likewiſe many ſalutary reforms into the church. The Ruſſian year had hitherto begun in September; Peter removed it to the firſt of January; but the new ſtyle, which is of much more importance to the commercial intereſts of the world, has not even yet been introduced into Ruſſia. In all the minor particulars of manners and cuſtoms he introduced alterations, the object of which was to aſſimilate the Ruſſians with the more poliſhed nations of Europe. In ſome points he exhibited too great a precipitancy, a common fault with deſpotic monarchs, but in general his ideas were liberal, and his reforms tended to the real advantage of the people whom he governed. In the year 1700, a confederacy was formed againſt the young king of Sweden, Charles XII. Peter joined in it with the view of recovering the provinces of Ingria and Carelia, which had formerly belonged to Ruſſia. For this purpoſe, he marched a large army, with which he laid ſiege to Narva. Charles haſtened to its relief with a very inferior force, but having well diſciplined troops he ſoon obtained a complete victory over the Ruſſians, who fought without judgment or ſkill. Peter was not diſpirited; he melted down the great bells of his churches to repair his loſs in artillery, and exerted all his powers to recruit and diſcipline his troops. After various actions with different ſucceſs, the Ruſſians gained a footing in Ingria and Livonia, and became maſters of the river Neva. The place where that river enters the gulf of Finland appeared to him a proper ſpot for a port, by means of which he might obtain a ſhare of the navigation of the Baltic; and having formed the plan, no obſtacles could prevent him from the accompliſhment of his purpoſe. A moraſs ſurrounded with foreſts, in the 60th degree of north latitude, was the uninviting ſcite which he choſe for a new capital of his empire. The firſt erection was a fortreſs on an iſland, the foundation of which was laid in May 1703. A hut, for his own reſidence on a neighbouring iſland, a larger wooden houſe for his favourite Mentſckikof, and an inn, were the firſt buildings of St. Peterſburg. Such was the eagerneſs with which he purſued his deſign, with all the reſources of deſpotic power, that in leſs than nine years from theſe rude commencements, the ſeat of empire was transferred from Moſcow to Peterſburg. A vaſt number of lives was ſacrificed in carrying on theſe labours, but human life never enters into the calculations of deſpots. Every thing muſt be ſubſervient to their will. Nor could any thing be more arbitrary than the means he took to fill it with inhabitants; one of which was to oblige all the nobility and principal merchants to have houſes in the new capital. But it was chiefly inhabited by foreigners, whom he encouraged to ſettle in his dominions, and even to the preſent time foreigners and their deſcendants make a great part of its population. The removal of the metropolis to a corner of this vaſt empire, at ſuch a diſtance from its moſt deſirable diſtricts, and from the neighbouring courts, was thought to be highly impolitic, but it proved to be very inſtrumental in civilizing the great body of the people, by breaking thoſe national habits of life which were foſtered in the barbaric grandeur of Moſcow. In the year 1704, the czar, in perſon, took Narva by aſſault. On this occaſion, his ſoldiers committing the uſual exceſſes in a captured town, he was, though at much perſonal riſk, extremely active in reſtoring order and tranquillity. Entering the town-houſe, whither many of the citizens had retired for refuge, he laid his bloody ſword on the table, and exclaimed, "It is not ſtained with the blood of the people of Narva, but with that of my own ſoldiers, which I have ſhed to preſerve your lives." Cruelty to a vanquiſhed foe was not among the characteriſtics of Peter. He continued faithfully to adhere to the intereſts of the king of Poland, after he had been dethroned by Charles, and the king of Denmark had been compelled to remain neuter. After the humiliating peace made by Auguſtus, Ruſſia remained the ſole object of hoſtility to the hero of Sweden: the dethronement of the czar was his avowed aim; "but," ſaid Peter, "though my brother Charles affects to act the Alexander, I truſt he will not find me a Darius." In 1708, Charles advanced to Grodno, where he narrowly miſſed taking the czar priſoner. He puſhed forwards towards the Dnieper, and gave the Ruſſians, who oppoſed him, a total defeat, though ſo much were they improved by practice and diſcipline that they ſtood ſeven charges before they gave way. Charles now croſſed the Dnieper, and marched to meet the coſſack Mazeppa in the Ukraine. In the mean time his general, Lewenhaupt, was leading an army in Livonia to reinforce him. Peter, in perſon, attacked Lewenhaupt at Leſnau, with a force not much ſuperior in number, and after a deſperate conflict of three days, took or deſtroyed half his army. This ſucceſs was the prelude of the great victory at Pultowa, in June 1709, which entirely defeated all the plans of the Swediſh monarch, and made him an exile among the Turks. Auguſtus was replaced on the throne of Poland; Pruſſia made an alliance with Ruſſia; Elbing, Wiburg, and Riga yielded to Peter's arms; and Carelia and Livonia acknowledged him as their ſovereign. In 1711 the Turks declared war againſt Ruſſia, in the courſe of which the grand vizier would infallibly have captured Peter and his whole army, had he not found means to induce him to enter into a negociation. The principal inſtrument which he uſed on this occaſion, and which freed him from ſo perplexing a ſituation, was a woman, whom, from the loweſt origin, he had raiſed to be the partner of his bed, and to whom he had been privately married. This was the empreſs Catharine I., originally a pariſh foundling, and who had paſſed through various hands to thoſe of her ſovereign. By the ſweetneſs of her voice, and the mildneſs of her manners, ſhe was able to ſoothe her ſovereign and lord, in all the paroxyſms of rage and gloom to which he was occaſionally ſubject; and ſhe retained her influence over him to the very laſt moment of his life. He rewarded her ſervices in this important inſtance, by a public declaration of marriage in the following year, and by the inſtitution of the order of St. Catharine, of which ſhe was the head and patroneſs.

Peter being at peace was left to purſue his deſigns, and in the years 1713 and 1714 he effected a total reduction of Finland, and a victory of the Ruſſian fleet over the Swediſh rendered him maſter of the iſle of Oeland. The czar ſoon after viſited Copenhagen, and a grand plan was formed for the invaſion of Sweden by the Danes and Ruſſians, in conjunction with an Engliſh and Dutch fleet: it was, however, rendered abortive, probably, by means of a ſecret negociation entered into between the czar and the Swediſh miniſter baron Goertz, in which very advantageous terms were granted to Ruſſia, in order to obtain a peace. Some great revolutions in the north of Europe entered into the projects of this daring miniſter, one of which was placing the pretender on the throne of England. About this time he was making another tour, in which he combined the purpoſe of introducing improvements in his dominions, with that of carrying on political intrigue. He went from Denmark to Hamburgh, and thence to the Hague, and in 1717 he viſited France, where he opened to the regent, duke of Orleans, a plan calculated for the advantage of France and Ruſſia, in which were comprized peace with Sweden, the humiliation of Denmark, and the diſturbance of England; but that prince's cloſe connection with George I. prevented him from liſtening to it. Soon after his return a domeſtic event took place, which was one of the calamities of Peter's reign, and has left a ſtain on his memory that can never be obliterated. His ſon Alexis, born in 1690, was the ſole offspring of his firſt marriage with Eudocia Lapookin; his education had been much neglected, and he had imbibed deep prejudices, and a rooted averſion from his father's improvements. As he grew up, he contracted habits of intemperance and groſs debauchery, with a fondneſs for the loweſt company. His father probably never entertained for him a ſpark of the paternal affection, and treated him with a harſhneſs that rendered him always uneaſy in his preſence. Alexis married a very amiable woman, whom he made wretched by his brutality, and ſhe died very ſoon after ſhe had brought him a ſon, in the year 1715. In the following year, renouncing his right of ſucceſſion in favour of Peter's ſon by Catharine, he requeſted permiſſion to retire into a convent. But during the czar's abſence he ſecretly left Ruſſia, and put himſelf under the protection of the emperor Charles at Vienna. By him the prince was ſent firſt to Inſpruck, and then to the caſtle of St. Elmo in Naples. He was diſcovered in this retreat, and having had the moſt ſolemn aſſurances of forgiveneſs he was induced to return to Moſcow. The promiſes of the tyrant were no bar to his revenge; and having him again in his power, he determined to proceed againſt him for high treaſon, a crime in that country, as in many others, which is made to ſuit the wiſhes of deſpotic princes and ſanguinary miniſters. There was no difficulty in Ruſſia in obtaining a conviction: the will of Peter was a rule to all his ſubjects, from which they did not dare to deviate. The ſentence was read to the young prince on the ſixth day of July 1718, and on the next day it was reported that his agitation of mind had thrown him into violent convulſions, and that his life was in danger. The czar, with ſome of his courtiers, repaired to the chamber in which he was confined, where, it is ſaid, the prince implored forgiveneſs, which he received, but that on the ſame day he died. Many myſterious circumſtances, however, attended his death, and it was generally believed he was taken off by poiſon. The death of the king of Sweden in the year 1718, and the arreſt of his miniſter Goertz, entirely deranged the czar's plans, and he was obliged to continue the war againſt that country without allies. A rupture enſued between Ruſſia and England, but a peace was concluded with Sweden, under the mediation of France, in the year 1721. On this occaſion the ſenate of Ruſſia requeſted the czar to aſſume the title of “Peter the Great, father of his country, and emperor of all the Ruſſias,” and his imperial title was very ſoon after recognized by all the European ſtates excepting Denmark. He now removed the principal mart of trade from Archangel to Peterſburg, which was already become a large and handſome city. After a triumphal entry into Moſcow, his ſecond ſon Peter being dead, he obliged all his people to ſwear that they would acknowledge as ſucceſſor to the crown any perſon whom he ſhould pleaſe to nominate.

As he had opened the Baltic ſea to his ſubjects at one extremity of his dominions, he now reſolved to attempt the ſame with reſpect to the Caſpian at the other extremity. Making uſe of the pretext of ſome violence that had been offered to his people by certain tribes of Perſians and Tartars, he fitted out a fleet at Aſtrachan, and on the Volga, and marched with a conſiderable body of troops in May 1722, to embark for an expedition into the provinces bordering on the Caſpian ſea. Peter having carried the point at which he aimed, ſeveral Perſian provinces were ceded to him in perpetuity, and a treaty of peace was concluded. His empire being now entirely at peace, and ſome of his great ſchemes brought to maturity, he thought proper to give a public demonſtration of his affection and gratitude to Catharine, by the ceremonial of placing upon her head the imperial crown, with his own hands. This coronation took place at Moſcow, in May 1724, and was conſidered as preparing the nation to receive her for its ſovereign in caſe of his death. He had undergone a ſevere attack of illneſs ſome time before that period, the effects of which ſeem never entirely to have left him. His activity was, however, ſtill unremitted, and he was particularly aſſiduous in forming uſeful and ornamental eſtabliſhments for his new capital, one of which was an academy of ſciences. A cold, which he took at the ceremony of bleſſing the waters, brought on a painful diſorder, which put an end to his life in January 28, O.S. 1725, being in the 53d year of his age. He left no will, nor made any diſtinct nomination of a ſucceſſor. The meaſures by which the ſucceſſion of Catharine was ſecured have been mentioned in her article. Peter the Great left three daughters by Catharine, and one grandſon by the unfortunate Alexis.

“This great prince,” ſays his biographer, “was of a lofty ſtature, and of a commanding but rude and ferocious countenance. His geſtures were quick and impatient, his ſpeech fluent and animated. His manners were groſs and uncultivated, and in the midſt of his attempts to civilize the nation, he himſelf remained a ſemi-barbarian. He was, however, eaſy and familiar with his intimates, and with thoſe from whom he expected to derive inſtruction; and, like all truly great men, loved to lay aſide pomp, and bring himſelf to the level of his company. He was furious and ungovernable in his fits of anger, and cruel and inexorable in his puniſhments, in which he occaſionally officiated as executioner; he was, however, capable of ſentiments of juſtice and humanity when brought to cool reflection. His talents were certainly conſiderable, and although he did not always take the beſt road to inſtruction, his perſonal acquiſitions were various and reſpectable. If he is eſtimated by what he performed, very few princes in any age can be compared to him. Ruſſia at his acceſſion to the throne did not poſſeſs a ſingle ſhip of war, and he left it with forty ſhips of the line and four hundred galleys. It was excluded from the Baltic, and he founded a maritime capital on a branch of that ſea. He converted a ſeditious and half-diſciplined militia into a regular army, capable of meeting the beſt troops in Europe. He introduced a police into the great towns, which rendered them ſecure and comfortable abodes. He planned, and partly executed, a grand ſyſtem of inland navigation, by which a junction is formed between the remoteſt parts of that extenſive country, and the ſeas ſurrounding it. (See CANAL.) He was the creator of a great number of inſtitutions for the promotion of learning and the uſeful arts and ſciences, among which may be enumerated colleges, at the principal cities, for the languages and mathematics, an academy of marine and navigation, a college of medicine, with anatomical lectures, and a botanical garden, an aſtronomical obſervatory, an imperial library and printing-offices, the academy of ſciences at Peterſburg, which he inſtituted, though death prevented him from putting it into activity. He reformed the architecture of the country, and introduced many improvements in the commerce of private life. He did not, indeed, civilize a nation which long after retained many traces of barbariſm, but he rouſed it from its torpor, gave it the means of future improvement, and was the principal author of that political importance which it has ſince attained. The epithet *Great* belongs to him by ſo many titles, that it is probably a permanent appendage to his name.” Mod. Univer. Hiſt. Coxe's Travels, vol. ii. Tooke's Ruſſia.

PETER II. the ſon of the unfortunate Alexis, and grandſon to Peter the Great, was born in the year 1715, and ſucceeded in 1727 Catharine I. He died in 1730 of the ſmall-pox, in Moſcow, on the very day which had been appointed for his marriage. His death was occaſioned by the ignorance of the phyſicians, who treated his diſorder as a malignant fever. Peter II. acquired a conſiderable degree of popularity, by fixing, during the latter part of his ſhort reign, his imperial reſidence at Moſcow. He was regretted as the grandſon of Peter the Great, and as the perſon in whom the male line of the houſe of Romanof became extinct. Coxe's Travels, vol. ii.

PETER III. emperor of Ruſſia, born in 1728, was the ſon of Anne, eldeſt daughter of Peter the Great, and Charles Frederic, duke of Holſtein-Gottorp. He was nominated grand duke of Ruſſia, and ſucceſſor to the crown, by his aunt the empreſs Elizabeth, in 1742, after having conformed to the Greek church, and in 1745 he eſpouſed Sophia Auguſta, princeſs of Anhalt-Zerbſt, who took the name of Catharine. Peter had received a bad education, and was eſtranged by Elizabeth from public affairs. Being, therefore, a prey to idleneſs, he gave himſelf up to trifling purſuits, and indulged in low ſenſualities. One of his principal amuſements was the training of his ſervants, and a ſmall body of ſoldiers, which he was allowed to keep at his palace, in the German diſcipline. He conſtructed a petty fortreſs, in which he acted as governor, and aſſiduouſly practiſed all the minutiæ of military ſervice. At the ſame time, he bore with impatience the conſtraint in which he was held by the empreſs, and often broke out into invectives, which, by the ſpies placed about him, were carried in an exaggerated ſtate to her ears. Nor did he conceal his hatred and contempt of the Ruſſian nation, nor his partiality to foreigners, in whom he ſeemed to place the moſt unbounded confidence. Elizabeth, therefore, urged by the chancellor Beſtuchef, was nearly perſuaded to ſet him aſide from the ſucceſſion. She did not, however, perſiſt in this intention, and on her death, in December 1761, Peter aſcended the throne without oppoſition, and with all the joy of a perſon enlarged from a long impriſonment into a ſtate of perfect liberty. He immediately releaſed the principal ſtate priſoners, who had been confined by Elizabeth; among theſe were Biren, duke of Courland, marſhal Munich, and Leſtof; and in all ſtate affairs he conducted himſelf upon political principles, diametrically oppoſite to thoſe of the late empreſs. He recalled alſo from exile the victims of the deſpotiſm of the former reign, who are ſaid to have amounted to ſeventeen thouſand perſons. He aboliſhed the dreadful ſecret ſtate inquiſition, and formed a plan for correcting abuſes in the courts of judicature. He freed the nobles from the obligation of ſerving in the army, and permitted them to viſit foreign countries without particular licence. An extravagant admiration of the great Frederic of Pruſſia was one of his paſſions, and he became an ally to that monarch. At the ſame time he formed a deſign of conquering the duchy of Sleſwick from Denmark, which he conceived belonged to him as duke of Holſtein. Although, as has been obſerved, he introduced important changes in the government, yet the ſalutary part of them was accompanied with projects of innovation, ſome of them trifling, and others at leaſt dangerous and imprudent. He offended the Greek clergy, by ſecularizing their monaſteries, and ſeizing their eſtates, and by ſhewing a contempt for the rites and ceremonies of that church, and a preference to the Lutheran, in which he had been educated. He gave umbrage to the army by his partiality for his Holſtein troops, and his rigour in introducing the Pruſſian diſcipline; and he affronted the nobility by the appointment of his uncle, prince George of Holſtein, to the poſt of generaliſſimo, and by the excluſive confidence which he placed in foreigners. But his conduct to the empreſs Catharine was that which eſpecially haſtened his ruin. He had frequently treated her with great indignity, and at length did not ſcruple to avow an intention of arreſting and repudiating her, ſetting aſide her ſon, the grand duke Paul, from the ſucceſſion, as not being his, and marrying his favourite miſtreſs, the counteſs of Woronzof. Catharine was, however, beforehand with him, and a revolution was effected completely in her favour. Peter was forced to ſign his own abdication in the moſt humiliating terms. After this he was ſent a priſoner to Robſcha, a ſmall palace at ſome diſtance from Peterſburg, where he was in a very few days murdered, at the age of thirty-four, after he had reigned only half a year. Coxe's Travels, vol. iii.

Peter, commonly called the Wild Boy, was found in the woods near Hamelyn, in Hanover, in the year 1725. He was, from his appearance, ſuppoſed to be about twelve years of age, and had ſubſiſted in thoſe woods upon the bark of trees, berries, &c. for a conſiderable time. How long he had been in that ſtate could never be aſcertained, but when found, the remains of a ſhirt collar were about his neck. He was brought to England in the following year, by order of queen Caroline, but though every attention was paid to him, he could never be brought to ſpeak. It was pretty well aſcertained that he was an ideot. He was placed under the care of a farmer at North Church in Hertfordſhire, where he lived on a ſtipend of 35*l. per ann.* allowed him by the government.

Peter-*Pence*, an ancient levy, or tax, of a penny on each houſe throughout England, paid to the pope.

It was called *Peter-pence*, becauſe collected on the day of *St. Peter ad vincula*; by the Saxons it was called *Rome-feoh*, *i. e.* the fee of Rome, and alſo *Rome-ſcot*, and *Rome-pennying*, becauſe collected and ſent to Rome: and laſtly, it was called *hearth-money*, becauſe every dwelling houſe was liable to it, provided there were thirty pence *vivæ pecuniæ* belonging to it, nay, and every religious houſe; the abbey of St. Alban's alone excepted.

This Peter-pence was at firſt given as a penſion or alms, by Ina, king of the Weſt Saxons, in the year 727, being then in pilgrimage at Rome: and the like was done by Offa, king of the Mercians, throughout his dominions, in 794: and afterwards by Ethelwulph, through the whole kingdom, in the year 855.

It was not intended as a tribute to the pope, but chiefly for the ſupport of the Engliſh ſchool or college at Rome; the popes, however, ſhared it with the college; and at length found means to appropriate it to themſelves.

At firſt it was only an occaſional contribution; but it became at laſt a ſtanding tax; being eſtabliſhed by three laws of king Canute, Edward the Confeſſor, the Conqueror, &c.

The biſhops who were charged with the collecting it, employed the rural deans and archdeacons in the buſineſs.

Edward III. firſt forbade the payment, but it ſoon after returned, and continued till the time of king Henry VIII. when Polydore Virgil reſided here as the pope's receiver-general.

It was aboliſhed under that prince, and reſtored again under Philip and Mary; but it was finally prohibited under queen Elizabeth.

Peter, *St.*, in *Geography*, a town of the duchy of Stiria; four miles S.E. of Landſperg.—Alſo, a town of the ſame duchy; three miles W.N.W. of Windiſch Weiſtritz.—Alſo, a town in the ſame duchy; ſix miles W. of Cilley.—Alſo, a town of Auſtria; 12 miles W.S.W. of Freuſtadt.—Alſo, an iſland on the river Rhine, ſtrongly fortified, near Mentz.—Alſo, a town on the S.W. coaſt of the iſland of Cape Breton, in a bay to which it gives name, and which is a very commodious place for carrying on the fiſhery.—Alſo, a ſmall iſland in the Weſt Indies, among thoſe which form the cluſter called "Virgin iſlands," dependent on Virgin Gorda.

Peter's, *St.*, a town of the iſland of Antigua.—Alſo, a town of the iſland of Stronſa. N. lat. 59°. W. long. 2° 31'.—Alſo, a river on the coaſt of Labrador, about four leagues from the iſland of Belle-iſle, in the ſtraits of that name.—Alſo, a river of Louiſiana, being one of the north-weſtern branches of the Miſſiſippi river, which it joins in about 45° 6' N. lat. W. long. 94° 22'.

Peter's, *St.*, *Bank*, a large fiſhing ground off the S. end of Newfoundland iſland, extending from Cape Race to St. Peter's iſland, oppoſite Placentia, St. Mary, and Trepaſſy bays. It has on it from 45 to 30 fathoms of water.

Peter's, *St.*, *Bay*, a bay on the S. coaſt of Cape Breton iſland. See *St.* Peter, *ſupra.*

Peter's, *St.*, *Fort*, a fort on the iſland of Martinico, in the Weſt Indies. N. lat. 14° 44'.

Peter's, *St.*, *Harbour*, on the N. coaſt of the iſland of St. John, in the gulf of St. Lawrence, about eight leagues W. of E. point. N. lat. 46° 25'. W. long. 62° 20'.

Peter's, *St. Haven*, a harbour on the E. coaſt of Labrador. N. lat. 56° 31'. W. long. 60 42'.

Peter's, *St.*, *Iſland*, a ſmall iſland on the W. coaſt of St. John's iſland, near to, and N. by W. of, Governor iſland, in the narroweſt part of the ſtrait between New Brunſwick and St. John's iſland.

Peter's, *St.*, or *St. Pierre's Iſland*, an iſland on the coaſt of that of Newfoundland, S.S.W. of the S.E. point of Fortune bay, and near to, and S.E. of the S. point of Miquelon iſland. This iſland is chiefly uſed for curing and drying fiſh. N. lat. 46° 46'. W. long. 56° 17'.

Peter's, *St.*, *Lake*, an expanſion of the river St. Lawrence, into which are diſcharged from the S. and E. Sorel river from lake Champlain, the river St. Francis, and ſome ſmaller rivers from the N.W. The Maſquinonge, Omachis, &c. enter the lake. The centre of it is 68 miles above Quebec, and 205 N.E. of Kingſton, at the mouth of lake Ontario.

Peter's, *St.*, *Mount.* See Keeneebaloo.

Peter's, *St.*, *Wort*, in *Botany*. See Ascyrun.

Peter's, *St.*, and *St. Paul*, in *Geography*. See Avatscha. Captain King, in the third volume of captain Cook's "Third Voyage," has given a plan of this harbour, which he places in N. lat. 53° 0' 38". E. long. 198° 43': the variation in 1779 being 6° 19' E.

Peter, *St.*, and *St. Paul*, a river at the bottom of the gulf of Campeachy. Its branches form an iſland, called "Tabaſco."

Peter, *St.*, *le Port*, or *Port St. Pierre*, a town ſituated on the S.E. part of the iſland of Guernſey, defended by two caſtles, *viz.* the old caſtle and Gornat caſtle. N. lat. 49° 10'. W. long. 2° 34'. See Guernsey.

Peter's *Point*, a cape of England, on the coaſt of Lincolnſhire; four miles S. E. from the mouth of the Witham.

PETERBOROUGH, or Peterburgh, a city having ſeparate juriſdiction, is ſituated at the eaſtern extremity of the county of Northampton, bordering on the great fens of Lincolnſhire, at the diſtance of 81 miles N. by W. from London. It is built on the north bank of the river Nen, and the country adjacent has been termed, from its fertility, the "Nile of England." This ſpot was originally called Medeſhamſtede, and here was at leaſt a village, if not a conſiderable town, early in the 6th century. Though not made a city till the reign of Henry VIII., yet at a very remote period this place was diſtinguiſhed in the Anglo-Saxon annals for its monaſtery, which was large in its eſtabliſhments, and extenſive in its juriſdiction. So cloſely is the intereſt which Peterborough poſſeſſes interwoven with the hiſtory of this conventual foundation, that in deſcribing the one, it is requiſite to enter into a ſhort account of the other. The foundation of this abbey was laid by Peada, eldeſt ſon of Penda, king of the Mercians, in 655 or 656; but dying in the fourth year of his reign, it was completed, in 664, by Wolfere, his brother, who ſucceeded him, aſſiſted by Ethelred, the remaining ſon, Kyneſburga and Kyneſwitha, the two daughters of Penda, and Saxulf, a pious and prudent earl, who was made the firſt abbot. It was dedicated to St. Peter at an aſſembly of nobles and biſhops; and endowed with large immunities and poſſeſſions, which were confirmed by the charter of Wolfere in the 7th year of his reign. Pope Agatha ratified theſe endowments, and conſtituted it a vice-papal ſee, where perſons might "pay their vows, be abſolved from their ſins, and receive the apoſtolical benediction." The monaſtery flouriſhed for nearly 200 years, under a ſucceſſion of ſeven abbots, when the Danes, commanded by Hubba, in 870, after deſolating the abbies of Croyland and Thorney, almoſt annihilated Medeſhamſtede, plundered its dependencies, deſtroyed the library, and ſlaughtered the venerable abbot, Hedda, together with the friars and the country people, who had fled to its altars for protection. The monaſtery is reported to have remained in ruins 96 years, till Athelwold, biſhop of Wincheſter, in 970, aſſiſted by king Edgar, and the archbiſhops Dunſtan and Oſwald, rebuilt it on an enlarged ſcale, and confirmed its former privileges and poſſeſſions. At this period the name of the town was changed to Burgh, and from the ſplendour and privileges of the monaſtery, it was generally called Gilden-burgh. In reference to the ſaint to whom the dedication was made, this name was afterwards changed to Peter-burgh. Under ſeveral ſucceeding abbots the fortunes of the eſtabliſhment were variouſly chequered, but nothing remarkable happened until the abbacy of Thoroldus, when the Danes, under Sweyn, deſtroyed the town, but were unſucceſsful in their repeated attacks againſt the monaſtery. In the year 1116, it was conſumed again, by an accidental conflagration, which left only the chapter-houſe, dormitory, and refectory ſtanding. By the ſame fire the greater part of the town was likewiſe deſtroyed. In 1118, John de Saliſbury, the reigning abbot, commenced a new church, which was finiſhed under Martin de Vecti in 1144. Under William de Waterville various architectural improvements and additions were made in the church, &c. The abbots were called to the houſe of peers in the time of Henry III. and were mitred in 1400. Queen Catharine, the firſt wife of Henry VIII., was interred here in 1535. In 1541 the monaſtery was converted into an epiſcopal ſee, and the conventual church into a cathedral. The government of it was entruſted to a biſhop, a dean, and ſix prebendaries, whoſe juriſdiction extended over the city of Peterborough, and nearly the whole of the counties of Northampton and Rutland. In the reign of queen Mary this church was again ſubmitted to the authority of the ſee of Rome, but under Elizabeth, Proteſtantiſm revived to the excluſion of Popery. In 1587, the funeral of the hapleſs Mary, queen of Scots, was here ſolemnized, unattended by ſplendour or ceremony: her remains were tranſlated to Weſtminſter in the reign of James I. 1612. During the rebellion of 1643, the cathedral experienced various acts of violence from the parliamentary forces; the ſtalls, organ, books, monuments, and every ornamental decoration, ſhared an equal deſtruction. After remaining eight years in a ſtate of ruin and deſolation, its damages were in ſome meaſure repaired, and the whole edifice reſtored for the performance of divine ſervice.

The ſtyle of architecture prevalent in this building is that denominated Norman, of which the circular arch and large column, with analogous mouldings, form the leading characteriſtics. It has been erroneouſly termed Saxon in the preſent inſtance, although no part of the exiſting cathedral was erected antecedent to the year 1118, when the monaſtery was deſtroyed by fire. The plan, like that of moſt other cathedrals, conſiſts of a nave with ſide aiſles, a tranſept, a choir terminating at the eaſt end, ſemicircularly, with a continuation of the ſide aiſles of the nave. The whole is finiſhed at the eaſt, by what is called the new building, or St. Mary's chapel. In the centre is a tower riſing from four large arches, at the interſection of the nave, choir, and tranſept. The weſt front is formed by a receſſed portico of three lofty arches, ſurmounted by pediments, pinnacles, and ſpires. In the centre arch is a ſmall chapel. The dimenſions of the cathedral, with its ſeveral parts, are ; length externally, including the buttreſſes, 471 feet ; of the nave, from the weſt door to the entrance into the choir, 267 ; of the choir, 117 ; and from the altar of the choir, to the eaſt window, 38 ; making, in the whole, from the weſt door to the eaſt window, 422 feet. The length of the tranſept, from north to ſouth, is 180 feet. The height of the nave, from the floor to the ceiling, is 81 feet ; of the central tower, from the floor to the ſummit, 135 ; whilſt its whole height externally is 150 feet. The breadth of the nave and aiſles, from the north wall to the ſouth, is 78 feet, and the breadth of the weſt front 156. The periods of erecting the various parts of the cathedral may be aſſigned thus : the choir, with its aiſles, from the circular extremity at the eaſt, to the commencement of the tranſept on the weſt, was begun in the year 1118, and finiſhed in 1144. Between the years 1155 and 1177, the tranſept was erected, and between 1177 and 1193, the nave, with the aiſles, were completed to the termination of the pillars. A farther addition was made about 1288, when the ſpace between the extreme weſtern pillar and the door of entrance was finiſhed, forming a projection on each ſide of the weſtern extremity, and terminated by two towers. The Lady's chapel, ſaid to have been on the eaſt ſide of the north tranſept, was built by William Parys, the prior, in the 14th century. At what period the weſt portico, with its three arches, was erected, is not preciſely known, but we preſume before the year 1274, as abbot Richard de London raiſed one of the weſtern towers before that year. The chapel in the centre arch, is in the ſtyle of architecture of a much later date than the weſtern front. The new building, at the eaſtern extremity of the choir, was erected by Richard Aſhton in the middle of the 15th century, and probably completed by abbot Kirton about 1518. This building formed the laſt addition to the church before the diſſolution of the monaſtery by Henry VIII., making a period of 400 years, from the foundation of the preſent church to its final completion. On the ſouth ſide were the cloiſters, which are nearly deſtroyed.

The Cloſe, to the weſt of the cathedral, is nearly ſurrounded by ancient monaſtic buildings, the ſouth ſide of which preſents ſeveral fine and intereſting parts of ancient architecture. On this ſide is alſo the biſhop's palace : north of the cathedral is the deanery, the entrance gateway to which was built by abbot Kirton, as the ſculpture and arms plainly indicate.

Nearly in the centre of the city is a parochial church, dedicated to St. John, which is ſaid to have been originally erected about the year 1400, by abbot Genge, aſſiſted by the citizens. The church is ſpacious, and contains ſeveral monumental ſlabs. Over the altar table is a large picture, painted by ſir Robert Ker Porter.

Symon Gunton, author of the Hiſtory of the Cathedral, was a native of this place, in which he reſided the greater part of his life, and where he died in 1676.

It is remarkable that Peterborough is the only city in England without mayor and aldermen. The civil government of the city is veſted in ſeven magiſtrates, and in the bailiffs to the lords of the manor. There are two members ſent to parliament, elected by the inhabitants, who pay ſcot and lot. A quarter ſeſſion is holden here for the city and liberty, by a commiſſion of oyer and terminer and gaol delivery, for criminal actions of all kinds. The chief of the commiſſion is the cuſtos-rotulorum, who is appointed by the crown at pleaſure. There are two gaols, one belonging to the earl of Exeter, for perſons taken within the liberty by his bailiff, the other belonging to the dean and chapter, for perſons arreſted by their bailiff in the city.

The trade of Peterborough is very inconſiderable. The benevolent inſtitutions are a charity-ſchool, a workhouſe, and Sunday-ſchools for the children of the poor. Various kinds of fiſh are caught in the river, over which is a bridge, erected by abbot Godfrey, in the fourth year of Edward II. From being half in the county of Huntingdon, and half in Northamptonſhire, a queſtion aroſe once, by which it ſhould be repaired ; a jury was impannelled, ſix from each county, to determine it ; and they returned, upon examination, "there was none of right bound to repair, or ſuſtain the ſame." But the king and queen coming to Peterborough, the bridge was repaired by abbot Adam, for their paſſage into the city. At preſent it is kept up by the feoffees, who, in 1790, thoroughly repaired it. The market is on Saturday, and there are two annual fairs. By the cenſus of 1811, Peterborough was ſtated to contain 900 houſes, and 3674 inhabitants.

At Milton, about three miles weſt of Peterborough, is a ſeat of earl Fitzwilliam. At another ſeat of the ſame nobleman, not far diſtant, was found, in 1720, a Moſaic pavement, and it is ſuppoſed by antiquaries, that near it was a Roman villa of ſome diſtinction. Beauties of England and Wales, vol. xi. Carliſle's Topographical Dictionary, vol. ii. Hiſtory of the Church of Peterburgh, by Symon Gunton, folio.

PETERBOROUGH, a poſt-town of America, in Hillſborough county, New Hampſhire ; incorporated in 1760, and containing 1333 inhabitants. In this town are the moſt valuable griſt, ſaw, oil, paper, and clothier's mills in the ſtate.

PETERDORF, a town of the duchy of Stiria ; four miles N.N.E. of Muckrau.

PETERERO. See PEDRERO. See GUERNSEY.

PETERHEAD, in *Geography*, a market-town and ſeaport in the diſtrict of Deer, and county of Aberdeen, Scotland, is ſeated upon a peninſula projecting into the German ocean, and connected with the mainland by an iſthmus about 800 yards in breadth. It is built in the form of a croſs, and is divided into four wards. The town-houſe, placed at the head of the principal ſtreet, is a fine building of hewn ſtone, ſurmounted by a ſpire upwards of an hundred feet in height. Many of the private houſes are alſo handſome in their exterior appearance. Peterhead is a borough of barony, under the ſuperiority of the Merchants' Maiden hoſpital, and is governed by a ballie and eight counſellors : the baillie is in the nomination of the ſuperiors, and has his commiſſion from them, but the counſellors are choſen by the feuars, at a general meeting called for that purpoſe. The revenue of the burgh, which is conſiderable, is expended in various improvements. The market day is Friday, and there are beſides two annual fairs.

Peterhead occupies the moſt weſterly point of Scotland ; and lies within three hundred miles of the Naze of Norway. It is much frequented in ſummer as a bathing and watering place, by perſons from all the principal towns in North Britain. The mineral well, called the *wine-well*, from its water ſparkling like Champagne, has been long and juſtly held in high eſtimation for its medicinal qualities. The harbour is in want of improvement, and is ſuſceptible of being rendered one of the largeſt and moſt commodious on the eaſtern coaſt. It is divided into two diſtinct parts, called the north and ſouth harbour, and is defended by a ſmall fort mounted with eight guns. The north harbour, which is the oldeſt, is chiefly appropriated for the reception of the numerous fiſhing veſſels which annually frequent the Moray Frith. Peterhead has long been a place of conſiderable trade, and has an extenſive manufacture of thread, woollen cloth, and cotton, beſides a large ſalt-work. Here is a reſpectable parochial ſchool; alſo a ſchool for writing and arithmetic, endowed by Dr. Anderſon's truſtees, with a ſalary of 20*l.* ſterling. The town, with the lands in the vicinity, were formerly the property of the abbey of Deer, which was erected into a temporal lordſhip in 1589, in favour of Robert Keith, then commendator of Deer, by the title of lord Altree. This peerage becoming extinct in 1593, the ſuperiority of the town became the property of earl Mariſchal, by whom it was conſtituted a burgh of barony, under the name of Keith Inch. In 1715 it was ſold to an Engliſh fiſhing company, whoſe truſtees transferred it to the preſent proprietors.

The pariſh of Peterhead, anciently called Peter Ugie, extends about four miles along the coaſt, and compriſes nearly ſeven thouſand acres of land, of which five thouſand are arable, and the remainder conſiſts of moor and moſs ground. In this pariſh are the ruins of Old-Craig, or Raven's-Craig caſtle. According to the parliamentary returns of 1811, it contains 919 houſes, and 4707 inhabitants. Topographical Dictionary of Scotland and the Britiſh Iſles; by Nicholas Carliſle, F. S. A. 1813. Beauties of Scotland, vol. iv.

PETERKINGEN, a town of Switzerland, in the canton of Berne; nine miles N. of Berne.

PETERS, a townſhip of America, in Franklin county, Pennſylvania; containing 1749 inhabitants.

PETERSBACH, a town of Bavaria, in the principality of Aichſtatt; five miles N. of Aichſtatt.

PETERSBERG, a town of the duchy of Magdeburg; 48 miles S.S.E. of Magdeburg.

PETERSBURG, properly St. Peterſburg, in Ruſs *Sanctpeterbourg*, is the imperial reſidence of the Ruſſian monarchs (Moſcow being the ancient capital). It is ſituated on the ſhores and the iſlands of the Neva, ſtanding partly on the continent in Ingria and Finland, and partly on ſeveral iſlands formed by the branches of that river, in N. lat. 59° 57', and E. long. 47° 49'. Its ſituation is pleaſant, and the air ſalubrious. Straight, broad, and generally long ſtreets, frequently interſecting each other at right angles, ſpacious open ſquares, variety in the elegant architecture of the houſes; in ſhort, the numerous canals, and the ſuperb river Neva, with their ſubſtantial and ſumptuous embankments, render the general view brilliant and enchanting. With regard to regularity and embelliſhment, no metropolis in Europe can come in competition with Peterſburg. Paris, notwithſtanding the multitude of its palaces, and the perpetual attention that is paid to the correction of its defective conſtruction, can never become an elegant city; and London can only appropriate that epithet as applicable to ſome of its modern annexations. Berlin may vie with any other capital with regard to its handſome ſymmetry, but Peterſburg is altogether grand and reſplendent. The diameter of the city, from eaſt to weſt, from the Voſkreſenſkoi monaſtery, is nine verſts; and from ſouth to north, from the town foſſe acroſs Kamennoi-oſtrof to the Nevka, eight verſts; the circumference, taking the Vyborg ſide by the right bank of the Neva, meaſures twenty-four verſts, or ſomewhat more than twenty Engliſh miles. Of this ſpace, however, much muſt be ſubtracted for the water, and the land is not yet completely built upon.

Peter the Great is ſuppoſed to have had ſeveral views in building his new city. His fondneſs for maritime affairs, a deſire of perpetuating his name, and his diſlike of Moſcow, where in his younger years he had met with ſuch a ſeries of ill treatment, were the chief motives that induced him to lay the foundation of this ſeat of empire; to which ſome add another inducement, namely, the pleaſure of mortifying the Ruſſians, who were ſo obſtinately attached to the city of Moſcow. However that be, the beginning and increaſe of this great city were very extraordinary; for till the year 1703, the only buildings on the ſpot where this flouriſhing metropolis now ſtands were two ſmall fiſhing-huts. But Peter having in that year taken the town of Nyenſhants, ſeated on the river Neva, and made himſelf maſter of this country, its commodious ſituation for the Baltic trade determined him to build a town and fortreſs here. He immediately began to put his project in execution, calling the town after the name of his patron ſaint.

By the police ordinance of the year 1782, Peterſburg is divided into ten precincts, each containing ſeveral quarters. The ſcite of theſe primary diviſions is generally determined by the natural boundaries formed by the river and its ſubordinate channels. The ſpace between the left bank of the Neva and the river Moika, is called the firſt admiralty quarter; between the Moika and the Katarina canal, the ſecond; and between the Katarina canal and the Fontanka, the third admiralty quarter. The part lying beyond the Fontanka, along the Neva, is denominated the Styckhof; below the Styckhof, along the Fontanka, lies the Moſkofſkoi; and along the Ligova canal, the Rojeſtvenſkoi, to which the Yæmſkoi quarter adjoins. Then follow the Vaſſilieofſtroi, the Peterſburgſkoi, and the Vyborgſkoi.

What the quartier du palais-royal is to Paris, the firſt admiralty quarter is to St. Peterſburg; the heart of the city, in which luxury and opulence have eſtabliſhed their ſeat, diffuſing themſelves around with increaſing energy to the remoteſt borders of the town; the centre of amuſement and buſineſs, the brilliant reſort of pleaſure and faſhion. Within its circuit are between twenty and thirty ſtructures of the firſt magnitude, of which the imperial winter palace is the moſt conſpicuous.

The coloſſal dimenſions of this edifice, being five hundred Engliſh feet in length, and three hundred and fifty in breadth, the magnificence which reigns within and around it, the treaſures of coſtly works of art and curioſities of every kind that are here collected, render it the moſt ſtriking object of the city.

The exterior of this palace, which, including the hermitage, occupies the ſpace of a ſmall town, is impoſing by its huge and ponderous maſs, though not remarkable for elegance of architecture. The ſtyle and the exuberance of decoration ſufficiently betray the period when it came into being. The whole height, amounting to ſeventy feet, compriſes only a baſement floor, with one grand ſtory and an entreſol. The ſituation of this palace is truly majeſtic. In front of it ſtands a magnificent creſcent of lofty and ſuperb edifices, forming a larger ſpan than is to be ſeen in any other capital, and behind it flows the beautiful Neva within its granite banks. The left wing, to which the hermitage adjoins, has, by means of a projection, the proſpect up the great Millione, one of the fineſt ſtreets of the city, and on the right ſtands the admiralty. It was in this vaſt palace, raiſed by the empreſs Elizabeth, though firſt inhabited by Catharine II., that the latter monarch diſplayed through her long reign, that magnificence and liberality which made her court the admiration of foreigners, and obtained for her the juſt eulogiums of all literary travellers.

It was here likewiſe that ſhe ended her days on the fourth of November 1796.

The ſummer gardens likewiſe, or the principal public promenade, lie within the bounds of this admiralty quarter. By their original deſtination they belonged to the imperial ſummer palace, a ſpacious wooden edifice, ſince demoliſhed; but are now entirely devoted to the public. They are well laid out and ornamented with fountains and ſtatues. The baluſtrade by which they are entered is a truly ſurpriſing work of art; it runs in a line with the houſes on the bank of the Neva, and conſiſts of thirty-ſix maſſy columns of granite, connected together by an iron paliſade of exquiſite workmanſhip, deſigned and executed by a Swede. The columns are two fathoms in height, and their diameter exceeds three feet: the ſhafts, reſting on granite pedeſtals of ſix cubic feet, and the pillars are decorated at top by a regular interchange of urns and vaſes. The huge maſſes of ſtone, the wonderful ingenuity diſplayed in the iron work, the ornaments of which are highly gilt, the connection of the whole with the ſuperb edifices ranging at either extremity, and the view of the Neva with its noble granite quay, fill the beholder with aſtoniſhment and delight.

This quarter contains four public ſquares. In one of them ſtands the juſtly famous monument of Peter the Great. This ſtatue is truly a maſter-piece. Falconet has ſucceeded in the reſemblance to admiration; the features of the czar's countenance are admirably expreſſed. The artiſt repreſents the hero on horſeback, as in the act of aſcending a ſteep rock, the ſummit of which he propoſes to attain. Peter is in an Aſiatic dreſs, and crowned with laurels; he extends his right arm with graceful dignity, while with the left he holds the bridle of his horſe, whoſe beauty of form, and elegant attitude, captivate the admiration of all ſpectators. The fiery courſer riſes on his hinder feet, and is in the attitude of ſtretching to attain the ſummit of the rock. To combine ſolidity with excellence was therefore a difficult taſk; but this the ingenious artiſt found a way to accompliſh. The brazen ſerpent, which is trampled on by the horſe, is emblematical, doubtleſs, of oppoſition to the views of the monarch; but it artfully ſerves likewiſe to give the proper equipoiſe to the ſtatue; the point of bearing being by this means not perceived, which is the full and flowing tail of the horſe gently falling on the ſerpent writhing with pain. The hewn rock on which it ſtands is a ſlightly mingled granite, formed of white and variegated quartz, white and red feldſpath, white and black glimmer, having here and there likewiſe grains of iron and ſchorl cryſtals. On one ſide of it is this ſimple inſcription, in letters of caſt braſs.

PETRU PERVOMU
EKATERINA VTORAIA.
LIETA 1782.

And on the ſide towards the ſenate the ſame in Latin:

PETRO PRIMO
CATARINA SECUNDA.
MDCCLXXXII.

The figure of the monarch is eleven feet in height, and that of the horſe ſeventeen. The expence of this grand monument was truly imperial. The tranſport of the rock from Lachta in Finland, coſt 70,000 rubles; Stephen Falconet, the ſtatuary, received, during his nine years' ſtay, about 48,000 rubles; for his maintenance, 26,800 rubles; apart for the fount, 17,500 rubles; his three ſubordinate artificers, 27,284; the founder Chailof, 2500 rubles, beſides incidental charges: the whole amounting, according to the report of the board of works, to 424,610 rubles. It was caſt in a ſtrong building, conſtructed over the rock for that purpoſe in Auguſt 1775. It is a bell-metal of copper, with a ſmall mixture of tin and zinc, and weighed 44,041 Ruſſian pounds. The head of the hero was modelled by Mad. Collot, who was afterwards married to Peter Falconet, ſon of the ſtatuary.

In this quarter of the town, too, is the marble palace. This ſuperb edifice, built originally by Catharine for the manſion of Gregory Orlof, at his death reverted to the empreſs, and during her life-time it remained uninhabited; but her ſon and ſucceſſor Paul, having invited Staniſlaus Poniatoſſky, king of Poland, to St. Peterſburg, aſſigned him this palace for his reſidence; and here, by a ſingular turn of fortune, he terminated his troubleſome and inglorious life.

The college of foreign affairs, the poſt-offices, the ſenate, and the loan bank, are among the public ſtructures; which, either from their magnificence, or ſtyle of architecture, deſerve to be reckoned remarkable objects in this quarter of the town, and the number of which is augmented by ſixteen palaces of noblemen, and a multiplicity of other beautiful and ſpacious buildings.

A very important rank in the topography of the ſame diſtrict is alſo maintained by the admiralty, with its lofty tower, from which it affords a view up the ſtreets diverging from it as radii from their centre, and eſpecially that called the Great Perſpective, extending at leaſt five miles in length. The body of the building is an oblong ſquare, and, as is juſtly obſerved by M. Storch, remarkable for nothing ſo much as its ugly appearance. The ſide of the admiralty to the Neva occaſionally preſents the public with a magnificent ſpectacle; here being the wharf and dock-yard from whence ſhips of war of ſixty to a hundred guns are built, and every launch is a great holiday.

The grand church dedicated to St. Iſaac, which was intended by the empreſs Catharine II. to be the moſt ſumptuous of all the city, was not completed in her reign. Like the marble palace, it is erected on a baſement of granite, the ſuperſtructure, both within and without, being of marble, jaſper, and porphyry. This church, which at the deceaſe of Catharine had been building upwards of twenty-ſix years, was raiſed to the top of the walls, and a beginning had been made with the dome. Her ſucceſſor, impatient to ſee the edifice completed, to the amazement of all who were not acquainted with his imperial taſte, cauſed it to be finiſhed of brick.

The ſquare, contiguous to the ſummer-gardens, is remarkable for nothing, except the ponderous monument erected to the memory of field marſhal Romanzof. The Iſaac place, on which the church of that name is built, is in the form of an obtuſe triangle, and is encloſed by handſome houſes. The Peter's place, in which the famous ſtatue of that monarch ſtands, is the grandeſt of all, whether we conſider it in itſelf, or in the picture viewed from it compoſed of the noble river, the paſſing ſhips and boats, the thronged bridge, and the oppoſite ſhore of Vaſſily-oſtrof, bordered by palaces, the imperial academies and ſumptuous houſes. In this quarter of the town originate three ſtraight, long, and elegant ſtreets, denominated perſpectives, becauſe from their ſeveral points of view they afford a proſpect of the admiralty's gilded ſpire. It proceeds in a direct line, one little curvature excepted, from the admiralty to the monaſtery of St. Alexander Nevſky, and in breadth it may vie with the fineſt ſtreets in Europe; being, according to the above-mentioned author, by one-half broader than Oxford-ſtreet, in London. Rents in this part of the town are conſiderably higher than in every other, and even the price of proviſions and other neceſſaries is here much enhanced by the readineſs wherewith the luxury of the inhabitants complies with the moſt exorbitant demands.

The principal public edifices of the ſecond admiralty quarter are the court ſtables, the college of medicine, and the opera houſe. This laſt is a ſpacious maſſy ſtructure in a noble ſimplicity of ſtyle, in the conſtruction of which, due regard was had to the ſeveral requiſites of its deſtination. Within the purlieus of this quarter of the town ſtand two of the principal Greek churches. In that dedicated to God's mother, of Kazan, containing her portrait, which is held in the higheſt veneration, the ſolemn thankſgivings for the ſucceſs of public affairs are uſually celebrated, at which the ſovereign is occaſionally preſent in perſon. The church of Nicolai, or the ſailors' church, conſiſts of two ſtories, whereof the lower may be heated in winter. Its five cupolas are richly gilded. The greateſt curioſity of the third admiralty quarter is the bank, perhaps the moſt elegant building in all Peterſburg. Of the churches in this quarter, only the Catholic and the Armenian are deſerving of ſpecification; both of them are rather conſpicuous for the taſte diſplayed in their ſtructure, than for their grandeur and magnificence. The inhabitants of the two laſt-mentioned quarters belong chiefly to the trading claſſes.

Among the public buildings of the Styckhof, the arſenal is the moſt remarkable. It forms an open quadrangle of three ſtories, is built in a grand ſtyle, and wears an aſpect of dignity, correſpondent to its deſign. Facing the Styckhof road it has a magnificent portico, and the roof is ornamented with trophies and allegorical figures of excellent ſculpture. Oppoſite the principal front, on the other ſide of the ſtreet, is a large ſquare court filled with piles of cannon balls and bombs. Remarkable of itſelf, and from the viciſſitudes it has undergone, is the edifice that was formerly the pantheon of prince Potemkin, which the empreſs Catharine II. afterwards purchaſed, and deſtined for her autumnal reſidence, denominating it the Tauridan palace. At that time, this ſuperb edifice conſiſted properly of only one floor; but the body of the building, having wings extending along the ſtreet, had over the grand portal, ſupported upon columns, two ſtories ſurmounted with a large cupola. The left wing was greatly lengthened by the empreſs, by a ſeries of additional erections, taking in one entire ſtreet, fitted up as dwellings for her retinue, orangeries, and neceſſary offices. She likewiſe changed the whole interior of the principal ſtructure, and augmented it by the addition of a theatre. Above fifteen hundred labourers were employed in this work, which was even proſecuted during the night by the light of torches, as the empreſs had reſolved to paſs the enſuing autumn there. Dying a few years after its completion, this gorgeous palace was by her ſon and ſucceſſor converted into barracks.

In this compartment are the imperial Italian gardens, the imperial tapeſtry manufactory, the foundery of cannon, the imperial brewery, and the ſlobode of the horſe guards. Here are likewiſe the churches of St. Sergius and of the Preobajenſkoi guards, dedicated to the transfiguration of Chriſt, with the church of St. Pantaleon and Simeon on the Fontanka, and the ſubaltern Yæger church on the Ligova canal, which is the only one of timber. The Lutheran church of St. Anne, belonging to the Germans, ſtands here in the third Artillery ſtreet. The Styckhof contains likewiſe the palaces of the princes of Wurtemburg, and on the Fontanka that of prince Sheremetof, with its ſpacious court ornamented with ſtatues and a pleaſure garden in the Dutch taſte.

The Rojeſtvenſkoi quarter, though comparatively ſmall and inconſiderable, yet contains the only monaſtery and the only convent within the city. The Voſkreſenſkoi nunnery, or convent, was originally built and inhabited by the empreſs Elizabeth, while grand-ducheſs, and on her acceſſion to the throne it was, in 1744, converted into a convent for twenty nuns. The building and walls incloſe a large quadrangle, in the centre of which ſtands the church. Catharine II. ſuffered the nunnery to remain, but enlarged the ſtructure, and founded in it a ſeminary for young ladies of noble families. The monaſtery of Alexander Nevſki is built in the ſhape of a ſpread eagle, and contains in its ample bounds the palace of the metropolitan, the cells of ſixty monks, five churches, a ſchool, &c. The famous ſhrine of St. Alexander, compoſed entirely of wrought ſolid ſilver, occupies a conſiderable ſpace in the elegant church erected expreſsly for that purpoſe. Beneath the pavement is the vault conſtructed by Catharine II. for her relics, and thoſe of her imperial ſucceſſors.

Among the public edifices of the Moſkofſkoi quarter, is the imperial Yægerhof for the *corps de chaſſeurs*. This ſpacious and noble edifice was juſt finiſhed at the demiſe of Catharine II. and her ſon Paul converted it into barracks. The town-hoſpital is likewiſe ſituated here, and deſerves notice from the grandeur of its architecture.

Vaſſili-oſtrof is the ſeat of commerce and of literature. The Exchange and Academy of Sciences ſtand on this iſland. The Academy of Arts alſo here raiſes its majeſtic front on the ſhore of the Neva, over-againſt the Galerenhof. Aſcending the river, the coaſt is lined with the ſpacious edifices of the land cadet corps; and the eaſtern promontory of the iſland is decorated with the three large ſtructures which form the Academy of Sciences, at the extremity of which appears the ſuperb Exchange. Among the numerous churches ſituate on the Vaſſili-oſtrof, the Lutheran church of St. Catharine is principally conſpicuous for the neatneſs and ſimplicity of its architecture, the portico of which is from the model of the temple of Concord.

The Peterſburg quarter of the town conſiſts of ſeveral iſlands; and though it has no ſumptuous edifices to boaſt of, yet contains the parent of all that exiſt in the imperial reſidence, namely, the original wooden palace or cottage of Peter the Great, over which is erected a brick building, on arches to preſerve it from the inclemencies of the weather, as a ſacred relic of that creative genius. Theſe iſlands are Petrofſki-oſtrof, which, beſides a ſmall wooden ſummer-houſe belonging to the grand duke Conſtantine, has nothing worth mentioning, and is partly covered with foreſt trees. Of the ſame deſcription is the Apothecary iſland, which has its name from the garden upon it belonging to the medical college. Another petty iſland is occupied by the hemp magazines, on which account, during the ſummer, a numerous fleet of barks and galleots are conſtantly collected about it. Kammenoi-oſtrof, belonging to one of the imperial family, has upon it an elegant villa, an hoſpital for invalids, and a number of beautiful pleaſure houſes. The iſland Yelagin, ſo deſignated from the name of its proprietor, is highly embelliſhed by art, and laid out in walks, parterres and avenues, with plantations and ſhrubberies, ſo as to reſemble the pleaſure-grounds of an Engliſh nobleman. Kreſtofſki-oſtrof, the largeſt of theſe iſlands, belongs to count Razumofſki, and though leſs transformed by art, is however, by reaſon of its delightful proſpects, ariſing from the noble viſtas and walks, and the ſhores of the ſurrounding iſles, very much frequented by the inhabitants of the city. The laſt and greateſt curioſity of this quarter is the citadel, which ſtands on the iſland in the Neva, four hundred fathoms long and half as much in breadth, near the

Peterſburg iſle, a little above Vaſſili-oſtrof, and therefore nearly oppoſite to the marble palace. The date of its conſtruction is memorable in the annals of the empire, as marking at the ſame time the era of this city. In the year 1703, while Peter the Great was cauſing an earthen rampart to be thrown up on this ſpot, little could he foreſee that the hamlet, conſiſting entirely of a few fiſhermen's huts, would within the courſe of a century be garniſhed with marble temples and gorgeous palaces. Even his rampart of mud has met with a brilliant lot, being faced on the Neva ſide with a magnificent quay of granite. This was the work of the empreſs Catharine II.

The fortreſs has two gates; one looking towards the Peterſburg iſland, with which it has communication by a drawbridge, the other fronting the admiralty-ſide, to which the only acceſs is by water. The moſt ſtriking edifice within the walls is the church of St. Peter and St. Paul, which owes its origin likewiſe to the ductile genius of the famous czar. It ſtands in an open place nearly in the centre of the whole encloſure; having, contrary to the uſual cuſtom, no more than one cupola, with a tower fifty fathoms in height, furniſhed with a chiming clock, for which no leſs a ſum than forty-five thouſand rubles were paid by Peter the Great. From this tower the ſpire riſes twelve fathoms, is gilt with ducat gold, and the whole preſents a beautiful object from various points of view. This church contains the bones of its heroic founder, and ſeveral of his ſucceſſors. Among the other curioſities of the caſtle are to be noted the imperial gold and ſilver aſſay offices and the mint.

Laſtly, the Vyborg quarter has the moſt rural appearance of all; ſince, excepting the ſtreet along the bank of the Neva, it is entirely occupied by cottages of the peaſantry, and its ſmall population is chiefly employed in ruſtic labours. Notwithſtanding this characteriſtic it however numbers amongſt its buildings two noble manſions: that belonging to the late count Beſborodko, ſtanding on the Neva, has wings of colonnades, which form an amphitheatre, and has an elegant garden in the Engliſh taſte. The other of theſe villas, remarkable for its curious ſtyle of architecture, is the property of count Stroganof, and has likewiſe extenſive gardens. The wharf for merchantſhips of all deſcriptions, in this quarter of the town, is the laſt particular we ſhall mention.

The population of St. Peterſburg is computed at 250,000 perſons, conſiſting of Ruſſians, Germans, Finns, French, Swedes, Engliſh, Dutch, Poles, Italians, Spaniards, Portugueſe, &c. St. Peterſburg is therefore a colonial city, of the motley mixture of which the Ruſſians form by far the major part of the people, though they are not the aborigenes of the region, which the ſovereigns of the Ruſſian empire have fixed upon as their imperial reſidence.

The revenue which the ſtate draws from the traffic of the city, may at preſent be eſtimated at about five millions of rubles. If to this be added the tax on the ſale of houſes, the contracts, &c., on the loweſt probable calculation, the total will perhaps be increaſed by one-half.

Bread corn is brought to St. Peterſburg from the countries bordering upon the Volga. Both rye and wheaten bread are eaten here; the latter is the common food of even the loweſt and pooreſt claſſes. The rye-bread is well taſted and yields more nouriſhment. It is univerſally eaten, and even in families of good condition, where they have the chooſing between this and the other. The poorer ſort uſe what is called black bread, prepared of rye-meal unbolled, and is extremely nutritious.

No capital, except London, is better ſupplied with water than this city. The Neva, with its numerous branches and canals, conveys it through every part of the town, ſo that no family can have far to fetch it. Salt is cheap; a pound being ſold at a copeek, which is ſomewhat leſs than a halfpenny. Good beef is bought for four copeeks the pound. Sheep, hogs, tame and wild fowl, and all ſorts of game, are uſually brought frozen in winter, and the price of them is generally regulated by the weather and the hardneſs or ſoftneſs of the ſledge-roads. Fiſh is here a very common article of conſumption. The ſterlet is one of the moſt eſteemed kinds of fiſh, and is conſequently the deareſt. Of theſe about twenty-five thouſand are every year brought alive to St. Peterſburg from the Volga; which river moreover ſends upwards of a million of ſizeable fiſh of various other kinds. The town is ſupplied with the ordinary ſorts of live fiſh from the Ladoga lake. Frozen, ſalted, and dried fiſh are moſtly the food of the lower claſſes. The Neva abounds with ſalmon, which, however, are inferior in point of flavour to thoſe of Riga. Cray-fiſh are alſo caught in the Neva; beſides which the Volga furniſhes annually about a million. Vegetables are the ſole article of conſumption, which the city obtains for the moſt part from its environs. The culture of the kitchen-garden is here brought to ſuch perfection, that the moſt delicate exotics of this kind are to be had at every ſeaſon of the year, and of uncommon excellence. Several of theſe, ſuch as cauliflowers, aſparagus, &c. are very common, and not dear. Sour cabbage, which the Ruſſians call *ſchtſchi*, the ſalutary antiſcorbutic virtues of which have procured it a welcome reception alſo in other countries, is a daily diſh of the common people; it is even ſerved up at great tables as a national delicacy. Salted cucumbers are eaten in equal abundance, and are extremely cheap. The fruit reared in the orchards and forcing-houſes in and about St. Peterſburg, is not nearly adequate to the demands of taſte and luxury. Fruit of the country comes from the Ukraine, and from the regions of the Volga and the Occa; foreign fruit, eſpecially apples, from Roſtock and Stettin, to the amount of about a hundred thouſand rubles annually. The firſt ſhips that arrive here in the ſpring, import oranges of both kinds, and lemons in ſuch abundance, that the ſale of theſe goods often ſcarcely pays the freight. A cheſt, containing four hundred lemons, is uſually to be had, at that ſeaſon, for two or three rubles. Of the ordinary liquors, *quas* is an acidulous, cooling, and wholeſome beverage, peculiarly national, and is offered for ſale at the corners of all the ſtreets. (See QUAS.) In ſummer it is cuſtomary to cool it with ice. The juice of the cranberry yields an excellent and refreſhing liquor, in very frequent uſe under the appellation of *klukva*. By a mixture of klukva, it is by no means uncommon not only to improve the quas and other drinks, but it is uſed, even in good houſes, for making punch, when lemons are at a high price, or not to be had. *Sbiten* is prepared of honey and pepper boiled in water, and hawked about the town by people who make it their trade, and are therefore called *ſbitenſhiks*. In the public houſes may be had beer, mead, and brandy. Among the more delicious ſorts of national liquors, the *viſhneſca* and *malinoſca* muſt not be forgot, a ſort of wine made from cherry-juice put into fermentation by ſugar and brandy; *kiſliſhtſhi*, a ſpecies of quas of a ſuperior quality, and ſeveral others. Their conſumption, however, falls very ſhort, when compared with that of foreign liquors. Wine, porter, and ale, are in general uſe. Of the firſt, upwards of two hundred and fifty thouſand hogſheads are imported every year, and of the two laſt to an amount exceeding two hundred and ſixty thouſand rubles, the greater part of which is here conſumed. The wood for firing produced in the circumjacent diſtrict is not ſufficient for the prodigious demand of this city; about a hundred and fifty thouſand fathoms, moſtly of birch, being annually brought in from other parts of the country.

Mr. Tooke, in his View of the Ruſſian Empire, vol. iii. p. 543, has given us the ſeveral items of expence incurred by travellers viſiting Peterſburg, which are as follow: ſervant, *per* month 15 rubles, clothes, food. Coachman, 10 rubles *per* month, without food, but clothes provided. Cook, from 10 to 15 rubles *per* month; but a foreigner 30 or 40 rubles. Maid ſervant, from 3 to 5 rubles *per* month. Keep of a ſaddle horſe, 18 rubles *per* month. A pair of coach horſes, to hire, from 50 to 60 rubles *per* month, coachman included. Waſhing ſhirt, 10 copeeks; ſtockings, ſilk, 15 cop.; cotton, 5 cop.; cravat, 4 cop.; waiſtcoat, 10 cop.; trowſers, 15 cop.; handkerchief, 3 cop. Phyſician 10 rubles. Carriage to hire, 100 rubles *per* month. Lacquay, *per diem* 1 ruble; *per* month 25 rubles. Wines; the beſt old port 350 rubles the pipe; table port 250 rubles; chateau margot 250 rubles the hogſhead; Madeira 300 rubles the hogſhead; Champagne, the caſe 50 bottles, 200 rubles; Rheniſh wine from 1 ruble 50 cop. to 3 rub. 50 cop. *per* bottle; Hungary wine from 2 rub. 50 cop. to 6 rub. the bottle. It muſt be underſtood, however, that this ſtatement was made in the year 1800. Since that period every thing is greatly enhanced in price.

The inhabitants of this large city, beſides Ruſſians, conſiſt of all nations; ſo that a perſon hears a great variety of languages, and ſees an infinite diverſity of faſhions and cuſtoms at St. Peterſburg. The ſplendour of the court is imitated by the inhabitants in general; though every thing belonging to apparel, and eſpecially if made by foreign artizans, is very dear; and likewiſe furniture, and houſes in an eligible ſituation, bear ſometimes an extravagant price. The police is well regulated; and liberty of conſcience is enjoyed in its utmoſt extent.

When a perſon intends to ſet out from hence in order to quit the country, it is neceſſary for him to be furniſhed with a paſs, for obtaining which he muſt previouſly advertiſe his name, and intention of travelling, three times in the gazette. No ſooner is the winter ſet in, than upwards of 3000 Ruſſians repair with their ſledges to Peterſburg, where they ſtand in every ſtreet, and are ſo cheap and convenient, that few go on foot even about the town. A ſledge and horſe may be hired for ten copeeks an hour; and within that time this carriage will go about ſeven or eight Engliſh miles, the horſe continually galloping. Every *iſvoſhik*, or driver, is marked with a number on his back. It is ſufficient for a ſtranger to know the place or the houſe whither he would go, and three or four Ruſſian words, as, *ſtupai*, drive on; *ſtoi*, ſtop; *pramo*, ſtraight on; *na prava*, to the right; *na leva*, to the left; and the driver will convey him ſafe. Moſt houſekeepers have their own ſledges and horſes, and perſons of diſtinction keep alſo their poſtilion. In ſummer time thoſe who are not inclined to go on foot in this extenſive city, either make uſe of their own carriage, which is almoſt of abſolute neceſſity here, or elſe hire either curricles or boats.

PETERSBURG, a townſhip of America, in New York, in Renſſelaer county, E. of the village of Troy, incorporated in 1793, and containing 4322 inhabitants.—Alſo, a poſt-town of Pennſylvania, in York county, two miles N. of the Maryland line; containing a Roman Catholic church, and about 80 houſes; 25 miles N.W. of Yorktown.—Alſo, a ſmall town of Kentucky, ſituated in Woodford county, on the E. ſide of Kentucky river; 19 miles W.S.W. of Lexington. It has a few dwelling houſes, and a tobacco warehouſe.—Alſo, a poſt-town of Virginia, of conſiderable trade, in Dinwiddie county, on the S.E. bank of Appamatox river, about 25 miles S. of Richmond. It contains about 400 houſes, irregularly built, an epiſcopal church, a court houſe, and a gaol. The Freemaſons' hall is a handſome building. It has ſeveral tobacco warehouſes, ſtores of dry goods, and ſome few neat and commodious dwelling-houſes. The town is a corporation; and in 1790 contained 2828 inhabitants, including 1265 ſlaves. Its ſituation is rather low and unhealthy. The whole exports of this town, valued at the uſual peace prices, amount to 1,389,300 dollars, beſides the value of peach and apple brandy, whiſkey, &c.; 80 miles W. by N. from Norfolk. N. lat. 37° 14'. W. long. 78° 8'.—Alſo, a very flouriſhing poſt-town of Georgia, in Albert county, in a pleaſant and ſalubrious ſituation, on the point of land formed by the confluence of Broad river with the Savannah. Several reſpectable merchants are ſettled in this town; 20 miles N. by E. from Waſhington. N. lat. 33° 46'. W. long. 81° 32'.

PETERSDORF, a town of Pruſſia, in the province of Samland; 24 miles E. of Königſberg.

PETERSFIELD, a town having ſeparate juriſdiction, in the hundred of Finchdean, is ſituated in the county of Southampton, or Hampſhire; 55 miles S.W. from London. Though but a chapelry to the pariſh of Buriton, Petersfield is a market and borough town of conſiderable antiquity. Its firſt charter of incorporation was granted by queen Elizabeth, who veſted its government in a mayor and commonalty, and empowered them to return two members to parliament; but two returns had been previouſly made, one in the thirty-fifth of Edward I., the other in the time of Edward VI. The right of election, as determined by the houſe of commons in 1727, is "in the freeholders of lands, or ancient dwelling houſes or ſhambles, or dwelling houſes or ſhambles built upon ancient foundations, within the ſaid borough." The number of votes is about 180, and the mayor is the returning officer. The regular place of worſhip is a chapel of eaſe, and near it ſtands an equeſtrian ſtatue of William III. erected by William Jeliffe, eſq. with an inſcription on the pedeſtal.

The paſſage of travellers from London to Portſmouth, forms the principal ſupport of Petersfield. It has a market on Saturday, and two annual fairs. The petty ſeſſions are holden here. Mapledurham, about two miles ſouth of Petersfield, was ſome time the ſeat and reſidence of the hiſtorian Edward Gibbon, eſq. At Butſer hill, a ſhort diſtance from Mapledurham, Aubrey places a conſiderable encampment. A few miles to the weſt from Petersfield are the villages of Eaſt and Weſt Meon, mentioned in the Domeſday book as the property of the biſhop of Wincheſter, and then known by the general name of Menes. In the church at Eaſt Meon is a very ancient font, bearing an exact reſemblance to that in Wincheſter cathedral, and moſt probably the work of the ſame artiſt, and given by the ſame biſhop. The upper part, or baſin, is placed on a circular ſhaft of three large ſingle ſtones, and its corners are ſupported on circular pillars without baſes, and having capitals of plain upright leaves. Beauties of England, vol. vi.

PETERSHAGEN, formerly *Hockleve*, a town of Weſtphalia, in the county of Minden, and once the reſidence of the biſhop of Minden.

PETERSHAM, a pleaſant poſt-town of America, in Worceſter county, Maſſachuſetts, formerly called by the Indians "Nichewang;" 28 miles N.W. of Worceſter. It is traverſed by Swift river, a branch of Chickapee river. The ſoil is rich, and here are large and excellent orchards; it contains 1794 inhabitants.

PETERSHAUSEN, a princely Benedictine abbey, near Conſtance, on a branch of the lake; given in 1802, with the dioceſe of Conſtance, as an indemnity to the margrave of Baden.

PETERSKIRCHEN, a town of Auſtria; five miles N. of Sonneberg.

PETERSTHAL, St., a town of Germany, in the circle of the Upper Rhine; ſix miles S. of Oppenau.

PETERSWALD, a town of Bohemia, in the circle of Leitmeritz; 18 miles N.N.W. of Leitmeritz.

PETERSWALDAU, a town of Sileſia, in the principality of Schweidnitz; nine miles S. of Schweidnitz.

PETER-WARDEIN, a town of Sclavonia, on the Danube, ſtrongly fortified; famous for the victory obtained near it over the Turks, in 1716, by prince Eugene; 38 miles N.W. of Belgrade. N. lat. 45° 26′. E. long. 19° 37′.

PETESIA, in *Botany*, a name of whoſe origin neither Browne nor Linnæus has vouchſafed to give any account, nor has any other writer, that we can find, hazarded a conjecture concerning it. We are obliged to leave it in the dark, as we find it. Browne Jam. 143. Linn. Gen. 54. Schreb. 72. Willd. Sp. Pl. v. 1. 612. Mart. Mill. Dict. v. 3. Juſſ. 199.—Claſs and order, *Tetrandria Monogynia*, Nat. Ord. *Rubiaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth ſuperior, in four or five deep, acute, permanent ſegments. *Cor.* of one petal, funnel-ſhaped; its limb in four deep ſegments. *Stam.* Filaments four, ſhort, inſerted into the baſe of the corolla; anthers oblong, equal to the tube. *Piſt.* Germen inferior, roundiſh, with a furrow at each ſide; ſtyle ſimple, erect; ſtigma acute. *Peric.* Berry globoſe, of two cells, crowned with the calyx, and finally ſplitting longitudinally. *Seeds* ſolitary in each cell, large, convex on the outſide, flat on the inner.

Eſſ. Ch. Corolla of one petal, funnel-ſhaped, four-cleft. Stigma ſimple, acute. Berry with two ſeeds.

Obſ. The character of this genus is involved in the greateſt poſſible confuſion. We have endeavoured to make it accord with *P. ſtipularis*, the only authentic ſpecies that remains, and to avoid abſurd contradictions. Probably *Ixora americana* ought to be reſtored to *Peteſia*, where Browne firſt placed it, and with which it agrees far better in habit and character than with other *Ixoræ*; but who can decide this point without examining all the plants in queſtion in a perfect ſtate? Whether *P. ſtipularis* be tetrandrous or pentandrous is not clear, nor does Browne, whoſe ſpecimens are before us, appear to have ſeen the flowers. For *P. Lygiſtum* of Linnæus, ſee Manettia.

1. P. *ſtipularis*. Linn. Sp. Pl. 160. Willd. n. 1. (P. fruticoſa, foliis ovatis oppoſitis, ſtipulis rigidis interpoſitis, racemis minoribus alaribus, calyce quinquefido; Browne Jam. 143. t. 2. f. 2.)—Leaves elliptic-lanceolate, moſt downy beneath. Panicles axillary, denſe, forked.—Native of Jamaica, on the hills above Bull Bay, and on thoſe between Sixteen-mile-Walk and St. Mary's. *Browne*. The *ſtem* is ſhrubby. Young *branches* ſquare, leafy, clothed with ſoft down, as are the *footſtalks*, backs of the *leaves*, and whole *infloreſcence*. The *leaves* are two inches long, elliptical, acute, entire, with one rib, and many tranſverſe curved veins; their upper ſurface at length ſmooth and naked. *Stipulas* between the baſes of the *footſtalks*, broad at the bottom, pointed, briſtly. *Panicles* much ſhorter than the leaves, each of twelve or fifteen ſmall *flowers*. *Berry* downy, about the ſize of hemp-ſeed. Swartz gueſſes this plant to be akin to *Rondeletia*, but he had never ſeen it. See his Obſ. Bot. 47.

2. P. *carnea*. Forſt. Prodr. 10. Willd. n. 2.—"Leaves oblong-lanceolate, ſmooth. Cymes terminal, three-cleft."—Native of the iſland of Namoka. *Forſt.* We muſt rely on Forſter for the genus of this plant.

3. P. *tomentoſa*. Jacq. Amer. 18. Linn. Sp. Pl. 161. Willd. n. 3.—"Leaves oblong, downy on both ſides."—Obſerved by Jacquin, in woods at Carthagena. A *ſhrub*, with weak trailing *branches*; the young ones obſcurely quadrangular, and ſlightly downy. *Leaves* oblong, tapering at each end, three inches long, ſoft with ſcarcely viſible down. *Corymbs* lateral and terminal. *Flowers* ſmall, inodorous, yellowiſh-white. *Fruit* unobſerved, ſo that Jacquin was in doubt as to the genus. We ſhould not be ſurprized if this proved the very ſame plant as *P. ſtipularis*.

4. P. *villoſa*. (P. fruticoſa, foliis ſubvilloſis ovatis oppoſitis, ſtipulis ſetâ terminatis, racemis alaribus; Browne Jam. 144.)—"Leaves ovate, ſomewhat villous. Stipulas tipped with a briſtle."—Gathered by Browne along with the firſt ſpecies. He gives no figure of it, nor have we ſeen a ſpecimen. We merely inſert it for further enquiry.

P. ſpicata, Swartz Ind. Occ. 1945, having numerous *ſeeds* and a cloven *ſtigma*, cannot belong to this genus, nor dare we adopt Loureiro's *ſimpliciſſima* and *trifida*.

PETHERTON, North, in *Geography*, a town in the hundred of North Petherton, in Somerſetſhire, 144 miles W. by S. from London. The town conſiſts chiefly of one ſtreet, which is built along the road from Bridgewater to Taunton, and contains many good houſes. It derives its name from its ſituation on the river Parret, which was anciently written Peder. It was formerly in the poſſeſſion of the Saxon kings, and of ſuch conſequence, that it never was aſſeſſed to the Danegeld, nor rated to any other ſubſidy. The pariſh is extenſive, and contains ſeveral hamlets. The church is dedicated to St. Mary, and is a large handſome ſtructure, conſiſting of a nave, chancel, and ſide aiſles. At the weſt end is an embattled tower, richly embelliſhed with ſculpture, and open ornaments towards the ſummit. The pinnacles are particularly light and elegant. The market is on Saturday, and there was formerly a large market-place for corn. Here is one annual fair. By the cenſus of 1811, the number of houſes was 546, and of inhabitants 2615. Within the pariſh are ſeveral places, of little note now, but which at former periods have been the reſidence of great and eminent families. Manſel, or Maunſel, is the ſeat of John Slade, eſq., the poſſeſſor of the manor and hundred of North Petherton. This eſtate had been the inheritance of the family of the Maunſels for many generations. Collinſon's Hiſtory of Somerſetſhire, vol. iii.

Petherton, *South*, a town in the hundred of South Petherton, Somerſetſhire, 137 miles from London, and ſix from Ilminſter. It was formerly called Pedredan, or Pedredſtown, from its ſituation on the Parret. It is the firſt conſiderable pariſh which that ſtream traverſes in its way to the ſea. It paſſes here under a ſtone bridge of three arches, a mile ſouthward of the pariſh church, at the interſection of the Roman foſſe-road, coming from Ilcheſter. The bridge was formerly of wood, which having become ruinous, two children were drowned in the river near it; the parents of the children rebuilt it of ſtone, and cauſed their infant effigies to be placed thereon, to commemorate the circumſtance. In a field near this bridge a large quantity of Roman coins, to the amount of ſix pecks, was dug up about the year 1720; and near Jailer's-mill, in the tithing of Southarp, a little below the ſurface of the ground, are the remains of Roman buildings, which the common people, from the name, ſuppoſe to be the foundation of an old priſon. In this ſpot, alſo, coins, fragments of urns, pateræ, and pieces of terras, have been diſcovered. It is undiſputed that South Petherton and its vicinity were known to, and occupied by, the Roman people, as it lies ſo near to one of their principal roads, and as their reliques have here been ſo frequently diſcovered. At Watergore, a ſmall hamlet ſouthward of the town, a Roman pavement was diſcovered in 1673; and Wigborough, not far diſtant, is ſuppoſed to have been a Roman town, not only from its name, but from the extenſive foundations of buildings which have been traced there.

When that people relinquiſhed this country, South Petherton became the poſſeſſion and the ſeat of the Saxon kings of Weſſex. King Ina had a palace here, which was long ago deſtroyed; there is, however, an old houſe near the church, with ancient windows, and armorial ſhields, which bear that prince's name, but it is unqueſtionably the erection of more modern times. King Athelſtan is reported to have occupied this place, which was thought an object of importance by all his ſucceſſors, till after the Norman conqueſt. The pariſh church ſtands on a little eminence near the centre of the town, and is dedicated to St. Peter and St. Paul. It is a large ſtructure, built in the form of a croſs, having two ſide aiſles, and a north and ſouth tranſept, with an octangular tower at their interſection, crowned with a ſpire. Behind the altar is a veſtry-room, which was formerly a confeſſional: many of the monuments, with the organ, were ſpoiled in the civil wars. The pariſh is divided into four tithings. A market is held here on Thurſday, and there was formerly a large market-hall and croſs, both which, with ſeveral houſes, were deſtroyed in the laſt century. The annual fair is on the fifth day of July. At this place is a conſiderable manufactory of dowlas. By the cenſus of 1811, the pariſh contained 352 houſes, and a population of 1867 inhabitants. At Hinton St. George, about three miles diſtant, is a ſeat of earl Poulet. Collinſon's Hiſtory of Somerſetſhire, vol. iii.

PETIA, a word uſed by medical writers in different ſenſes. It is commonly underſtood to mean a piece of rag, uſed to tie medicinal ingredients in, to be uſed by infuſion in liquors; but petia oculi ſignifies an hæmorrhage of the eye.

PETICULÆ, the ſame as *petechiæ*, purple ſpots appearing on the fleſh in malignant fevers.

PETIGLIANO, in *Geography*, a town of Etruria; 50 miles S.E. of Sienna.

PETIGO, a word uſed by ſome authors for *impetigo*.

PETILIUM, in *Botany*, a name given by Linnæus, in the firſt edition of his Genera Plantarum, p. 91, to the Crown Imperial, which he at that time conſidered as a diſtinct genus from FRITILLARIA; ſee that article.

PETILIUS FLOS, a name uſed by ſome botanical authors for the African marygold.

PETIMBUABA, in *Ichthyology*, the name of a fiſh caught in the American ſeas, and called by ſome, in Engliſh, the *tobacco-pipe fiſh*. See FISTULARIA.

PETIN, in *Geography*, a ſmall iſland in the Eaſt Indian ſea. S. lat. 2 20'. E. long. 99° 27'.

PETINA, LA, a town of Naples, in Principato Citra; 6 miles S.W of Cagiano.

PETIOLATE LEAF, in *Botany*. See LEAF.

PETIOLUS, the Footſtalk, or Leafſtalk, is what ſupports the leaf when the latter is not ſeſſile, or cloſe to the ſtem or root. In all ſimple leaves, and in ſome compound ones, whoſe leaflets are ſeſſile, the footſtalk is neceſſarily ſimple: in compound leaves in general it is branched. The footſtalk is uſually channelled on the upper ſide; convex, angular, or keeled underneath. Sometimes it is dilated, and concave, or ſheathing at the baſe. It occaſionally ends in tendrils, as in ſome Vetches, and now and then bears the flower-ſtalk, as in *Turnera* and *Menyanthes*. See LEAF.

PETIS DE LA CROIX, FRANCIS, in *Biography*, a learned French orientaliſt, born in 1654, was the ſon of the king's interpreter for the oriental languages, and received an education to qualify him for the ſame employment. At the early age of ſixteen, he was ſent by the miniſter Colbert to reſide in the Eaſt. He paſſed ſeveral years at Aleppo, viſited Iſpahan and Conſtantinople, and employed himſelf in the moſt diligent ſtudy of oriental literature. He returned to Paris in 1680, and in two years afterwards he was ſent to Morocco, as ſecretary under M. de Saint-Amand, to Muley Iſhmael, king of that country. He pronounced before that ſovereign the ambaſſador's harangue in Arabic, with an elegance and purity which excited the admiration of the whole court. In the two following years he accompanied the French armament againſt Algiers, in quality of ſecretary-interpreter of the marine, and was employed to tranſlate into the Turkiſh language the treaty of peace in 1684. He performed the ſame office with reſpect to the negociations with Tunis and Tripoli. When the latter power was engaged to pay the king of France the ſum of 600,000 livres, by way of reimburſement, a conſiderable bribe was offered to Petis de la Croix, to put in the treaty crowns of Tripoli inſtead of French crowns, which would have made the difference of 100,000 livres, but his fidelity to his ſovereign was incorruptible. In 1687 he was employed at Morocco under the duke de Mortemar: and, in ſhort, it was through his intervention that all the affairs between the French miniſtry and the eaſtern courts were tranſacted, from the year 1680 to the time of his death. In 1692 he was appointed to the profeſſorſhip of Arabic in the college royal, and the ſurvivorſhip of his father's office of Oriental interpreter was conferred upon him. From this period he never left the kingdom, but employed himſelf in tranſlations from the eaſtern languages, of which he was acquainted with the Arabic, Turkiſh, Perſian, Tartarian, Ethiopic, and Armenian. He died at Paris in 1713. His principal publications are "The Oriental Library of Hadji Calfa;" "The Hiſtory of all the Mahometan Monarchies," from the Turkiſh; "General State of the Ottoman Empire, from the Foundation to the preſent Time, with abridged Lives of the Emperors;" from the Turkiſh; "The Hiſtory of Gengiſcan;" "The Hiſtory of Timur-Bec," from the Perſian; "The Thouſand and One Days," tales from the Perſian; beſides other tracts, geographical and deſcriptive, and ſome grammars, dictionaries, &c. Moreri.

PETISTAGUIT, in *Geography*, a river of Canada, which runs into the river St. Lawrence, N. lat 50 . W. long. 66 26'.

PETIT, SAMUEL, in *Biography*, a French Proteſtant divine, was born in the year 1594. He was the ſon of a reſpectable miniſter at Niſmes, in Languedoc, from whom he received the elements of an excellent education. While a child, he diſcovered a powerful inclination for learning, and aſtoniſhed the maſters under whoſe tuition he was placed, by the rapidity with which he became a proficient in the Greek and Latin languages. Having laid a good foundation of grammar learning, he continued to extend his acquaintance with the ancient languages, and afterward to apply his attention to rhetoric and philoſophy. Being intended for the miniſtry, he ſpent three years at Geneva in attending the divinity lectures of Diodati, and thoſe of the other learned profeſſors of that celebrated ſchool. At the ſame time he applied himſelf to the ſtudy of the oriental tongues. The zeal with which he applied to learning is almoſt incredible: for a whole year he allowed himſelf reſt only on each alternate night, the others were devoted to ſtudy. Such was his progreſs, that at the age of ſeventeen he was admitted to the miniſtry. Almoſt immediately after this he was choſen to fill the chair of profeſſor of divinity in the academy of Niſmes, to which was added the profeſſorſhip of the Greek and Hebrew languages. Theſe poſts he retained with very high reputation during the remainder of his life; while he purſued his various learned ſtudies with uncommon diligence. He was likewiſe eminent as a preacher, and devoted much of his time to the charitable duties of viſiting the ſick. To the deep regret of all who knew him, and to the loſs of the learned world, he died in 1643, when he was only in the 49th year of his age. He was a man of vaſt and profound erudition, but his learning was accompanied with modeſty and humility, and through life he is ſaid to have exhibited a bright pattern of unaffected piety, and of all the moral virtues. His works are very numerous, and he left behind him in MS. two large volumes of notes upon Joſephus, which were purchaſed by lord Clarendon for 150 louis-d'ors, and preſented to the univerſity of Oxford, where they were depoſited in the Bodleian library. Here they were conſulted by Hudſon, when he was preparing his edition of the Jewiſh hiſtorian. Moreri.

Petit, Peter, a celebrated French mathematician and natural philoſopher, was born in the year 1598. He cultivated from a very early period the ſtudy of the mathematics and phyſics, in which he made conſiderable progreſs, and which recommended him to the acquaintance of M. Paſcal. His father was comptroller of the elections in the diſtrict in which he lived, an office to which he ſucceeded, but which, in 1633, he ſold, and removed to Paris. Here he diſtinguiſhed himſelf by his writings, and became intimate with the moſt eminent men of his time. On ſeveral occaſions he was employed by cardinal Richelieu, who gave him a commiſſion to viſit the ſea-ports, with the title of engineer and geographer to the king. He was afterwards ſent into Italy by his majeſty, on ſpecial affairs. After his return, he became a convert to the principles of Des Cartes. About the year 1640, he received the appointment of intendant of the fortifications of France. During a part of the year 1646 and 7, he was ſtationed at Rouen, where, in conjunction with M. Paſcal, he went through the ſame experiments on the ſubject of a vacuum, which Torricelli had made before in Italy. (See Pascal.) From this time there are no farther particulars relating to the life of M. Petit, though he lived to the year 1677, when he was about 79 years of age. He is deſcribed as having excelled particularly in aſtronomy, and as having had a ſingular paſſion for experimental philoſophy. He was author of many treatiſes on mathematical, phyſical, and aſtronomical ſubjects, of which a long liſt is given in the Gen. Biog. Moreri.

Petit, Peter, a learned phyſician, was born at Paris in the year 1617, and obtained the degree of doctor in the univerſity of Montpellier, and of bachelor of medicine in that of Paris. He was alſo elected a member of the academy of Padua. Although he had acquired an extenſive acquaintance with the medical ſcience, in the courſe of the ſtudies by which thoſe degrees were obtained, yet the bias of his mind was not directed to the practice of the profeſſion which he had cultivated, but led him to philoſophical and literary purſuits, and eſpecially to the ſtudy of hiſtory, and to the cultivation of Latin poetry. It was by the excellence of his poems that he obtained the honour of admiſſion into the Paduan academy; and the ſame merit occaſioned him to be ranked as one of the Pleiades of Paris, an appellation given to a party of ſeven of the moſt accompliſhed Latin poets of that capital. A collection of his poems was publiſhed in 1683, dedicated to M. Nicolai, preſident of the chamber of accounts, and prefaced by a curious diſſertation on the mania of poetry. His poem of "Codrus," and that entitled "Cynomagie," are much praiſed for the elevated ſentiments, the elegance of expreſſion, and the ſtrength and harmony of the verſe, which they exhibit. One of his poems was on the ſubject of "Tea," and was printed at Leipſic, in 1685, with the title of "Thée, ſive de Sinenſi Herba Thée," with an epigraph of Nicholas Pechlin reſpecting this herb, and the deſcriptions of ſeveral other authors. The writings of Petit, however, were not limited to poetical eſſays; he was the author of ſeveral curious tracts, of which the following are the titles. "De Motu Animalium Spontaneo," Par. 1660, in which he defended Ariſtotle againſt Deſcartes: "De Lacrymis, Libri tres," 1661, 12mo.: "Exercitationum de Ignis et Lucis Natura Defenſio," 1664, 4to.: "Diſſertatio de novâ Renati Carleſii Philoſophia," 1670, 8vo: "Miſcellanearum Obſervationum, Libri quatuor," 1682, 8vo.: "De Amazonibus Diſſertatio," 1685, 12mo.: "De Sybilla, Libri tres," Lipſ. 1686, 8vo.: "De Natura et Moribus Anthropophagorum," Traj. 1688, 8vo.: "Homeri Nepenthes, ſive, de Helenæ Medicamento luctum avolente Diſſertatio," ibid. 1689, 8vo.: "Commentarii in tres priores Aretæi Cappadocis Libros," Lond. 1726: "Traité de la Nourriture qui peut ſe tirer de l'Eau." Eloy Dict. Hiſt. de la Med.

Petit, Francis, a diſtinguiſhed phyſician, who is better known by this name than by that of *Pourfour du Petit*, was born at Paris on the 24th of June, 1664, and loſt his parents, who were engaged in trade, during his childhood. He is ſaid to have been ſlow of apprehenſion, and weak in memory, when a boy; ſo that, though he laboured much at ſchool, his progreſs was extremely ſlow, until his mind was intereſted, and his faculties called forth, by the philoſophy of Deſcartes, which his tutor put into his hands. The ſubject became the leading object of his purſuits, and he began his travels early, with the view of increaſing his knowledge. At Rochelle he became intimate with M. Blondin, who had a valuable library, a garden of medicinal plants, and a muſeum of natural curioſities, and who inſtructed him in anatomy, and recommended him to ſtudy medicine. He adopted this counſel, and in 1687 repaired to Montpellier, where he graduated, and returned to Paris in 1690. Here he ſtudied anatomy under Du Verney, botany with Tournefort, and chemiſtry with Lemery, and obtained the friendſhip of theſe celebrated men. After three years of ſtudy, and attendance on the hoſpital of La Charité, he became attached to the army, and in his ſuperintendance of the hoſpitals at Mons, Namur, and Dinant, he obtained conſiderable diſtinction, and eſtabliſhed in them diſſecting-rooms, and chemical laboratories, and directed the ſtudies of the pupils in botany. After the peace of Ryſwick, in 1697, he returned to Paris: but the war of the Spaniſh ſucceſſion called him again to the military hoſpitals, and it was not till the peace of Utrecht took place, in 1713, that he ſettled in Paris. In 1722 he was elected a member of the Academy of Sciences, and three years afterwards he was appointed penſionary anatomiſt, on the ſuperannuation of M. du Verney. His reputation obtained for him this honourable appointment, and he was now extenſively employed in the practice of his profeſſion. He was particularly ſucceſsful in the treatment of diſeaſes of the eye, which he illuſtrated by various models, and remedied

died by improving the inſtruments and operations of his predeceſſors, in relation to this delicate organ.

This ingenious man died at Paris on the 18th of June, 1741, aged 77. He left ſeveral works behind, beſides the papers which he communicated to the academy. They were written in a negligent, and not always correct ſtyle; for the conſtant occupation of his time in obſervation and experiment prevented him from exerciſing the *limæ labor* on his writings, and rendered him careleſs about the turn of his phraſes. His works are; "Trois Lettres d'un Medecin des Hoſpitaux du Roi à un autre Medecin de ſes Amis, ſur un Nouveau Syſteme du Cerveau," Namur, 1710, 4to. "Diſſertation ſur une Nouvelle Methode de faire l'Operation de la Cataracte," Par. 1727, 12mo. "Lettre dans laquelle il eſt démontré que la Cryſtallin eſt fort près de l'Uvée, et ou l'on rapporte de nouvelles preuves de l'Operation de la Cataracte," 1729, 4to. "Lettres contenant des Reflexions ſur ce que M. Hecquet, M.D. a fait imprimer touchant les Maladies des Yeux," 1729, 4to. "Lettres contenant des Reflexions ſur les Decouvertes faites ſur les Yeux," 1732, 4to. Eloy Dict. Hiſt.

Petit, John Lewis, a celebrated ſurgeon, was born of a reſpectable family at Paris, on the 13th of March, 1674. From his childhood he diſplayed an acuteneſs and penetration beyond his years, which gained him the attachment of M. de Littre, a celebrated anatomiſt, who reſided in his father's houſe. This kindneſs of M. de Littre, and his own curioſity, ſometimes attracted the boy to the diſſecting room of the former, where he ſoon evinced an intereſt in anatomical purſuits. Diſſection, ſo far from alarming him, became his play: he was found one day, in a garret, where he had ſecreted himſelf, diſſecting a rabbit, which he had caught, in imitation of what he had ſeen M. de Littre perform. This able anatomiſt did not fail to cultivate this inclination; and from the age of ſeven years, his young pupil regularly attended at his demonſtrations, and made ſuch rapid progreſs, that he had ſcarcely attained the age of twelve, when M. de Littre confided to him the ſuperintendance of his anatomical theatre. He afterwards ſtudied ſurgery under Caſtel and Mareſchal, and was admitted Maſter at Paris in 1700. He was born, it has been ſaid, for the art which he practiſed, and would have created ſurgery, if it had been previouſly unknown. He became the firſt practitioner, and, as it were, the oracle of ſurgery in Paris; he was conſulted in all caſes of importance; and there were few operations of difficulty and delicacy, which he did not ſuperintend, or actually perform; and his hand and his counſels were alike ſucceſsful. Such a reputation was of courſe not limited to his native city, but extended throughout Europe. In 1726 he was ſent for by the king of Poland, and again in 1734 by Don Ferdinand, afterwards king of Spain: he re-eſtabliſhed the health of both theſe princes, who endeavoured to retain him near their perſons with the offer of great rewards. But he preferred his native capital to the moſt brilliant ſituations, and found there a ſufficient number of perſons who properly eſtimated his merits. He became a member of the Academy of Sciences in 1715, and was appointed director of the academy of ſurgery, and cenſor and royal profeſſor at the ſchools. He was likewiſe choſen fellow of the Royal Society of London. He died at Paris on the 20th of April, 1750, aged 76. He was equally beloved for the qualities of his heart, as he was admired for thoſe of his underſtanding; for his diſpoſition was naturally lively and hoſpitable, and his manners were indicative of openneſs and warmth of heart, rather than the reſult of a ſtudied politeneſs. He was extremely animated in every thing that concerned his profeſſion; and an overſight irritated him more than an inſult. But his anger was ever of ſhort duration, and he entertained no enmities. His benevolence towards the ſuffering poor was unbounded, and he ſpared no labour or exertions for their relief.

He communicated many memoirs to the Academy of Sciences, and ſeveral to the Academy of Surgery, which were printed in their firſt volume. His only ſeparate publication was, his "Traité des Maladies des Os," printed at Paris in 1705, in 12mo., and frequently reprinted, with additions. An edition, in 1758, in two volumes, 12mo., was publiſhed by M. Ant. Louis, with an hiſtorical and critical eſſay reſpecting it ſubjoined: and his pupil, M. Leſne, publiſhed his poſthumous works in 1774, with the title of "Traité des Maladies Chirurgicales et des Operations qui leur conviennent," in three volumes, 8vo., with many plates of chirurgical inſtruments. His treatiſe on the bones involved him in ſeveral controverſies; but the only chagrin which he felt, aroſe from finding Winſlow, who, as cenſor royal, had approved the work, retract his approbation, in a letter inſerted in the Journal des Savans for May, 1725. Eloy Dict. Hiſt.

Petit, Anthony, a diſtinguiſhed anatomiſt, was born at Orleans, and received the degree of doctor of phyſic at Paris, in November 1746. He was elected a member of the Royal Academy of Sciences in 1760. His talents in the practice of his profeſſion procured for him the appointment of inſpector of military hoſpitals in 1768, and, in the following year, the chair of anatomy and ſurgery at the king's garden, where his ſcience and eloquence attracted a crowd of auditors. In 1775 he was ſucceeded by M. Vicq d'Azyr in the duties of this chair, while he remained titular profeſſor. He was author of the following works; *viz.* "Lettre d'un Medecin de Montpellier, au Sujet de l'examen public que le Sieur Louis a ſubi à ſaint Côme, en 1749, pour ſervir d'Eclairciſſement a ce qu'en dit M. Fréron," 4to. 1749. "Diſcours ſur la Chirurgie," an introductory lecture delivered at the ſchools of medicine, 1757. "Conſultation en faveur des Naiſſances tardives," 1764, 8vo. "Premier et ſeconde Rapport en faveur de l'Inoculation," 1766, 8vo. "Deux Conſultations Medico-legales," relative to a caſe of ſuppoſed ſelf-murder, and to a ſuppoſed infanticide, 1767. He alſo edited, "Anatomie Chirurgicale publicé cidevant par Jean Palſin," 2 tom. 8vo. 1753. Eloy Dict. Hiſt. de la Med.

Petit, *Cape*, *Jury*, *Larceny*, *Serjeanty*, *Seſſion*, *Treaſon*. See the ſubſtantives.

Petit *Goave*, in *Geography*. See Goave.

Petit *Port*, a harbour on the coaſt of Peru, near the equator.

PETITA Terra. See Summons.

PETITCODIAK, in *Geography*, a river of America, which falls into an arm of the bay of Fundy, called Chegnecto channel. The Indians have a communication from the head of it with St. John's river, by a portage acroſs to the head of Kennebeeſius.

PETITE Guerre, Fr., in *Military Language*, is carried on by a light party, commanded by an expert partiſan, conſiſting of between one and two thouſand men, ſeparated from the main army, in order to ſecure the camp on a march, to reconnoitre the enemy or the country, to ſeize their poſts, convoys, or eſcorts, to plant ambuſcades, and to practiſe every ſtratagem for ſurpriſing or diſturbing the enemy.

PETITE-PIERRE, La, or **Lutzelstein**, in *Geography*, a town of France, in the department of the Lower Rhine, and chief place of a canton, in the diſtrict of Savarre.

varre. The place contains 1019, and the canton 9323 inhabitants, on a territory of 292½ kiliometres, in 22 communes.

PETITE-RIVIERE, a town of Hiſpaniola; 15 miles E.N.E. of St. Marco.—Alſo, a town of Canada, on the St. Lawrence; 65 miles N.E. of Quebec.

PETITES-CHIELLES, a town of France, in the department of the Jura, and chief place of a canton, in the diſtrict of Saint Claude. The place contains 578, and the canton 11,923 inhabitants, on a territory of 255 kiliometres, in 28 communes.

PETITE-TERRE, a ſmall iſland in the Weſt Indies, near Deſeada.

PETITE-TROU, a town of the iſland of Hiſpaniola; 19 miles E. of Jeremie.

PETITIA, in *Botany*, was named by Jacquin, in honour of Francis Pourfour du Petit, a celebrated phyſician and anatomiſt of Paris, who died in 1741. He publiſhed ſome botanical obſervations, in the form of letters, in 1710. Jacq. Amer. 14. Schreb. 72. Willd. Sp. Pl. v. 1. 614. Mart. Mill. Dict. v. 3. Juſſ. 107.—Claſs and order, *Tetrandria Monogynia*. Nat. Ord. *Perſonatæ*, Linn. *Vitices*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, ſmall, erect, with four teeth, permanent. *Cor.* of one petal; tube cylindrical, erect, long; limb in four ovate, acute, flat, reflexed ſegments, half the length of the tube. *Stam.* Filaments four, awl-ſhaped, very ſhort, in the upper part of the tube; anthers erect. *Piſt.* Germen roundiſh, ſmall, ſuperior; ſtyle awl-ſhaped, erect, the length of the ſtamens; ſtigma ſimple. *Peric.* Drupa roundiſh. *Seed.* Nut ovate, obtuſe, of two cells, with ſolitary, oblong kernels.

Eſſ. Ch. Calyx four-toothed, inferior. Limb of the corolla four-cleft, reflexed. Drupa with a nut of two cells.

Obſ. Jacquin ſays the flowers are often three-cleft and triandrous.

1. P. *domingenſis*. Jacq. Amer. t. 182. f. 6, a leaf only.—Native of woods in Hiſpaniola. An upright *ſhrub*, whoſe young *branches* are ſquare and furrowed. *Leaves* oppoſite, ovate-oblong, pointed, ſmooth, entire, veiny underneath, ſix inches long, on ſlender *footſtalks*. *Panicles* axillary, three inches long, with awl-ſhaped *bracteas* at their ſubdiviſions. *Flowers* numerous, white.

Dr. Mærter, whoſe diſcoveries, though not acknowledged, have ſo greatly enriched the Vienna gardens, has obſerved to us that this plant is truly a ſpecies of *Citharexylum;* nor do we ſee any reaſon to doubt the accuracy of this opinion, though, having never ſeen a ſpecimen, we cannot form any poſitive concluſion.

PETITIO INDUCIARUM, in the *Civil Law*, the ſame as imparlance in common law.

PETITIO *Principii*, in *Logic*, a begging the queſtion, or precarious ſuppoſing a thing to be true, or taking it for granted, when it really remains either dubious, or elſe expreſsly denied.

PETITION, PETITIO, a ſupplication in form, made by an inferior to his ſuperior; eſpecially to one having ſome juriſdiction.

To ſubſcribe a petition to the king to frighten him into change of his meaſures, intimating, that if he denied, many thouſands of his ſubjects will be diſcontented, &c. is included among the contempts againſt the king's perſon and government, tending to weaken the ſame, and is puniſhable by fine and impriſonment. 1 Hawk. P. C. 60.

The right of petition is, however, unqueſtionable; provided care be taken, that, under the pretence of petitioning, the ſubject be not guilty of any riots or tumults, for preventing which, it is provided by the ſtat. 13 Car. II. ſtat. 1. cap. 5, that no petition to the king, or either houſe of parliament, for any alterations in church or ſtate, ſhall be ſigned by above twenty perſons, unleſs the matter thereof be approved by three juſtices of the peace, or the major part of the grand jury, in the country; and in London, by the lord mayor, aldermen, and common council: nor ſhall any petition be preſented by more than ten perſons at a time, on pain, in either caſe, of incurring a penalty not exceeding 100*l.* and three months impriſonment. But, under theſe regulations, it is declared by the ſtatute 1 W. & M. ſtat. 2. cap. 2, that the ſubject hath a right to petition; and that all commitments and proſecutions for ſuch petitioning are illegal.

PETITION *of Appeal* to the houſe of lords is the dernier reſort of any ſubject, who thinks himſelf aggrieved by any interlocutory order or final determination in the court of chancery. This juriſdiction of the houſe of peers is ſaid to have begun in 18 Jac. I., and the firſt petition, which appears in the records of parliament, was preſented in that year; and the firſt that was heard and determined, was preſented in a few months after; both levelled againſt the lord keeper Bacon, for corruption and other miſbehaviour. It was afterwards warmly controverted by the houſe of commons, in the reign of Charles II. But the diſpute has long ſince terminated. We may obſerve, that no new evidence is admitted in the houſe of lords, upon any account, for this is a diſtinct juriſdiction.

PETITION *of Bankruptcy*, is a petition preſented to the lord chancellor by one creditor to the amount of 100*l.*, by two to the amount of 150*l.*, or by three or more to the amount of 200*l.*; upon which he grants a commiſſion to certain perſons, who are then ſtyled commiſſioners of bankrupts. See COMMISSION.

PETITION *of Right*, was a parliamentary declaration of the liberties of the people, aſſented to by king Charles I., in the beginning of his reign: in which it is enacted, that none ſhould be compelled to make or yield any gift, loan, benevolence, tax, and ſuch like charge, without conſent by act of parliament; nor upon refuſal ſo to do, be called to make anſwer, take any oath not warranted by law, give attendance, or be confined, or otherwiſe moleſted concerning the ſame, &c. And that the ſubject ſhould not be burthened by the quartering of ſoldiers or mariners; and all commiſſions for proceeding by martial law to be annulled, and none of like nature iſſued thereafter, leſt the ſubject (by colour thereof) be deſtroyed or put to death, contrary to the laws of the land, &c. See ſtat. 3 Car. I. cap. 1.

PETITOT, JOHN, in *Biography*, was an enamel painter of very conſiderable renown, born at Geneva in 1607, who practiſed for a conſiderable length of time in England, being aſſiſted, it is ſaid, in the manufactory of his colours, by ſir Theodore Mayerne, a phyſician and renowned chemiſt.

Petitot copied many of Vandyke's pictures with great neatneſs and care; but though his colours were ſpecifically pure and bright, he poſſeſſed not the art of breaking and uniting them; and conſequently his pictures lack richneſs, truth, and harmony. He was nevertheleſs the firſt man of his time, in that branch of the art. From England, after the execution of Charles, he went to France, and ſucceeded at the court there, ſo as to acquire an ample fortune. Being a Proteſtant, he with ſome difficulty, after the paſſing of the edict of Nantes, procured permiſſion to retire to Geneva; and afterwards ſettled at Vevay, in the canton of Berne, in eaſe and affluence; and there he died at the advanced age of 84, in 1691.

The uſual price of Petitot for a portrait was 50 piſtoles; but for ſome years before his death, it was advanced to 40. But he only painted the heads and hands of his figures; the hair, ground, and draperies, being executed by his brother-in-law, Bordier; and it appears to their credit, that they aſſociated and lived together for 50 years, without the ſmalleſt conteſt or miſunderſtanding.

He left a ſon of his own name, who practiſed the ſame profeſſion with his father; and though he was not by any means equal to him, yet he obtained very conſiderable employment and repute. His age and the period of his death are alike unknown.

PETIVARS, in *Geography*, a tribe, inhabiting towards the north-eaſt of Braſil, who are ſaid to be benevolent and hoſpitable. They bore their lips, and adorn them with a green ſtone, of which they are ſo vain as to deſpiſe all other nations. When the wife has brought forth a child, the huſband confines himſelf to his bed for a month, and receives viſits of congratulation. Eſtalla obſerves, that this cuſtom is not only common in many parts of America, but was alſo known to the ancient Spaniards, as mentioned by Strabo. The reaſon of this cuſtom is, that if any accident were to befal the father, the new-born babe muſt ſuffer.

PETIVER, James, in *Biography*, an Engliſh naturaliſt and indefatigable collector, who flouriſhed at the end of the 17th and beginning of the 18th centuries, paſſed the chief part of his life as an apothecary, at the White Croſs in Alderſgate-ſtreet, London. Of his origin nothing is known, and the only indication we can find of his family connections, occurs in the octavo edition of his *Gazophylacium*, p. 15, where he ſays, "this ſerpent, with ſeveral other animals, I find amongſt ſome Cape paintings, which our worthy kinſman Dr. Sherard hath lately given me to figure," &c. It were unjuſt to defraud him of even the ſhadow of ſo illuſtrious a relationſhip. Dr. Pulteney has aſcertained that Petiver was apprenticed to Mr. Feltham, apothecary to St. Bartholomew's hoſpital, and that after he was eſtabliſhed for himſelf in Alderſgate-ſtreet, he became apothecary to the Charter-houſe, and obtained a conſiderable ſhare of practice in his profeſſion. He had an early propenſity to collect natural curioſities, and engaged various captains and ſurgeons of ſhips to bring home any thing they could find to enrich his growing muſeum. He ſupplied ſuch perſons with printed liſts, and indications, of what was beſt worth their notice, as well as with inſtructions for preſerving what they might collect. Nor was he leſs induſtrious in procuring the productions of his own country. He travelled in 1692 into the midland counties of England, nor did he confine his inquiries to the beaten tracks, but extended them to the cryptogamic walks of Botany, hitherto ſcarcely explored. His ſubſequent publications ſhew that he was in the daily habit of obſerving the minuteſt productions of the animal as well as vegetable kingdoms, in the neighbourhood of London. His muſeum and his reputation gradually increaſed, inſomuch that Sir Hans Sloane, ſome time before Petiver's death, offered him four thouſand pounds for the former, and afterwards purchaſed it; while the latter is evinced by his being elected a Fellow of the Royal Society, and ſtill more by his being acknowledged as the liberal and intelligent correſpondent and aſſiſtant of the great Mr. Ray. He proved no idle member of the learned body which adopted him. Above twenty of his papers appear in the Philoſophical Tranſactions, between the years 1697 and 1717. Theſe are moſtly accounts of various productions of the three kingdoms of nature, ſent to the author from diſtant countries. One of his treatiſes however has a higher aim, and entitles him to rank as a philoſophical naturaliſt. This occurs in vol. xxi. N° 255, under the denomination of "Some attempts made to prove, that herbs of the ſame make, or claſs, for the generality, have the like vertue, and tendency to work the ſame effects." The idea had indeed been ſuggeſted by Cæſalpinus, but it was firſt exemplified by Petiver. Linnæus afterwards carried it further, nor can any reflecting perſon doubt of the foundneſs of the doctrine.

The firſt publication of our author was a ſmall octavo of 96 pages, with two plates, entitled *Muſci Petiveriani Centuriæ decem*; 1695—1703. This is more than a bare catalogue of his collection, as many of the articles are ſcientifically defined, and accompanied with brief but intelligent remarks. Copious accounts of his correſpondents and benefactors are interſperſed. An invidious mention of his contemporary, and rival collector, Plukenet, occurs in p. 78, where that botaniſt is accuſed of "raſh conjectures" and "falſe references," and of refuſing to compare ſome of Petiver's ſpecimens with his own, for the purpoſe of aſcertaining ſynonyms. Theſe authors were always at variance; for though they now and then ſpeak of each other with civility, they much more frequently lay aſide all decorum in their criticiſms. Plukenet in his *Mantiſſa* (ſee Plukenet) handles Petiver very roughly; nor was the latter at all behind-hand in abuſe. This does not indeed appear by the generality of his publications; but we have ſeen in the collections of Tournefort and Vaillant at Paris, various tickets, whether manuſcript or printed we cannot poſitively ſay, attached to a number of dried ſpecimens, in which the ſubject of our preſent article diſplays a malignity and coarſeneſs of criticiſm, directly calculated to defeat its own deſign, and of which we have ſcarcely ever met with another inſtance.

Petiver publiſhed, in 1702, the 1ſt and 2d Decades of his *Gazophylacium Naturæ et Artis*, the plates of which are in folio, the letter-preſs 32 pages in 8vo. Theſe were followed by three more Decades in 1704, with 48 pages of letter-preſs; and "A Claſſical and Topical Catalogue" of the whole work was ſubjoined, in 14 pages more. The 50 plates, which compoſe theſe five Decades, contain a great number of objects of natural hiſtory, diſperſed without any order, many of them very imperfect, eſpecially the ſpecimens of plants. In turning over theſe engravings, it is impoſſible not to recollect Shakſpear's deſcription of the Mantuan apothecary:

> " —— in his needy ſhop a tortoiſe hung,
> An alligator ſtuff'd, and other ſkins
> Of ill-ſhap'd fiſhes;" &c.

The inſects are better than the reſt, but of theſe the moſt famous is an impoſture. The *Papilio*, figured in t. 10. f. 6, which Linnæus has named *Ecclipſis*, and deſcribed from this figure alone, was found, on the inſpection of the original ſpecimen by Mr. Jones, to be no other than *P. Rhamni*, which, being artificially painted, impoſed on our author. The late Dr. Grey indignantly ſtamped the ſpecimen to pieces.

In 1709—1711 five more Decades of the ſame work came forth, with folio letter-preſs, and a folio edition of the "Catalogus Claſſicus et Topicus."

It would be impoſſible as well as uſeleſs to particularize the publication of every one of Petiver's liſts and catalogues. They were all, as far as could be collected, republiſhed in two vols. folio, under the title of *Jacobi Petiveri Opera*, by John Millan in 1767, price plain ſix guineas; or with the inſects coloured, which is the beſt, ſeven guineas; and with the whole coloured, which muſt chiefly have been done from imagination, twenty guineas.

The firſt volume conſiſts of the *Gazophylacium* extended to 156 plates, with explanations of all but the laſt, which contains 37 ſhells copied from Bonanni. A great part of the laſt fifty of theſe plates, at leaſt, are compilations from printed works, ſuch as thoſe of Plumier, Pona, Merian, and others, whoſe figures certainly gain nothing in being copied and diminiſhed by Petiver. Some of the plates, however, are taken from original drawings. The moſt extraordinary circumſtance is his deſcending to copy his rival Plukenet, as in t. 106, f. 10 and 11, and elſewhere. The reſt of this volume is made up of 22 plates of Amboyna ſhells and marine animals, copied from Rumphius; and two plates intended to teach the rudiments of Botany. The paper of our author on the virtues of plants, Phil. Tranſ. n. 255, is judiciouſly introduced into the letter-preſs of this volume; as well as an illuſtration of Ray's ſyſtem, as far as regards Engliſh plants.

The ſecond volume, deſigned to have commenced with the above-mentioned rudiments of Botany, is particularly eſtimable, as containing 72 plates of Engliſh Plants, with 12 plants in each plate, arranged and named according to the 1ſt and 2d editions of Ray's *Synopſis*. This performance, though incomplete, as it ends with the *Cuſcuta*, R. Syn. ed. 2. 282, the laſt of the herbaceous plants, is of great importance in many caſes. The figures ſhew, with tolerable accuracy, what was known of Ray's plants by his contemporaries, and have proved of uſe in ſome difficult queſtions, as appears by the *Flora Britannica*; though indeed few of them are done from original drawings, and ſome are copied from books erroneouſly cited by Ray himſelf, as the *Hieracium*, t. 13. f. 6, and the *Scilla*, t. 67. f. 5. Next follow four plates of uſeful Peruvian plants, not ill copied from Feuillée; and two of rare medicinal ones, chiefly from Pomet. Haller, who had no complete ſet of Petiver's works, ſays he remembers to have ſeen with diſguſt his very faulty repreſentation of the plant yielding the Peruvian bark. Nothing certainly can be much worſe than this figure, which occurs twice; yet we can perceive that it was taken from one of the large downy-leaved ſpecies of *Cinchona*, and not from what Haller had elſewhere ſeen repreſented; ſo that it throws ſome light on the obſcure hiſtory of the valuable drug in queſtion. It muſt alſo be recollected, thut Petiver publiſhed theſe plates ſolely for the purpoſe of obtaining better information. They were intended to be ſent abroad, to aſſiſt travellers in their enquiries, nor had he any thing better within his reach. Next to theſe plates follow five of marine plants or animals, and Italian graſſes, copied from Boccone, Barrelier, &c.; and two of Egyptian plants from Proſper Alpinus. Copies of Plumier's *Filices*, with ſome *Fungi*, occupy 17 plates more, which are what Linnæus cites in his *Species Plantarum*, along with the original work. Three plates more of marine productions are ſubjoined. Six very uſeful ones of Engliſh *Papiliones* conclude the engravings of this volume. They are accompanied by printed catalogues of explanations, and various other papers, all, for the moſt part, the original impreſſions, which appear to have lain dormant on the bookſeller's hands, till this republication of the whole was contrived. The purchaſer ſhould, by collating his copy with ſome authentic one, take care that it is complete. The *Concordia Graminum, Muſcorum*, &c., a work often cited by Engliſh writers, is one of the moſt valuable things in this collection. Our copy has but 12 pages, and ends with n. 375, being evidently imperfect; yet we have never ſeen more. The *Botanicum Anglicum; Hortus Siccus Chirurgicus* and *Pharmaceuticus*, conſiſt of tickets, intended to be ſeparately applied to dried ſpecimens, for ſale, like ſome publications of Ehrhart and Dickſon. To them are annexed labels for ſix different noſtrums, ſold, as we preſume, by our author; theſe are the Indian Purge, Ambretta, Purging Marmalade, Golden Aqua Mirabilis, Purl Royal or Elixir Regale, and Syrup of Manna, or the Cordial Purge. Theſe ſavour of quackery, and account for the flouriſhing ſtate of Petiver's finances; while they perhaps may partly explain the cauſe of Plukenet's diſdainful enmity, as the latter was a learned and regular, but unſucceſsful, phyſician.

It does not appear that Petiver had any family, or that he was ever married. He died at his houſe in Alderſgate ſtreet, on the 20th of April 1718, but of his age we find no mention. His body lay in ſtate at Cooke Hall, and was probably interred at his pariſh church, to the charity-ſchool attached to which he left 50 pounds, and five guineas to Dr. Brady for preaching his funeral ſermon. His pall was ſupported by ſir Hans Sloane, Dr. Levit, phyſician to the Charter-houſe, and four other phyſicians. We know not that any portrait of him is extant.

The collections of dried plants, and other natural productions, which belonged to Petiver, and, after his death, were bought by ſir Hans Sloane, now make a part of the Britiſh Muſeum. They are frequently reſorted to for the ſake of aſcertaining obſcure ſynonyms, his plates being ſo generally cited by Linnæus, and in many inſtances ſo inſufficient to expreſs the preciſe object intended. Pulteney's Sketches of Botany. Haller Bibl. Bot. and Petiver's Works. S.

PETIVERIA, in *Botany*, a genus dedicated, with many compliments, by Plumier, to James Petiver, the Engliſh naturaliſt; ſee the laſt article. Plum. Gen. 50. t. 39. Swartz. Obſ. 137. t. 10. f. 3. Linn. Gen. 181. Schreb. 241. Willd. Sp. Pl. v. 2. 284. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 2. 334. Juſſ. 84. Lamarck Illuſtr. t. 272. Gærtn. t. 75. Claſs and order, *Heptandria Monogynia*. Nat. Ord. *Holeraceæ*, Linn. *Atriplices*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of four linear, obtuſe, equal, erect, permanent leaves. *Cor.* none, "except the calyx, being coloured, ſhould be ſo denominated." *Linn. Stam.* Filaments ſix to eight, awl-ſhaped, erect, unequal, moſtly ſhorter than the calyx; anthers linear, cloven. *Piſt.* Germen oblong, compreſſed, emarginate; ſtyle very ſhort, lateral, received into a longitudinal furrow of the germen; ſtigma pencil-ſhaped. *Peric.* none. *Seed* oblong, compreſſed, dilated upwards, emarginate, furniſhed at each ſide with two rigid, acute, reflexed briſtles.

Eſſ. Ch. Calyx of four leaves, inferior. Corolla none. Style lateral. Stigma pencil-ſhaped. Seed one, with four reflexed briſtles.

Obſ. Dr. Swartz has materially corrected the Linnæan character, in which the briſtles of the ſeed were taken for ſtyles; and finding the number of ſtamens, though variable from ſix to eight, very commonly ſeven, he has transferred this genus from *Hexandria Tetragynia* to *Heptandria Monogynia*.

1. P. *alliacea*. Guinea-hen Weed. Linn. Sp. Pl. 486. Stockh. Tranſ. for 1744. 287. t. 7. Trew Ehret. 33. t. 67. (P. ſolani foliis, loculis ſpinoſis; Plum. Ic. 213. t. 219.)—Common about hedges and dry buſhy places in the Weſt Indies. *Swartz.* The *root* is perennial. *Stem* ſomewhat ſhrubby, erect, alternately branched, about two feet high, roundiſh, ſtriated, downy, leafy. *Leaves* alternate, on ſhort ſtalks, elliptic-oblong, three inches in length, generally ſmooth, with one rib and ſeveral tranſverſe veins; their margin either quite entire, or with a few ſhallow blunt ſerratures. *Stipulas* a pair of obtuſe, ſometimes ſtalked, glands, at the baſe of the footſtalks. *Spikes* terminal, very

long and ſlender, of numerous, alternate, rather diſtant, erect, ſmall, whitiſh or reddiſh *flowers*, of no beauty. We readily concur with Swartz, in uniting the *P. octandra* of Linnæus with his *alliacea*, nor do we find grounds to diſtinguiſh it, even as a variety; the ſtamens being in ſome flowers ſix, in others ſeven or eight, on one and the ſame plant.

The whole herb is ſaid to have a very ſtrong and volatile ſcent of garlick, ſo that ſome perſons in Hiſpaniola uſe it as a remedy for the headache. When cattle, in diſtreſs for more grateful food, in the dry ſeaſon, feed upon the *Petiveria*, it is ſaid to give, not only their milk, but their fleſh, and eſpecially the kidnies, a powerful and diſagreeable flavour of garlick. Sloane ſays that this inconvenience is cured, by removing the cattle to freſh paſtures, where this plant does not grow, for about a week before they are killed. Guinea-hens are reported to be very fond of it.

Petiveria, in *Gardening*, contains plants of the woody, exotic, perennial, evergreen kind, for the ſtove, of which the ſpecies cultivated are, the common guinea-hen weed (P. alliacea); and the dwarf guinea-hen weed (P. octandra). See the preceding article.

Method of Culture.—Theſe plants may be increaſed by ſlips or cuttings planted out in the ſummer, as well as by ſeeds; which muſt be ſown on a hot-bed early in the ſpring. When the plants are come up, they ſhould be removed into ſeparate pots, and plunged into a moderate hot-bed. When the plants have obtained a good ſhare of ſtrength, they ſhould be inured by degrees to the open air, into which they may be removed towards the end of June, placing them in a warm ſituation, where they may remain till autumn, when they muſt be placed in the ſtove, and during winter have a moderate degree of warmth.

They afford variety, and produce a good effect among other potted plants.

PETKAM, in *Geography*, a town of Eaſt Frieſland; three miles S.E. of Emden.

PETNBOFEN, a town of Bavaria, in the municipality of Aichſtatt; ſeven miles S.S.E. of Aichſtatt.

PETOLA, in *Botany*, &c. See Momordica.

Petola, in *Zoology*, a ſpecies of coluber, the ſcuta of whoſe abdomen are two hundred and nine; and the ſquamæ of the tail ninety. See Coluber.

PETOLIN, in *Natural Hiſtory*, the French name for a ſhrub of the piſtachia kind, famous for affording bladders or tubercles on its leaves and tender branches, in the manner of the common turpentine tree; which are found full of inſects. Theſe inſects are always found to be of the puceron kind, and ſome of them are winged, others not, as is known to be the caſe in that genus of animals. Theſe bladders, and thoſe of the turpentine tree, called its *horns*, have been by ſome ſuppoſed to be the natural production of the trees, but they are, in reality, only a peculiar ſpecies of bladder-galls, formed by theſe animals, one female of which making her way into the leaf, while the young raiſes its covering membrane into a bladder, in which ſhe produces her young ones; which by ſucking its ſides, derive the juices to it, and occaſion its increaſe. See Puceron.

PETOUNE' Hotun, in *Geography*, a town of Chineſe Tartary, in the government of Kerin-Oube; 485 miles N.E. of Pekin. N. lat. 45° 15'. E. long. 124° 34'.

Petoune' *Kianen*, a port of Chineſe Tartary; nine miles N.W. of Petouné Hotun.

PETRA, a river of Naples, which runs into the ſea, 13 miles N.E. of Bova.—Alſo, a town of Sicily, in the valley of Mazara; two miles N.N.W. of Girgenti.—Alſo, a ſea-port town, in the iſland of Metelin, ſituated on a rock almoſt inacceſſible. N. lat. 39° 27'. E. long. 26° 14'.

PETRAHAR, a town of Hindooſtan, in Bahar; 20 miles E. of Ramgur.

PETRALIA, a town of Sicily, in the valley of Demona; 17 miles S. of Miſtrella.

PETRALTA, a town of Naples, in Calabria Citra; five miles E.S.E. of Coſenza.

PETRANTA, a town of Etruria, near the ſea-coaſt; 15 miles N.W. of Lucca. N. lat. 43° 58'. E. long. 10° 21'.

PETRARCHA, Francesco, in *Biography*, one of the moſt celebrated names in the literature of the middle ages, was born at Arezzo, in Tuſcany. His father was a notary in Florence, who, with his wife, was exiled in 1302, and took up his reſidence at Arezzo. After ſome changes in their abode, his parents, having loſt all hope of being reſtored, carried him to Avignon, being then only eight years old. In that city, and in Carpentras, he paſſed his youth, receiving inſtructions, according to the mode of the age, in grammar, dialectics, and rhetoric. He then ſtudied the civil law at Montpellier and Bologna, ſpending four years in the former city, and two in the latter. He however deſerted the legal profeſſion, though his father had ſet his heart upon ſeeing him in the doctorial robes. In his own juſtification he ſays, that he found it impoſſible, at that period, to practiſe the law in an honourable manner, and conſiſtently with a juſt ſenſe of integrity. At the age of 22 he returned to Avignon, and about that time he loſt both his parents. Finding himſelf left in indifferent circumſtances, he, together with a younger brother, enrolled himſelf in the clerical order, but only received the tonſure. At Avignon he contracted an intimacy with Jacopo Colonna, afterwards biſhop of Lombes, which was the foundation of the attachment that he preſerved during his whole life to the houſe of Colonna. With ſuch a patron he might unqueſtionably have obtained high eccleſiaſtical preferment, but his habits of life were little conformable to the clerical character. He was particularly unfitted for this profeſſion by that amorous paſſion which is ſo conſpicuous a circumſtance in his life and writings, and which commenced when he was about 23 years of age. Who was that Laura whom he has rendered ſo celebrated by his poems, became a ſubject of controverſy even in his lifetime, and has ever ſince exerciſed the inquiſitive talents of critics and biographers. The Italians acquieſce in the proofs adduced by the Abbè de Sade, that ſhe was the daughter of Audebert de Noves, ſyndic of Avignon, and the wife of Hugh, ſon of Paul de Sade. The nature of his love has alſo been a matter of diſpute; ſome have regarded it as a mere Platonic attachment, others have conſidered it as an ordinary ſenſual affection. If Petrarch is himſelf to be truſted, it was a real and a violent paſſion, which, for a long courſe of years, kept his mind in agitation, and influenced the whole tenor of his life. It appears to have been void of criminality, and no ſuſpicion reſts upon the virtue of Laura. It may not be amiſs in this place to take notice of the theory of De Sade, and of its examination by Alexander Fraſer Tytler, eſq. This gentleman has written a very elaborate paper in the fifth volume of the Tranſactions of the Edinburgh Royal Society on the ſubject, and in defence of the purity of Petrarch's love, in oppoſition to the hypotheſis of De Sade.

"The works of Petrarch," ſays Mr. Tytler, "bear evidence of his abilities as a politician, theologian, and philoſopher, and it is in theſe characters that he appears to have been chiefly diſtinguiſhed by his contemporaries, but it is not on theſe foundations that the laſting ſtructure of his fame has been reared. It is to thoſe incomparable verſes, in which he has celebrated the accompliſhments and bewailed the fate of the beautiful Laura, that Petrarch has been indebted for his permanent reputation. The hiſtory of the poet's paſſion for his lovely miſtreſs, muſt ever be regarded as forming the moſt intereſting portion of his annals. His character, in fact, took its tone from that predominant affection, which influenced his ſtudies, his habits of life, and all his purſuits and occupations. A love ſo pure, ſo ardent, and ſo laſting, is difficult to be paralleled in the hiſtory of human nature. Petrarch was the paſſionate admirer of Laura for 21 years, while ſhe was in life, and with unabated ardour of affection, he is ſaid to have bewailed her loſs for 26 years after her death." The works of the poet bear the ſtrongeſt teſtimony that this paſſion was an honourable and virtuous flame. Petrarch aſpired to the happineſs of being united to Laura in marriage, and from the ſame kind of evidence it is clear that Laura was not inſenſible to his paſſion. At length De Sade attempts, in his ponderous work, to blaſt the fair fame of the lady; maintaining, as we have ſeen, "that Laura was a married woman, the mother of a numerous family; that Petrarch had no other end in his purſuit, than what every libertine propoſes to himſelf in the poſſeſſion of a miſtreſs; and that the lovely Laura, though never unfaithful to her huſband's bed, was ſenſible to Petrarch's paſſion, gratified by his attentions, and continued to give him every mark of regard which, without a direct breach of her matrimonial vow, ſhe could beſtow upon him." Such is the hypotheſis of De Sade, which has been fully examined by Mr. Tytler: into his reaſoning we cannot enter, without tranſgreſſing the limits allotted to a biographical article in this work. He carries with him all the beſt feelings of the reader, and if his arguments do not amount to what may be denominated hiſtoric demonſtration, yet they are ſtrong, and deſerving the regard of thoſe who would be ſatisfied on the point under diſcuſſion. In the concluſion he ſays, "I have now, as I truſt, impartially canvaſſed the whole of theſe arguments drawn by the author of the *Memoires* from the works of Petrarch himſelf, or what may be termed the intrinſic evidence in ſupport of the material part of his hypotheſis, namely, that Laura was a married woman; nor do I think I preſume too much when I ſay, that I have ſhewn their abſolute inſufficiency to prove that propoſition." He then proceeds farther, and aſſerts, that in the whole of Petrarch's works, conſiſting of more than 300 ſonnets and other poetical pieces, there is not to be found a ſingle paſſage which intimates that Laura was a married woman. He then produces a variety of direct arguments on the ſubject, and he concludes; "if, while on the one hand we have ſhewn that there is not the ſmalleſt ſolidity in all that elaborate argument, which has been brought to prove that Laura was a married woman, we have proved on the other, from the whole tenour of the writings of Petrarch, the only evidence that applies to the matter, that his affection for Laura was an honourable and virtuous flame."

One of the methods taken by Petrarch to combat his unfortunate paſſion was frequent travelling, and in 1330 he accompanied Jacopo Colonna to his new biſhopric of Lombes, where he paſſed the ſummer, and then returned with him to Avignon. That prelate introduced him to his brother, cardinal Giovanni Colonna, who was thenceforth one of his principal patrons, and in whoſe palace he became acquainted with the moſt learned men of the age. He made a more extenſive tour in 1333, taking his courſe through Paris into Flanders, and thence to Aix-la-Chapelle and Cologne, and returning by Lyons to Avignon. By theſe and his other journies he increaſed his acquaintance with men, and his knowledge of the manners and cuſtoms of the world. In 1334, a new pope having ſucceeded to the pontifical chair, under the name of Benedict XII., Petrarch began that courſe of remonſtrance on the deſertion of Rome, and the removal of the holy ſee to Avignon, which was ever after one of the favourite topics of eloquence in proſe and verſe. In 1336 he viſited, with filial and claſſical reverence, all the monuments of antiquity which render Rome ſo intereſting. The love of Petrarch was not of a kind to exclude tranſitory amours, and the manners of the age were little reſtraint to ſuch indulgence; and it appears that in the year 1337 he had a natural ſon, who died while he was a young man. For the education of this ſon he ſhewed an anxious ſolicitude. It was about this time that he reſolved upon that retreat which has made the name of Vaucluſe ſo famous in the annals of love and poetry. This place, ſituated in the county of Provence, where the river Sorgue ſprings from a rocky cavern, is a romantic ſolitude, well ſuited both to the lover and the ſtudent, and Petrarch ſeems to have enjoyed it in both capacities. He purchaſed a ſmall houſe and farm in this ſequeſtered ſpot, which was his favourite reſidence for many years. Here he compoſed not only the greateſt part of his vernacular poetry, but many of his epiſtles in Latin proſe and verſe, and of his eclogues. Here likewiſe he wrote his books on a "Solitary Life," and on "Religious Tranquillity," and made a commencement, in 1339, of the poem on which he moſt valued himſelf, his "Africa." He did not entirely bury himſelf here, but made occaſional viſits to Avignon, and other places. The literary reputation conſequent upon his writings, now began to make him extenſively known. One of its moſt flattering effects was a letter addreſſed to him by Robert, king of Naples, the greateſt protector of letters and learned men of the age. This connection was a prelude to the higheſt honour which could be conferred upon him as a poet, and which makes an era in his life. The ancient cuſtom of ſolemnly crowning eminent poets in the capital of Rome had for ſome ages fallen into diſuſe. From the revival of letters in the 13th century, the honour of the laurel had indeed occaſionally been conferred upon poets, but not in that place, nor with the former ceremonials. Petrarch had for ſome time indulged the hope of attaining this diſtinction, when in the month of Auguſt, 1340, he unexpectedly received a letter from the Roman ſenate, urging him to come and take the laurel in that city; and a few hours after, he was greeted with a letter from the chancellor of the univerſity of Paris, containing a ſimilar application in favour of that capital. He wavered for ſome time in his choice, but at length his own inclination, and the advice of cardinal Colonna, determined him for Rome. As he thought it a neceſſary form previouſly to ſubmit to an examination of his learning and talents, he gave king Robert the honour of being his examinant, and accordingly repaired to Naples in March 1341. His reception from that monarch was of the moſt flattering kind, and they converſed together on equal terms of literary equality. During three days, Petrarch, in preſence of the king and his whole court, ſuſtained his trials, which related not only to poetry, but to all the ſciences then cultivated; and, in ſhort, he was declared worthy of the crown. Robert likewiſe decorated him with the honorary title of his chaplain, and appointed one of his courtiers to aſſiſt in his name at the ceremony in the Capitol. At Rome he was received by his friend count d'Anguillara, who fixed upon Eaſter-day for the time of conferring the deſtined honour. On that day, in the midſt of the applauſe of the whole Roman people,

ple, and with a numerous attendance of perſons of rank and diſtinction, the laurel was placed upon Petrarch's head by the count.

From Rome the poet went to Parma, where he paſſed ſome time with his protectors the lords of Corregio, and employed himſelf in finiſhing his "Africa," and it was probably from that family that he obtained the dignity of archdeacon in the church of Parma. At the acceſſion of pope Clement VI., in 1342, Petrarch was one of the ambaſſadors ſent to compliment him in the name of the ſenate and people of Rome, ſoon after which a priory in the dioceſe of Piſa was conferred upon him through the favour of the ſame pope. In the following year he compoſed his curious "Dialogue with St. Auguſtine," in which he confeſſes the paſſion for Laura, which ſtill held dominion over his ſoul. That this confeſſion was rather ſentimental and rhetorical than penitentiary, is evident, as he makes no mention in it of a connection which about this time made him the father of a ſecond natural child.

In the year 1348 Petrarch viſited Padua for the firſt time, where he became acquainted with Jacopo da Carrara, who was one of his great friends and admirers, and it was this year that was remarkable for the univerſal peſtilence which ravaged all Europe, and one of the victims to it was the celebrated Laura. The ſame peſtilence deprived him of his great friend and patron cardinal Colonna, but he was now in ſuch general eſteem, that he was ſure of an honourable reception from perſons of the firſt rank wherever he went. He paſſed a year or two at Parma, Carpi, and Mantua, and in 1350 he again viſited Padua, where Jacopo de Carrara, in order to detain him, procured him a canonry. From that city he wrote a very eloquent letter to the emperor Charles IV., exhorting him to come into Italy for the purpoſe of remedying the many evils with which that country was oppreſſed. Sentiments of piety induced him to take a journey to Rome, in this jubilee year, and in the way he ſaw Florence, for the firſt time, the place whence he derived his origin, and where he had ſeveral perſonal friends. Returning, he went to Padua and Venice; at the latter place he contracted a friendſhip with the celebrated doge Andrew Dandolo, and employed himſelf, though unſucceſsfully, in mediating a peace between that republic and Genoa. After this he was invited to return to Florence, and take a part in their newly founded univerſity, which he declined. He next went to Milan, with an intention of proceeding further, but he was received with ſo much kindneſs, and with ſuch preſſing ſolicitation to ſtay by Giovanni Viſconti, its archciſhop and ſovereign, that he was conſtrained to take up his abode there. He was admitted into the council of ſtate, and in 1354 was ſent to Venice to make another effort for pacifying the two hoſtile republics, but his eloquence again proved fruitleſs. Upon the death of Giovanni, Petrarch attached himſelf to his nephew Galeazzo, by whom he was always highly honoured. In the ſame year he went to Mantua to meet the emperor, who having at length come to Italy, ſent an equerry to Milan, to conduct into his preſence the perſon of whoſe fame he had heard ſo much. Petrarch met with a moſt gracious reception; but the hopes he had conceived of great advantages to his dear country, from the viſit of this monarch, all vaniſhed upon his diſhonourable retreat a few months afterwards. Petrarch, on this occaſion, wrote a letter of cenſure to the emperor, but it is probable it never got into his hands, as he not only never loſt the imperial friendſhip, but afterwards received a diploma conferring the title of count palatine. His fondneſs for ſolitude induced him to take a villa three miles off Milan, where he paſſed his ſummers, but he ſays in a letter deſcriptive of his manner of life, that even here he found the greateſt difficulty in ſubduing certain inclinations which appear always to have put his virtue to the greateſt trial. Devotional practices were his chief reſources againſt temptation, to which he joined very aſſiduous occupation by reading and writing by night and by day. In 1360 Petrarch was ſent by Galeazzo to Paris, to congratulate king John on his liberation from Engliſh captivity, and his reception in that capital was anſwerable to the celebrity of his name.

By pope Innocent VI. Petrarch was treated at firſt with much neglect or even contempt, but in the year 1361 he had ſo far overcome his prejudices, as to offer the poet the place of apoſtolical ſecretary, which he declined, as he did alſo a very preſſing invitation from John, king of France, to reſide at his court. When pope Urban V. had ſucceeded to the pontifical chair, he preſented Petrarch with a canonry of Carpentras, for the purpoſe of attracting him to his court, but it did not anſwer the purpoſe. The pope condeſcended to ſend him ſeveral invitations to viſit him, but advanced years, and infirmities to which he was ſubject, retarded Petrarch's reſolution to pay his homage to the father of Chriſtendom in his proper reſidence; nevertheleſs, in 1370, he undertook the journey, but owing to ill health he was unable to accompliſh it. He returned to his villa, where, in a very ſhort time, he had the mortification to hear of Urban's death. His ſucceſſor, Gregory XI., was very deſirous of ſerving the poet, but he had reached that period of life when a quiet retreat was the moſt deſirable. He was, however, conſtrained, in 1373, to undertake a journey to Venice, on account of his patron Franceſco da Carrara, who, having had a difference with the republic, was obliged to ſubmit to the condition of ſending his ſon to aſk pardon and ſwear fidelity, and was very deſirous that Petrarch ſhould accompany him. It was alſo to be his office to harangue the Venetian ſenate; but on making the attempt he was ſo overcome by the dignity of the aſſembly, and his own fatigue, that he ſtood ſilent. The diſcourſe was accordingly deferred till the next day, on which he happily ſucceeded. On his return to his villa near Padua he fell into a ſtate of languor, in which he paſſed the concluding months of his life. At length, in the night of July 18th, 1374, he was attacked with an apoplectic fit, and was found dead the next morning in his library, with his head reſting on a book. His remains, attended by the prince of Padua, Franceſco da Carrara, the biſhop, all the clergy, and the principal perſons of the city, were depoſited in the church of Arqua.

Petrarch was unqueſtionably one of the moſt memorable characters of his age and nation: his fame is, however, founded chiefly on his Italian poetry. He had paid great attention to moral philoſophy, and publiſhed ſeveral works upon it. His treatiſes "De Republica optime adminiſtranda," and "De officio et Virtutibus Imperatoris," prove that he had paid attention to political and military ſubjects. He left works alſo on theology, which ſhew that he was perfectly orthodox: on hiſtory and geography. But it is not only as an author that literature is indebted to Petrarch; no one had a greater ſhare in bringing to light thoſe writers of antiquity, the revived ſtudy of whoſe works was the great inſtrument of diſpelling the barbariſm of the dark ages. He was actuated by an enthuſiaſm in this matter, and was indefatigable, both in his own reſearches, and in ſolicitations to his friends in different parts, for the ſame purpoſe. The works of Cicero were eſpecially the object of his aſſiduous enquiry, and to him is owing the diſcovery of the valuable Familiar Epiſtles of that great man. Although his reading was chiefly confined to Latin authors, yet he extended his ſearch to the Greek, and his literary reputation procured him from Conſtantinople the preſent of a copy of Homer's poems. He had collected, with great care and expence, a large library, which in 1362 he preſented to the republic of Venice. After this he probably collected another; and Petrarch himſelf alludes to a collection which he had made of imperial medals in gold and ſilver, and which he offered to the emperor Charles IV. This is the earlieſt mention of a treaſure of that kind. The eſteem in which this great man was held by his countrymen, was ſhewn by the vaſt number of commentators on his works, eſpecially his Italian poems, which appeared from his death to modern times. The editions of his poems have been almoſt innumerable. The earlieſt was that of Venice in 1470, and the beſt is ſaid to be that alſo of Venice, in two volumes 4to. 1756.

PETRARIA, in *Ancient Writers*, is ſometimes taken for a quarry of ſtone.

In other places petraria is uſed for a ſort of engine of war, with which ſtones were caſt on the enemy; chiefly uſed in ſieges, &c.

PETRASTRUMIA, in *Geography*, a town of Naples, in Principato Ultra; 9 miles S. of Benevento.

PETRATSCHAN, a town of Pruſſian Lithuania; 4 miles W.S.W. of Regnitz.

PETRE OIL, Πετρελαιον, the ſame as petroleum. See PETROL.

PETRE, *Sir* WILLIAM, in *Biography*, an eminent ſtateſman, was born at Exeter, and educated at the college of that name, at Oxford; but in 1523 he was elected fellow of All-Souls. He took his doctor's degree in civil law. His talents recommended him to Thomas Cromwell, by whoſe means he was employed in ſtate affairs, and was in the commiſſion for viſiting the monaſteries. He obtained a large ſhare of the church lands in the reign of Mary, to whom he had been counſellor, as he had been to her father and brother. He found means to ingratiate himſelf with queen Elizabeth, who appointed him one of her ſecretaries of ſtate, and member of the privy council. He was a great benefactor to Exeter and All-Souls' colleges, and founded ſeveral charitable inſtitutions. He died in 1571; leaving very large eſtates in Eſſex, which are now in the poſſeſſion of his deſcendant, the preſent lord Petre.

PETREA, in *Botany*, was ſo called by Houſtoun, in honour of Robert James, lord Petre, who was born in 1710, and died of the ſmall-pox in 1742. Peter Collinſon, in a letter to Linnæus, ſpeaks of this nobleman as "the worthieſt of men, whoſe death was the greateſt loſs that botany or gardening ever felt in this iſland." After deſcribing his lordſhip's ſpacious ſtoves, and many of their valuable contents, amongſt which numerous tropical trees had attained a degree of growth not to be ſeen in any other garden; as well as the nurſeries for more hardy kinds, in which, at the time of lord Petre's death, were 219,925 individuals, moſtly exotic; the writer concludes thus. "As this young nobleman was the greateſt man in our taſte that this age produced, I thought it might not be unacceptable to give you ſome account of the greatneſs of his genius. But his ſkill in all liberal arts, particularly architecture, ſtatuary, planning and deſigning, planting and embelliſhing his large park and gardens, exceeds my talent to ſet forth." Mr. Collinſon was ſeized with his laſt illneſs when on a viſit to the ſon and worthy ſucceſſor of this nobleman in 1768. (See COLLINSON.)—Reliq. Houſt. 5. t. 11. Linn. Gen. 315. Schreb. 413. Willd. Sp. Pl. v. 3. 313. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 4. 38. Juſſ. 108. Lamarck Illuſtr. t. 539. Gærtn. t. 177.—Claſs and order, *Didynamia Angioſpermia.* Nat. Ord. *Perſonatæ*, Linn. *Vitices*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, bell-ſhaped; its limb very large, in five deep, ſpreading, oblong, obtuſe, coloured, veiny, permanent ſegments; the mouth cloſed with five double abrupt ſcales. *Cor.* of one petal, wheel-ſhaped, unequal, ſmaller than the calyx; tube very ſhort; limb flat, in five rounded, ſpreading ſegments, the middle one largeſt, and differently coloured. *Linn. MSS. Stam.* Filaments four, concealed within the tube, aſcending, two of them ſhorteſt; anthers oval, erect. *Piſt.* Germen obovate; ſtyle ſimple, the length of the ſtamens; ſtigma obtuſe. *Peric.* Capſule obovate, flat at the top, concealed in the hollow of the calyx, of two cells. *Seeds* ſolitary, obovate, convex at the outſide, flat at the inner, attached to the baſe of each cell.

Eſſ. Ch. Calyx five-cleft, very large, coloured. Corolla wheel-ſhaped, much ſmaller. Capſule of two cells, in the bottom of the calyx. Seeds ſolitary.

1. P. *volubilis.* Climbing Blue Petrea. Linn. Sp. Pl. 873. Jacq. Amer. 180. t. 114. Curt. Mag. t. 628.—Leaves and cluſters ſimple.—Native of Vera Cruz, the Caracaos, and Martinique, where it blooms in November. Houſtoun is ſaid to have ſent it to Chelſea garden before the year 1733; but we agree with Dr. Sims, that the flowers were probably never ſeen in England, till they appeared in Mr. Woodford's late collection at Vauxhall, in Auguſt 1802. It is obſerved to thrive beſt in rich loam, and a warm moiſt air, being advantageouſly trained over a trellis, where, if luxuriant, it muſt make a beautiful appearance, being one of the moſt elegant plants that can be imagined. The *ſtem* is ſhrubby, twining round every thing in its way, and aſcending, without tendrils, to the tops of trees twenty feet high; its *branches* round, roughiſh, ſlender, and leafy. *Leaves* oppoſite, on ſhort, thick, rather ſilky *ſtalks*, elliptic-oblong, entire, varying in length from two to five inches, and in breadth from an inch to an inch and a half, furniſhed with one rib and many tranſverſe veins producing innumerable reticulations; rough on both ſides to the touch, but not to the ſight; ſhining above; opaque and paler beneath. *Cluſters* about the ends of the branches, a foot or more in length, elegantly pendulous, ſimple, of many *flowers* turned one way. The *ſtalks*, minute *bracteas*, and tube of the *calyx*, are rough with ſilky brown hairs. Limb of the *calyx* ſmooth, light violet; its ſegments an inch long when fully grown. *Corolla* of the ſame colour, variegated with dark violet and white; ſometimes it is ſaid to be wholly white, the *calyx* remaining of its proper hue. The *piſtil* is thought to be occaſionally imperfect.—A ſpecimen with lanceolate *leaves*, five or ſix inches long, gathered at the Caracaos along with the common kind, by Dr. Mærter, ſeems to us a mere variety, but the following is certainly a new and very diſtinct ſpecies.

2. P. *multiflora.* Panicled Petrea. (Funis quadrifidus; Rumph. Amboin. v. 5. 4. t. 3.)—Leaves and cluſters twice compound.—Gathered in the iſland of Honimoa, or Honimao, by the late Mr. Chriſtopher Smith, from whom we have an unnamed ſpecimen. The *ſtem* is woody, climbing, branched, quadrangular, with four furrows; downy when young. *Leaves* oppoſite, on longiſh ſmooth *ſtalks*, twice ternate; *leaflets* on ſhortiſh ſtalks, ovate, undulated, entire, ſmooth on both ſides; ſhining above; rather opaque and ſomewhat paler beneath, with a rib and veins like the former ſpecies; the terminal ones one and a half inch long, the reſt much ſmaller. *Cluſters* axillary, twelve or eighteen

inches long, twice compound, downy, compoſed of innumerable, ſomewhat whorled, *flowers*, of whoſe colour we can determine nothing from the dried ſpecimen, but they appear to agree in that reſpect with the foregoing. Their ſize is rather ſmaller. The ſegments of the *calyx* are more contracted at the baſe, and its tube has ten ſtrong ribs; whereas the other ſpecies has five principal ribs, far leſs conſpicuous, and a number of minute crowded intermediate ones.

Such is our plant, which accords preciſely with the figure of Rumphius; but his deſcription is leſs applicable. What he aſſerts, of the main ſtems ſplitting into four parts, and diſcharging a bitter limpid water, we have no means of verifying. He ſays the *flowers* are yellow, or whitiſh, with ſix minute *petals* and as many *ſtamens*, having in the middle a cloven *piſtil*, like a lizard's tongue. The *germen* is ſaid to turn black as it ripens; but of the nature of the *fruit* he gives no account.—Notwithſtanding this deſcription, his plate exhibits the *calyx* in five deep ſegments, with others in an early ſtate, exactly as in our ſpecimen. There is no repreſentation of the *ſtamens* or *piſtil*. He deſcribes the *leaflets* twice as large as we find them, and remarks that their ſtalks, when old, become *claſpers*. The *ſtems* are very tough and pliant, ſerving for ropes. On the whole there ſeems little doubt of the plant of Rumphius being the ſame with our's, nor, though we have often had his plate and deſcription in contemplation, do we find any thing ſo applicable to them as this *Petrea*.

Petrea, in *Gardening*, contains a plant of the climbing, exotic, ſhrubby kind for the ſtove, of which the ſpecies cultivated is, the twining petrea (P. volubilis).

It has a variety with bright blue petals.

Method of Culture.—This is increaſed by ſeeds, which muſt be obtained from the places where the trees grow naturally, and be ſown in pots plunged into a good hot-bed; and when the plants come up, they ſhould be each planted in a ſeparate ſmall pot filled with light loamy earth, and replunged into a hot-bed of tanners' bark, and be afterwards placed in the bark-bed in the ſtove, where they muſt conſtantly remain, and be treated like other plants of the ſame country.

They afford ornament in ſtove collections.

PETREL, in *Ornithology*, the name of a very remarkable bird, called *procellaria* by authors. See Fulmer, and Procellaria *glacialis*.

Petrel *Iſland*, in *Geography*, a ſmall iſland in Duſky bay, near the coaſt of New Zealand, N. of the harbour in Anchor iſland.

PETRELLA, a town of Naples, in the county of Moliſe; 11 miles E. of Moliſe.—Alſo, a town of European Turkey, in Albania; 26 miles S.E. of Durazzo.—Alſo, a town of the duchy of Urbino; 20 miles N.W. of Urbino.

PETRI, Christiern, in *Biography*, was a learned Daniſh divine, who flouriſhed in the 16th century. It is not certain when he was born; but it appears he purſued his ſtudies during ſeveral years at Paris, where he was admitted to his degree of M.A. Upon his return to his native country, he was made canon of Lunden, and alſo chancellor of that ſee. After this he took a ſecond journey to Paris, where he was entruſted with the care of editing "Danica Hiſtoria, lib. xvi. Autore Saxone Grammatico," which made its appearance in the year 1514. He was in Denmark at the time Chriſtiern II. was compelled to fly from that country, and he followed him into exile. Soon after that event, and until the time when that prince was impriſoned, and his affairs became deſperate, Petri took up his reſidence in Flanders, where he renounced the communion of the church of Rome, and embraced the principles of the Reformation. He became now exceedingly zealous in propagating the doctrines which he had adopted; and with this view wrote and publiſhed various works at Antwerp, in the Daniſh language, from 1528 to 1531. Among others he publiſhed, in 1529, "The New Teſtament tranſlated into Daniſh." Nor was he leſs zealous in making converts from Popery, after his return to his native country in 1532. Little more is known of him, but that he died at an advanced age, under the reign of Chriſtiern III., who, notwithſtanding the change in his religious faith, permitted him to enjoy to the laſt the emoluments of his canonry. He left behind him a number of works, chiefly on theological ſubjects, and on the education of youth. Moreri.

Petri, or *Petieri*, in *Geography*, a town of Africa, on the Ivory coaſt.

PETRICOW, a town of Bohemia, in the circle of Chrudim; 9 miles S. of Chrudim.

PETRIDIA, in *Natural Hiſtory*, the name of a genus of foſſils of the ſcrupi kind, of a plain uniform ſtructure, of no great variety of colours, and emulating the external form of pebbles.

Of this genus there are twelve known ſpecies. Hill.

PETRIFACTIONS, are animals and vegetables, or their parts, changed into a foſſile ſubſtance. In the Linnæan ſyſtem, by Gmelin, petrifactions make the fifth claſs of minerals, which is divided into eight genera, *viz.*

Anthropolithus,	Man, or the parts of man.
Zoolithus,	Mammalia, or their parts.
Ornitholithus,	Birds, or their parts.
Amphibiolithus,	Amphibia, or their parts.
Ichthyolithus,	Fiſhes, or their parts.
Entomolithus,	Inſects, or their parts.
Helmintholithus,	Worms, or their parts.
Phytolithus,	Vegetables, or their parts.

Before we treat of theſe genera, in the order in which they ſtand, we ſhall give a general outline of the ſubject, as it is deſcribed in Mr. William Martin's "Attempt to eſtabliſh a Knowledge of extraneous Foſſils on ſcientific Principles;" referring our readers to the work itſelf for the details, and alſo to his other work, entitled "Figures and Deſcriptions of Petrifactions collected in Derbyſhire," &c.

Mr. Martin ſays, that the natural bodies which conſtitute our globe are either organized or unorganized: the firſt includes animals and vegetables, the latter foſſils.

Foſſils are uſually diſtinguiſhed into *native* and *extraneous*. Native foſſils, or minerals, are foſſils deſtitute of an organic form, exhibiting ſuch a ſtructure only as ariſes from the appoſition or continual addition of the particles of which they are compoſed. Extraneous foſſils, or *reliquiæ*, *relics*, are foſſils that have the form or ſtructure of animal or vegetable bodies. If it be objected, that theſe bodies poſſeſs an organic form; it may be replied, that they may nevertheleſs be regarded as unorganized, ſince that form is no longer inſtrumental to growth, motion, or the propagation of the ſpecies.

Extraneous foſſils comprehend two ſorts of animal and vegetable relics, *viz.* the *conſervata* and *petrifacta*: the *former* are the remains of animals or vegetables, preſerved by various operations of nature among minerals; the *latter* are mineral bodies, which have received their form from animals or vegetables.

The phenomena attendant on extraneous foſſils are *general* or *peculiar*. The general phenomena are ſuch as are common to both kinds of organic remains: theſe are the following.

Extraneous foſſils have been found in every quarter of the known world: they are met with embodied in the hard rocks and ſtones; but they are not equally common to all rocks and mineral ſubſtances, inaſmuch as granite, ſienite, gneiſs, micaceous ſchiſtus, and ſome ſpecies of limeſtone, never contain organic remains; and thoſe rocks, in which extraneous foſſils are never found, conſtitute the higheſt mountains. The parts of organized bodies moſt common in a foſſil ſtate, are thoſe which are known longeſt to reſiſt putrefaction and decay: theſe are wood, and the leaves and ſtems of certain plants; ſhells, bones, corals, and other hard parts of animals. Very tender and ſucculent bodies, whether animal or vegetable, are rarely found in a foſſilized ſtate. Shells, and various exuviæ of the vermes claſs, are moſt commonly found in the ſtrata immediately repoſing on, or following tracts of granite, gneiſs, and the other rocks, in which extraneous foſſils are never imbedded. Strata containing the remains of fiſh and marine ſhells, &c. mixed ſometimes with the parts of amphibious animals and plants; or thoſe in which vegetables only occur, generally ſucceed, or reſt on the tracts, in which the exuviæ of vermes alone are found. The remains of land-animals, particularly of the claſs mammalia, rarely occur in regular ſtrata. Animal reliquiæ, particularly the marine, are moſt common in calcareous ſtrata; whereas vegetable reliquiæ frequently occupy argillaceous beds, eſpecially thoſe productive of coal.

The phenomena *peculiar* to petrifactions are as follow: petrifactions are generally confined to mountains, or other elevated ſituations, where the more ancient of the ſecondary ſtrata are preſented to our view; they are uſually incorporated in the earths and ſtones, of which theſe ſtrata conſiſt, forming, as it were, a part in the original fabric of the globe; no particular petrifaction is confined wholly to one kind, or ſpecies of ſtones; the ſubſtance, which forms the petrifaction, is frequently of the ſame nature as the ſurrounding rock; when it differs, it is found to conſiſt of mineral matter, with a finer texture or grain than that of the matrix. A petrifaction often conſiſts of ſeveral diſtinct minerals: thus chalk and flint often form ſeparate parts of an *echinite;* and in Derbyſhire, chert, calcareous ſpar, bitumen, and quartz, are frequently incorporated together in the ſame ſhell.

The common conſtituent ſubſtances of petrifactions are earths and ſtones of the calcareous, argillaceous, or ſiliceous claſs. Animal petrifactions are leſs common, in proportion to the degree of locomotive power which the originals poſſeſſed.

Shells and zoophytes abound in petrifactions: fiſh and inſects without wings are more rare. The petrified remains of mammalia are ſtill leſs frequent; and winged inſects and birds have perhaps never been found in this ſtate.

The vegetable petrifactions moſt common are ſuch as bear the form of plants, growing in moiſt and boggy grounds. The petrifactions hitherto recognized, however, as bearing the forms of plants or animals, known to exiſt at preſent, are very few, compared with thoſe, the living ſpecies of which have not been diſcovered.

A petrifaction ſeldom, if ever, exhibits a complete change, or ſubſtitution of mineral for organic matter; more or leſs of the original animal or vegetable ſubſtance being generally preſent, and diſcoverable either in the external or internal parts of the foſſil. In petrified ſhells and corals, the original calcareous matter is frequently ſeen covering the ſurface, or remaining in ſmall portions in the internal parts, and is readily diſtinguiſhed, although the ſubſtituted mineral, forming the principal portion of the foſſil, be alſo calcareous.

The petrifying proceſs is carried on, in ſome waters, at this day, of which we have a ſtriking inſtance at Matlock; but it appears to be confined to the formation of petrified wood, or woodſtone. Petrifactions rarely exiſt in veins.

The phenomena peculiar to the Conſervata are as follow: they are for the moſt part found in low or flat tracts, where the ſtrata are evidently of modern formation. They are alſo found in the caves and fiſſures which pervade the more ancient mountain ſtrata, but are rarely incorporated in the ſtone, or other ſubſtance of which ſuch ſtrata conſiſt: they occur alſo in the beds of rivers, and in moſt ſituations where mineral or other matter is daily accumulating: they are found in all ſtates, between that in which actual decay takes place, and that in which farther decay is prevented, either by a new combination in the remaining principles, by an impregnation with mineral particles, or by ſome other natural proceſs incident to theſe bodies. The animal conſervata moſt common are ſuch remains as are moſt rare in the petrified ſtate, ſuch as the bones of mammalia and fiſh, and ſhells of the ſame genera as thoſe found in the neighbouring ſeas. The moſt common vegetable conſervata are wood, and other parts of trees: they are more frequently referrible to plants and animals now exiſting than the petrificata, and they are not uncommon in mineral veins.

The origin of extraneous foſſils is ſhewn by the attendant phenomena. The conſervata cannot be ſaid to originate from, ſince they really are the remains of, plants and animals, introduced, by different proceſſes of nature, into the mineral kingdom: but petrifacta owe their form to organized bodies; they derive their ſubſtance generally from minerals.

It is inferred by Mr. Martin, that the introduction of extraneous bodies into the mineral kingdom has been effected in various modes, and at various periods, during a ſucceſſion of ages; but with reſpect to thoſe from which the petrifacta derive their form, chiefly while the ſuperficial parts of the globe were in their primeval liquid ſtate, and the ocean far above its preſent level. He therefore conſiders the *periods at which*, and the *agency by which*, the depoſition of organic bodies has been effected in the mineral regions.

The periods of introduction, he ſays, may be reduced to *three:* the *firſt* commencing with the exiſtence of marine animals, and ending with the formation of plants. During this period, the moſt ancient of the ſecondary tracts were formed, and the remains of the zoophytes and ſhell-fiſh, the only animals apparently then exiſting, enveloped in the ſubſtance of the ſtrata.

The *ſecond*, commencing with the formation of plants, and an increaſe of thoſe animals which are peculiar to the ocean; ending with the time at which the ocean, after a gradual ſubſidence through ſeveral ages, firſt attained its preſent level. During this period our author ſuppoſed the leſs ancient and ſome modern tracts were formed, and the remains of plants and fiſh, as well as ſhells, and other relics of the vermes, added to the foſſil world; and he adds, "Towards the middle of this period, it is probable the mammalia and other land animals were either created, or conſiderably increaſed in number, as their remains are found, though very ſparingly, in ſome modern ſtrata, ſuppoſed to have been depoſited juſt before the ſea had finally retired to its preſent limits."

The *third* period commences with the reduction of the ocean to its now actual level, and continues to the preſent time. Throughout this period, modern and very recent tracts of alluvial and other ſtrata have been depoſited, and various extraneous foſſils, particularly the remains of mammalia, introduced into the mineral kingdom.

The *agent*, according to Mr. Martin, by which the introduction of extraneous foſſils into mineral ſtrata has been chiefly brought about, is water; that is, of the ocean, of ancient lakes and inland ſeas, of rivers, local inundations, and perhaps the general deluge.

To the agency of the ocean, in a primary ſtate, is to be referred all depoſits of ſea-ſhells, and other marine bodies found in ſtrata, which do not alternate with ſtrata, holding the remains of fiſh or plants. To the ſame agent, during the ſecond period, are to be aſcribed all other accumulations of organic bodies, in which marine remains make a conſiderable part, and which are depoſited in regular determinate beds of ſtone, &c. "Sea-ſhells and other marine bodies," ſays Mr. Martin, "poſſeſſing but a ſmall degree of locomotive power, evidently have been generated, have lived and died, in the ſame accumulated heaps which their remains now exhibit. Theſe, apparently, in ſome inſtances, have been gradually entombed in matter, precipitated from an immenſe body of water, ſlowly without alteration, through an unknown length of time, and hence forming ſtrata of great thickneſs. In other tracts, marine bodies of the vermes claſs have been more quickly enveloped. The matter of the depoſition, having been repeatedly changed, forms, in ſuch caſes, only thin, ſucceſſive ſtrata of various kinds of earths and ſtones, alternating with each other. Fiſh, &c. endued with a great degree of locomotive power, have probably been arreſted in their courſe, and inſtantly killed, by ſome ſudden diffuſion of matter inimical to animal life." Some perſons have thought this to have been effected by ſub-marine volcanic eruptions.

"Where vegetable foſſils, whoſe originals grew on dry land, are found mixed with marine ſhells, in deep and regularly diſpoſed beds, it is obvious that a tranſportation of vegetable bodies from the land to the ſea muſt have taken place. In ſuch inſtances, it appears probable that plants and wood, ſpecifically lighter than water, would remain floating for a certain length of time, before their depoſition at the bottom of the ſea could be accompliſhed; and that this, at laſt, muſt have been effected by a gradual attachment of mineral particles, ſuch as the ſea then abounded with, to the ſurface of theſe floating leaves, ſtems, &c.; thus inducing in each individual that degree of ſpecific gravity neceſſary for its ſubſidence, and final depoſition, in the depths of the ocean."

The depoſition of vegetable matter, &c. in inland ſeas, would be carried on, for a certain length of time, under the ſame proceſſes as thoſe ſuppoſed to have taken place in the ocean. The influence of rivers, currents, &c. in the immediate depoſition of organic remains among mineral matter, is only to be traced in thoſe accumulations of ſand, gravel, clay, &c. To local inundations are to be referred moſt ſuperficial accumulations of organic foſſils, not depoſited in regular ſtrata, and which are not immediately connected with the courſe of ſtill exiſting rivers. Partial inundations of freſh waters appear, in many inſtances, to have occaſioned the depoſits of animal bones, ſo frequent in the looſe earth or ſoil of thoſe alluvial tracts, which have not originated from the deeper, but more contracted influence of rivers and currents. To ſudden inundations may be perhaps aſcribed the deſtruction, at leaſt, of thoſe animals, whoſe bones are found in clefts and chaſms of ancient ſtrata. To the agency of the general deluge are to be referred the ſuperficial depoſitions of marine and other remains mixed with each other, and lodged in cavities, &c. at heights to which no partial inundation of the ſea could reach.

Mr. Martin, in a note, p. 36, ſays, "it perhaps may be doubted, if any depoſition of organic bodies has ever yet occurred, unequivocally demonſtrative of a general flood. The ſhells found in Peru, on a mountain conſiderably higher than any affording ſimilar remains in Europe, appear to have been perfect petrifactions, included in the ſubſtance of the ſtone of which the mountain conſiſts: of courſe, they prove the ſubmarine formation of the rock in queſtion, but not that its contents have been elevated to their preſent ſituation by the deluge. Even looſe or unconſolidated depoſits of marine remains, ſometimes found, according to Pallas, in the more external fiſſures and veins of lofty primary rocks, in which extraneous foſſils do not occur as integrant parts, are no certain proof of this event. It is highly probable, that ſecondary ſtrata have originally covered many elevated tracts, where there is at preſent no appearance of ſuch formation: and that extraneous foſſils, formerly imbedded in theſe ſecondary ſtrata, will remain in a very complete ſtate of preſervation, long after their original matrix has been deſtroyed, is indeed a fact ſufficiently illuſtrated by the looſe reliquia ſo abundant in the common ſoil of ſome countries, and which have been liberated undoubtedly by the waſte and decay of their native rock. When, however, the remains of marine and of land animals occur together, in ſuperficial accumulations, they certainly exhibit a leſs ambiguous evidence of the deluge; yet not altogether a deciſive one, except both kinds of reliquia are found in a ſimilar ſtate of preſervation. If, on the contrary, the ſhells are petrified, and the bones are in nearly a recent or unmineralized condition, it is obvious that they were not originally introduced into the foſſil kingdom at the ſame period; and hence the ſupport which the preſence of marine objects gives to the concluſion, that ſuch depoſits are truly diluvian, is done away with." Mr. Martin adds, "It muſt not be inferred, that we wiſh to eſtabliſh a diſbelief of the general deluge. The exiſtence of that event is confirmed by authority far above the evidence of geological facts. But in the preſent ſtudy, it is neceſſary to guard againſt the too common error of aſcribing effects to cauſes, inadequate to their production."

Before we come to treat of the genera included under this claſs of mineralogy, we may obſerve that Mr. Parkinſon, and ſome other modern writers, have diſcuſſed the ſubject under the general term oryctology. We have, in the article Fossils, given our reaſons for maintaining the older term; and we may add, that as the more modern one comes from the Greek ορυσσω, *to dig*, and λογος, *a diſcourſe*, or *treatiſe*, it does not neceſſarily lead the reader to *petrifactions*, but to any other ſubſtances dug out of the bowels of the earth. We, however, take pleaſure in referring to Mr. Parkinſon's work, entitled "Organic Remains of a former World," in which our readers will find abundance of important and intereſting matter. His concluſions are, that it appears obvious, from what has actually been diſcovered, that a conſiderable number of ſpecies, kinds, and perhaps orders of animal, vegetable, and mineral materials, have been loſt for ages, and conſequently that the general ſtate and inhabitants of the earth have undergone ſome very remote and very conſiderable change; and it muſt be equally obvious, that ſuch change muſt have been produced by ſome ſuch event as the deluge deſcribed in the Old Teſtament; the book of nature thus bearing ample evidence to the truth of the book of revelation. Nothing, he adds, is clearer than judging from the general nature of the foſſil materials of the antediluvian world which have reached us, or at leaſt are known to have reached us, that the poſt-diluvian world has a very high comparative advantage, is actually richer, and to a conſiderable extent, in valuable productions, and is much more fitted for the neceſſaries, and even comforts and luxuries of civilized life. Hence, independently of the accompliſhment of any other important purpoſe, by the revolution of a former world, one grand object appears to have been attained, *viz.* ſuch an arrangement of the ſeeming ruin, as produced the regeneration of a world ſtored, in its deepeſt receſſes, with ſubſtances calculated to promote the comfort of man; to tempt him to the exerciſe of his innate powers, to furniſh him with the means of maintaining his dominion over the animals around him, and even to urge him to a change from the ſavage to the civilized ſtate. Another world riſes from the overwhelming flood, compoſed of the fragments of the former, which appear to be blended together in an apparently diſordered and incongruous maſs. But after the lapſe of a ſmall period of time, the conſtituent parts of the newly-formed world are diſcovered to be arranged according to thoſe wiſe laws which the great Creator had decreed from the beginning. The ſurface again teems with animal and vegetable life; and the freſh creation, enriched by a melioration of its materials, obtains an increaſe both in its ſtock of utility and beauty.

Genera.

Anthropolithus. The human body, or ſome of its parts, changed into a foſſil ſubſtance.

Species.

Totalis; the whole human ſkeleton. This, according to Gmelin, was found, in 1785, at Fahlun, in Sweden, imbedded in a maſs of ſulphuret of iron or pyrites, and converted into a hard ſtone. Other ſpecimens are ſaid to have been found in ſome mineral waters in France, and near Freyburg and Saxony. Mr. Parkinſon, however, maintains that no well-atteſted inſtance of the mineralized remains of man is known.

Partialis; the cranium, or other bones. Theſe are ſaid to have been found in France, at no great diſtance from Rheims. In a cavern, in the Mendip-hills of our own country, ſome human bones have been found inveſted with ſtalactite; but they ſeem to be but of modern exiſtence.

Zoolithus. The body of ſome animal of the order mammalia, or its parts, changed into a foſſil ſubſtance. Of this genera there are enumerated eight

Species.

Turcosa; the teeth; hardiſh, and of a blueiſh-green colour. Theſe have been found in the copper mines of Cumberland, in Perſia, Siberia, Bohemia, France, Germany, &c.; and are held in great eſtimation by the inhabitants of the Eaſt. Their colour is greeniſh, with a tinge of blue, which, after long expoſure to the air, becomes a dirty yellow brown or blackiſh, opaque, hard, adhering a little to the tongue, and admitting ſome degree of poliſh and luſtre; their colour ſeems to be acquired by the oxides of iron or copper.

Osteolithus; the bones becoming a calcareous ſubſtance. Theſe have been found in Great Britain, and many parts of the continent, converted into limeſtone.

Simiæ; the entire ſkeleton of an ape, found in the year 1733, at Henneburg, near Gluckſbrun in Germany, imbedded in bituminous marle, impregnated with copper.

Elephantis; the tuſks, grinders, and bones of the elephant, found in various bogs of England and Ireland. According to Mr. Parkinſon, much remains to be aſcertained with reſpect to the foſſil bones of the elephant, of which conſiderable numbers have been found in various parts of France, Germany, and Italy, as well as in this country; but no where are they ſo abundant as in Siberia. In America the remains of an unknown ſpecies of this animal are alſo very abundant. For the exiſting ſpecies, ſee Elephas. The elephantine remains which have been found in Siberia, have been ſuppoſed to belong to no ſpecies now known, for though the teeth are formed of plates diſpoſed parallel to each other, as in the Aſiatic elephant, theſe plates are ſaid to be thinner, and conſequently more numerous. The remains of elephants diſcovered in this country ſeem to be referrible, in moſt inſtances, to the Aſiatic. With regard to the elephant, whoſe remains have been found in America, the tooth of which differs eſſentially from all known foſſil or recent ſpecies, in having its crown cuſpidated and covered with enamel, there exiſts at preſent every reaſon for ſuppoſing it to be a ſpecies now extinct. The general opinion was, that this animal was carnivorous, which is contradicted by the aſſertion, that the ſtomach of one of theſe animals has been found filled with vegetable matter. An animal of this kind, with its fleſh, ſkin, and hair, has been lately found in Siberia.

Cervi; the ſkeleton, horns, or ſeparate bones of the ſtag. Theſe are found frequently buried in the ground in ſome mountains in England and Ireland, eſpecially the horns of the mooſe deer; and alſo in the mountains near Baruth in Sileſia, ſometimes the whole ſkeleton, and ſometimes parts only. In Ireland there have been found the remains of deer, of a ſize far exceeding any now known; and in Scotland the remains of an elk, as well as thoſe of an enormous animal of the ox kind, but larger than even the urus.

Rosmari; the head of the morſe (ſee Trichecus); Found in the neighbourhood of Bononia in Italy.

Bovis; the ſkeleton of the ox, found about a century and a half ago between Querſurt and Gutterſtadt in Saxony. See Cervi, above.

Soricis; the ſkeleton of the ſhrew; found in Bohemia, buried in ſchiſtus. See Sorex.

Before we quit this genus, we may obſerve, that in moſt parts of Europe remains of large animals have been found; and in both North and South America, the reliquiæ of enormous unknown animals have been diſcovered. According to Pallas, from the Tanais to the continental angle neareſt to America, there is hardly a river in this immenſe ſpace, eſpecially in the plains, upon the ſhores, or in the bed of which, have not been found the bones of elephants, and of other animals not of that climate. From the mountains by which Aſia is bounded, to the frozen ſhores of the ocean, all Siberia is filled with prodigious bones. The beſt foſſil ivory is found in countries neareſt to the arctic circle, as well as in the eaſtern countries, which are much colder than Europe, under the ſame latitude; countries in which only the ſurface of the ground becomes thawed during the ſummer.

The number of bones which have been diſcovered of the rhinoceros is very conſiderable, not only in Siberia, but in Germany, and other parts of Europe, and in the opinion of St. Fond and others, they are all of a double-horned ſpecies, ſimilar to the rhinoceros of Africa. It is, however, ſuppoſed that the rhinoceros, which correſponded with all the foſſil remains, was the rhinoceros of Sumatra.

Ornitholithus. The body, or parts of a bird changed into a foſſil ſubſtance. Of this genus there are three

Species.

Rostri; the beak; found in the neighbourhood of Jena, and in the mountains on the confines of Switzerland, ſometimes perfect, ſometimes only impreſſed on a ſchiſtoſe ſwineſtone.

Ossium; the bones of birds found in Sileſia.

Plumarum; the feathers of birds, which are found principally at Oeningen, on the confines of Switzerland, impreſſed on a ſchiſtoſe ſwineſtone. Notwithſtanding this enumeration, the foſſil remains of birds are very rarely met with, although, as Mr. Parkinſon ſays, they are frequently mentioned, and even deſcribed, by different authors. Foſſils, much reſembling the beaks of birds, are ſometimes found, but theſe are ſuppoſed to be parts of fiſhes. Several of thoſe ſpecimens which have been ſpoken of, as petrifactions of whole birds, and of their neſts, have been merely calcareous incruſtations of very modern formation. Bones very much reſembling the bones of birds have been found in the calcareous ſtone of Oxfordſhire, and in ſome parts of France and of Germany.

Amphibiolithus. The body, or ſome part of an amphibious animal changed into a foſſil ſubſtance. Of this three ſpecies are mentioned.

Species.

Testudinis; the Tortoiſe. This has been found entire, or in parts, ſometimes in the ſtone quarries of Oxfordſhire; in a bed of ſchiſt in Switzerland; on St. Peter's mountain near Maeſtricht in Brabant; in Malta; in Leipſic, and other parts of Saxony.

Ranæ; the toad or frog. The head of a frog found in a bed of ſchiſt in Switzerland, and an entire petrified toad in a ſlaty ſwineſtone at Oeningen.

Crocodili; the entire ſkeleton of a crocodile. A ſpecimen of this was found near Elſton in Glouceſterſhire, in indurated clay; and others near Drax in Aquitain, at the depth of nearly fifty yards under the ſurface of the earth; near Suhl in Henneburg, and near Boll in Wirtemburg in a ſlaty ſtone.

The foſſil remains of amphibia, ſays Mr. Parkinſon, are very numerous, and ſupply us with ample exerciſe for enquiry and admiration. In different parts of England, particularly in Somerſetſhire and Devonſhire, the remains of animals apparently of the Lacerta genus are frequently found; but are, as far as we are able to judge, really different from any animal which is known to us. A moſt beautiful ſpecimen of part of the jaw of the foſſil animal of St. Peter's mountain, already referred to, was preſented to the Royal ſociety by profeſſor Camper, and is now depoſited in the Britiſh muſeum. A ſpecimen of the head of this animal has been alſo obtained from the ſame mountain by Faujas St. Fond, and is delineated in the work which he has given the world deſcriptive of the foſſil riches of that mountain. The plates of St. Fond, as well as the ſpecimen of profeſſor Camper, ſhew that theſe are the remains of an enormous animal, different from any at preſent known. It muſt, however, be obſerved, that the remains of crocodiles, apparently of the ſame ſpecies which now exiſt, have alſo been diſcovered; part of the head of the Aſiatic crocodile was found in very good preſervation in the quarries of Altdorf.

Ichthyolithus. The body or parts of a fiſh changed into a foſſile ſubſtance. Of this genus Gmelin has enumerated four ſpecies, beſides varieties, but inſtead of particularizing them we refer the reader to our article Ichthyolite.

Entomolithus. The body, or ſome part of an inſect, changed into a foſſil ſubſtance. See Entomolithus.

Species.

Cancri; the crab or ſome of its parts. Found in various parts of Great Britain, and in moſt parts of the globe, in ſlate or foliated limeſtone, either entire or in parts, as the ſhell, legs, claws, &c. of various ſpecies.

Monoculi. The Monoculus polyphemus, found near Solenhofen, in foliated limeſtone.

Paradoxus. The Oniſcus paradoxus, found in various parts of Great Britain and the continent, in various kinds of limeſtone, and indurated clay or ſlate, looſe or affixed, ſolitary or in numbers, entire or in parts, ſtraight, incurved, expanded or contracted; the head covered with a very convex, roughiſh, often three-parted ſhell, ſemilunar on the fore part, grooved its whole length, with two hemiſpherical or cylindrical, three-lobed, covered with a laminar ſhell, conſiſting of verſatile triarcuated rings; the tail is thin, three-parted by three tubercles.

Inſects of the ſmaller kinds are ſeldom found in a foſſil ſtate, the ſmallneſs of their ſize, and the delicacy of their ſtructure, preventing their preſervation. The one which is generally found in the moſt perfect condition is that which is commonly denominated the Dudley foſſil, from its being found in the neighbourhood of Dudley in Worceſterſhire. Other ſpecies of this have been found in Wales and Germany. From the imperfect ſtate in which theſe inſects have been found, little more, perhaps, can be ſaid of them, except that the remains which have been examined ſhew that the covering of the body was formed by three ſeries of thick cruſtaceous ſhells, tranſverſely diſpoſed in rows, the length of the body, while one plate ſerved to give a covering to the head of the animal. Other remains of the ſmaller inſects have been mentioned by different authors, but few or none appear to have been deſcribed as agreeing with any inſect now known in exiſtence. The remains of lobſters and crabs are frequently found in the iſles of Sheppey and Malta, and ſome very good and perfect ſpecimens were diſcovered in digging the archway at Highgate in the years 1812 and 13, one of which is in the poſſeſſion of the compiler of this article. The remains of different ſpecies of theſe animals are alſo found in a compreſſed ſtate in the ſchiſtous maſſes of Pappenheim and Oppenheim.

Helmintholithus. The body, or parts of a cruſtaceous worm, or ſhell-fiſh changed into a foſſil ſubſtance.

Species.

Asteriæ; the ſtar-fiſh, or its parts. The varieties of this, found in a foſſil ſtate, are as follows.

1. Aſterias papposa, found in ſlaty limeſtone at Pappenheim.

2. A. rubens, found in St. Peter's mountain near Maeſtricht.

3. A. minuta, found in chalk-pits in various parts of England; it is ſmall, of a reddiſh-white colour; in form of a ſtar, or wheel with four or five radii; it is ſomewhat convex at the centre.

4. A. glacialis, found in France.

5. A. reticulata, found in France near Chaſſois.

6. A. aurantiaca.

7. A. equeſtris, in the ſandſtones in Saxony.

8. A. ophiara, in Italy and Germany, in marble, and with ſolitary rays in a yellow ſhining ſandſtone.

9. A. pectinata, at Pappenheim, in ſlaty limeſtone.

10. A. multiradiata, near Stutgard, with the rays aggregate.

11. A. Caput Meduſæ, found generally in mountains of chalk, limeſtone or ſandſtone, ſometimes the mere impreſſions are what are left.

Echini; the Echinus or Sea Hedgehog. Divided into two ſections, *viz.* A, including the entire animal; and B, its parts.

Section A.

1. Echinus eſculentus, found in England, Saxony, Germany, &c. in chalk, lime, marle, flint or agate.

2. E. excavatus, in marble at Verona, of a yellow-grey colour.

3. E. globulus, in England, and divers parts of Germany, generally calcareous, rarely in flint.

4. E. ſaxatilis, in limeſtone near the ſalt-pits in Upper Auſtria.

5. E. ovarius, in England, France, and Switzerland, in chalk and lime-ſtone hills.

6. E. diadema, in the mountain Raudberg in Switzerland, and at Rottenburg in Weſtphalia.

7. E. circinatus.

8. E. cidaris, found in England, Saxony, Franconia, and various parts of Europe, in flint, chalk, or marble.

9. E. mamillatus, in Malta, Switzerland, on the limeſtone mountain Legerburg, and near Baſſeville in iron ore.

10. E lucunter, in the chalk-hills of England.

11 E. coronalis, in the flint and chalk-hills of England.

12. E. aſterizans, found filled with cretaceous matter, the ſhell itſelf being converted into ſpar.

13. E. teſſellatus, in the chalk-hills of Baſil.

14. E. botryoides.

15. E. ſinuatus, in the chalk and limeſtone hills of England.

16. E. ſemiglobofus, in the calcareous mountains of Sileſia and Switzerland.

17. E. quinquelabiatus, in the calcareous mountains of Switzerland.

18. E. conoideus.

19. E. albo-galerus, and the next, are found in the chalk-hills of England, and in marble in Lower Saxony.

20. E. depreſſus.

21. E. vulgaris, found abundantly in calcareous hills, in England, Germany, and Sileſia.

22. E. quadrifaſciatus.

23. E. ſexfaſciatus.

24. E. ſubuculus.

25. E. ſcutatus, in the chalk-hills of England and Denmark.

26. E. ovatus.

27. E. puſtuloſus, in the chalk-hills of England, and in the marble rocks of Germany.

28. E. quadriradiatus, in the coarſe marble of Holſtein.

29. E. minor.

30. E. dubius.

31. E. roſaceus, found in the mountains of Languedoc.

32. E. altus.

33. E. orbiculatus, in the calcareous mountains of Switzerland.

34. E. ſubrotundus.

35. E. corollatus.

36. E. orbiculus, in Venice; near Brandenburg in Weſtphalia, and in Languedoc.

37. E. placentæ, in Malta.

38. E. cor-anguinum, in the chalk-hills of England, and coarſe marble rocks of Germany.

39. E. lacunoſus.

40. E. radiatus.

41. E. complanatus, in the limeſtone mountains of Switzerland.

42. E. ſubglobulus, in the chalk-hills of England, and the marble of Switzerland.

43. E. oananchytis.

44. E. bicordatus, in the mountains of Switzerland.

45. E. carinatus, found in Norway.

46. E. ſpatagus, found in great abundance in the chalk-hills of England, near Maeſtricht, and in various parts of Germany and Switzerland.

47. E. briſſoides.

48. E. ovalis, found in the mountains of Switzerland.

49. E. pyriformis.

50. E. lapis cancri.

51. E. patellaris.

Section B. The Parts.

This ſection includes ſpecimens, 1. Of the ſpines, denominated Jew's-ſtone, of which there are nine varieties that do not require particular notice; 2. Of the knobs; 3. Of the ſeparate compartments of the ſhell; and 4. Of the teeth of the ſhell, which laſt are found abundantly in Great Britain, and various other parts of the globe; the ſpines are ſhorter or longer, ſmooth, ſtriated or ſtudded.

Chiton, found near Creazzo, in the Venetian territories.

Lepadis, or Acorn-ſhell. 1. L. balanus is found in Piedmont, in ſandſtone; in Malta, Languedoc, and near Dreſden in Saxony. 2. L. balanoides. 3. L. tintinnabulum. 4. L. mitella: theſe three laſt are all found in Piedmont, either in ſandſtone or marble. Mr. Parkinſon ſays, although ſeveral ſpecies of the Lepas have been found in a mineralized ſtate, they are by no means frequent foſſils. The L. anſerifera is ſaid to have been found foſſil, and ſo has the L. diadema; theſe muſt, however, be exceedingly rare foſſils.

Pholadis. The Pholas in a foſſil ſtate is by no means common; but the P. criſpata has been found among the Harwich foſſils; others have been diſcovered in Piedmont, generally imbedded in ſilica or limeſtone.

Mya. This is found in a foſſil ſtate in England, Arabia, Belgium, Switzerland, Germany, France, and other parts of the continent. The Mya *pictorum* (which ſee) is deſcribed by Solander as exiſting among our Hampſhire foſſils; a foſſil mya of three or four inches in length is found in the rocks near Bognor.

Solenites. The Solen in a foſſil ſtate is found in Arabia, Belgium, Switzerland, Germany, France, and other parts of the European continent. Remains of the S. ſiliqua, and of the S. enſis, have been found at Harwich; and a ſmall foſſil ſhell, named by Solander S. ficus, has been found between Lymington and Chriſtchurch.

Tellinites. The Tellina is found foſſil in Glouceſterſhire, Italy, Switzerland, Bohemia, Auſtria, &c. in clay or limeſtone. The varieties are, 1. T. lingua felis, in the limeſtone mountains of Switzerland and Wirtemberg. 2. T. roſtrata, at or near Ball in Wirtemberg, in calcareous earth. 3. T. donacina, near Herbipolis, in limeſtone.

Bucardites. The Cardium, or cockle, found in a foſſil ſtate in the clay-pits at Richmond in Surry; at Sherborne in Gloceſterſhire; in the cliffs at Harwich; on Shooter's Hill, and in vaſt maſſes of grey limeſtone in the county of Cork; in Germany, Italy, Bohemia, Auſtria, and other parts of the continent.

Mactræ. This is found in the foſſil ſtate in Piedmont, about Verona in Italy, in England and Germany, generally calcareous.

Donacites. The Donax ſcortum and D. irus are found in Germany and Switzerland.

Veneris. Different ſpecies of the Venus are found in this and other countries of Europe, and the V. paphia is met with on the continent of America.

Spondyli. The Spondylus gædaropus is found in America, Switzerland, and Germany, and the S. regius in marble, near the ſalt ſprings in Upper Auſtria.

Chamites. Of the Chama eight ſpecies are found in a foſſil ſtate in the ſouthern parts of Europe.

Arcæ. The Arca is found in the cliffs at Harwich, and various parts of Gloceſterſhire and Oxfordſhire, and likewiſe in many parts of Germany and Switzerland.

Ostreæ. The Oyſter, or ſcallop-ſhell, is found foſſil in different counties of England, as Gloceſterſhire, Berkſhire, Oxfordſhire; alſo in Italy, Germany, and moſt countries of Europe, in chalk, flint, marble, clay, ſandſtone, &c.

Section A. Scallops.

1. Oſtrea radiata, is found near Witney and Graveſend, and in Germany.
2. O. maxima, in the Venetian territories, Malta, Hungary, and divers parts of Germany.
3. O. jacobæa, in Piedmont and Germany.
4. O. ziczac, in the Netherlands and Germany.
5. O. minuta, in Auſtria, near Brunn, and near Libochowitz in Bohemia.
6. O. ſtriata, near Querfurt in Saxony, and in Hungary.
7. O. pleuronectes, found in various parts of Germany.
8. O. pallium, in Bohemia, Saxony, Switzerland, and Germany.
9. O. nodoſa, in Alſace.
10. O. puſio, in Belgium, Germany, and Bohemia.
11. O. glabra, in Germany and Bavaria.
12. O. faſciata, found near Odolca, in Bohemia
13. O. lima, found near Ariſtorf, in Switzerland.

Section B. Oyſters.

The O. diluviana, O folium, and O. edulis, are found in moſt parts of the globe.

Anomites. No bivalve exiſts as a foſſil in ſuch prodigious number as the Anomia. Theſe ſhells are characteriſed by the beak of the larger or under valve, which is perforated, being greatly produced, riſing or curving over the beak of the ſmaller or upper valve. Twenty-one of theſe ſpecies of ſhells are mentioned by Gmelin, of which the following ſeem moſt worthy of notice.

1. A. gryphus, found in England, France, Germany, Switzerland, &c. in gravel or clay-pits, ſometimes with both ſhells joined.

2. A. lacunoſa is one of the moſt abundant of theſe ſpecies. They are found in conſiderable numbers in different parts of England, but particularly in Lincolnſhire, Warwickſhire, and Glouceſterſhire.

3. A. terrebratula, found fixed or detached, in lime or flint, and ſometimes filled with ſpar, near Witney in Oxfordſhire, and alſo at Graveſend; likewiſe in Germany, Saxony, Bohemia, Auſtria, and moſt parts of the continent.

Mytilites; the Mytilus or Muſcle-ſhell. Several ſpecies of this are known foſſils, ſome of which approach very nearly to thoſe which are recent, and one in particular appears to differ very little from the M. modiolus, which is found in various parts of Germany, fixed and marmoreous. The other principal ones are;

1. Mytilus criſti-galli, found in Malta, Normandy, Switzerland, Germany. It is ſometimes very large, and generally marmoreous.

2. M. frons; found in Chriſtianſtadt in Sweden, in Belgium, Normandy, and Malta, in marble, ſand, or flint.

3. M. margaritiferus; this is found near Ariſtorf, in Switzerland; admitting a beautiful poliſh, and exhibiting the moſt ſplendid irideſcent colours, according to its poſition in the light.

4. M. edulis; found in Piedmont, and very many parts of Germany, generally fixed and calcareous, ſometimes ferruginous, or in ſand-ſtone.

Pinnites; the Pinna. This alſo is found in a foſſil ſtate in Piedmont, near Ariſtorf in Switzerland, in Franconia, and near Dreſden in Saxony.

Nautilites; the Nautilus. Specimens of this, in the foſſil ſtate, are very frequent. They have been found in ſeveral parts of our own iſland: ſome fine ſpecimens have been met with at Lime in Dorſetſhire, in different parts of Wiltſhire, and at Whitby in Yorkſhire. The fineſt ſpecimens are thought to be found in the neighbourhood of Bath, and in the iſle of Sheppey in Kent. In digging for the Highgate archway, a number of very beautiful ſpecimens were diſcovered, ſome exceedingly large, and ſtill retaining a reſplendent pearly ſhell, highly decorated with pyrites; of which one is in poſſeſſion of the compiler of the preſent article.

The ſhell with the outer whorl much larger than the others is common in Northamptonſhire, Kent, Sheppey, and other parts of England; alſo in many countries on the continent. It is generally marmoreous, ſometimes pyritaceous, or ſiliceous.

That with the circumference rounded and knotty, and the grooves tranſverſe and flexuous, is met with in almoſt every part of the globe, in marble, limeſtone, clay, marle, ſwineſtone, hornſtone, agate, flint, &c. from the ſize of a ſixpence to more than two feet in diameter. The chambers are often filled with cryſtals of various kinds.

The N. belemnita is found abundantly in many parts of England, particularly in Gloceſterſhire and Oxfordſhire, and in moſt mountainous parts of Europe. They are more or leſs opaque or tranſparent, ſtraight or a little bowed, cylindrical, conic, more or leſs clavate, fuſiform, a little compreſſed, pointed or rather obtuſe, with a groove or two towards the tip; internally hollow or filled up, from a quarter of an inch to eight inches long; the colour is whitiſh, amber, grey, browniſh, or blackiſh. They are often incloſed in, or adhere to other ſtones, and are compoſed of ſeveral cruſts encircling each other, and are moſt frequent in chalk, gravel, or clay. When burnt, or ſcraped with a knife, they give out an odour like raſped horn. Common people have a notion that they are to be found after a thunder-ſtorm.

Coni. The Conus is to be met with in Piedmont, Switzerland, and Tranſylvania; and commonly it has a marble nucleus.

Porcellanites. The Cypræa, or cowrie, found marmoreous in Piedmont and Auſtria.

Bullites. The Bulla, near Northberg in Germany.

Cylindrites. The Voluta has generally a marble nucleus, in Switzerland, Piedmont, near Verona, in Auſtria, Saxony, and Germany.

Buccini; the Buccinum or Whelk. Of the ſeveral ſpecies of this, the angular or B. bezoar is found on the hills near Hampton in this country, in Switzerland, the Netherlands, and Germany.

Strombi. The Strombus chiragra is found near Oedenburg in Hungary. S. lucifer with a long ſpire, near the warm bath in Wirtemburg.

Muricis. Several ſpecies of the Murex or whelk is found foſſil; the M. granulatus is met with in Italy and Auſtria. It is marmoreous, or filled with ſandſtone.

Trochilites. The Turbo is found in various ſpecies, in divers parts of Europe.

The Turbo littoreus in Switzerland, and many parts of Germany, ſometimes filled with ſpar, or covered with arboreſcent figures.

Of the *Cancellate* tribe, the T. ſtriatulus with an elongated ſpire is met with in England, France, Switzerland, and various parts of Germany, aggregate and fixed, generally in marble, flint, calcedon or ſandſtone, and ſometimes filled with ſpar.

Helicis. The Helix or ſnail-ſhell is met with in the foſſil ſtate, either *flattened*, in various parts of England, Belgium, Switzerland, Hungary, &c. detached or fixed, ſolitary or gregarious, or mixed, in marble, flint, or ſandſtone; or *rounded*, near Verona, in the Venetian territories, in Piedmont, Switzerland, and Germany; or *ovate*, in England, France, Switzerland, and Germany, in marble or ſandſtone.

Neritites. The Nerita is found in Piedmont, Switzerland, Carinthia, Auſtria, Germany, &c. and generally in limeſtone.

Auricularis. The Haliotus, or ſea-ear, found in Belgium.

Patellariæ. The Limpet is found in various parts of England, Switzerland, and Italy. The P. ſaccharina is common in various parts of Sweden.

Dentalis. The Dentalium, or tooth-ſhell, found in various parts of Italy, Switzerland, Germany, Bohemia, Sileſia, and Saxony, in marble, jaſper, or calcedony.

Tubulites. The Serpula is to be met with in many of the countries of Europe. The flexuous or contorted, called *vermiculites*, is found in Malta, Italy, Switzerland, Germany, Franconia, and Belgium, in marble, ſandſtone, generally ſeated on other petrified ſhells.

Teredinis. The Teredo is found in Sheppey iſland, and Piedmont, in ſubterraneous wood.

Sabellæ. The Sabella is found every where among impreſſions.

Tubiporites. The Tubipore is met with in Sweden, Belgium, Franconia, and Sileſia.

T. muſica is found in England, Belgium, Germany, Gothland, in marble, quartz, or ſandſtone.

Madreporites. The Madrepore is found foſſil in Gothland, Belgium, Piedmont, and the Venetian territories, in beds of marle. Of the forty-two ſpecies characteriſed by Gmelin, we ſhall only notice the following.

M. turbinata, found in Derbyſhire, Gothland, Switzerland, Auſtria, and various parts of Germany and the Netherlands, in marble.

M. porpita, or ſhirt-button madrepore, in Switzerland, Auſtria, Saxony, and Weſtphalia, generally detached, in marble, jaſper, and flint.

M. aſtroites, in Oxfordſhire, near Heddington and Witney, in the Netherlands, Germany, Auſtria, and Saxony, in chalk, calcedony, or ſandſtone.

M. cæſpitoſa, in Derbyſhire, Switzerland, and various parts of Germany, in marble and flint.

Milleporites. The petrified Millepores are found chiefly in Switzerland, Germany, and Sweden. Milleporæ do not appear to be nearly ſo frequently found in a mineral as in a recent ſtate. Several foſſils have been placed among the millepores, which Mr. Parkinſon thinks ſhould unqueſtionably rank with the madrepores: ſuch are the M. ſimplex turbinata, and the M. ſimplex diſcoides of Waller and Geſner.

Celleporites. The Cellepore is found in Gothland, in marble or ſandſtone. C. antipathes and C. gorgonia, as foſſils, are rather uncommon.

Isidis; the Iſis or coral. Of this we may obſerve, that the ſimple joints of the I. hippuris are often found in England, Switzerland, and Sicily.

I. entrocha is found in England, and on almoſt every part of the continent, ſometimes in ſingle ſeparate joints, ſometimes connected together in a column, from the ſize of a pin's head to a finger's length, and of about the thickneſs of the middle finger: they are more or leſs tranſparent, in proportion as they contain more or leſs ſilica, are ſtriated from the centre to the circumference, and have a cavity in the middle. When reduced to powder, they are eſteemed very powerful diuretics, and are exhibited in nephritic caſes; the doſe being as much as will lie on a ſhilling.

I. aſteria, or ſtar-ſtone. Of this there are ſeveral varieties: the one denominated by Gmelin *b*, is orbicular at one end, and angular at the other, and is found in England, Switzerland, Germany, Auſtria, &c. ſingle or gregarious, detached or fixed, with the joints ſolitary, or forming a column, which is rarely curved or branched, ſmooth or warty, rarely three or ſix-ſided, very rarely ſquare; the joints, when ſeparated, reſemble a radiated ſtar: when thrown into ſtrong vinegar, or acetous acid, they have the property of moving, which, however, is probably occaſioned by the efferveſcence cauſed by the acid acting upon the calcareous matter of which they are compoſed.

Gorgoniæ. The Gorgonia is found in Switzerland, Italy, and Saxony, in the foſſil ſtate.

Alcyonii. The different ſpecimens of the Alcyonium, in the foſſil ſtate, are found chiefly in Switzerland and Germany; but the A. arboreum is met with in England.

Spongiæ. Petrified ſponge is found near Paffrath in Switzerland, and in Franconia.

Escharites. The Fluſtra is found foſſil in the Netherlands, Franconia, and Switzerland, in ſandſtone and calcareous ſoil.

Tubulariæ. The Tubularia is met with in Gothland and Switzerland.

Corallinæ. The Coralline is found in Bohemia and Venice.

Sertulariæ. The Sertularia is met with in France and the Netherlands.

Pennatulæ. The Pennatula (or ſea-pen) phoſphorea is found in the Netherlands, and on mount Baldo in Verona.

P. encrinus, in its *expanded* ſtate, is found in England and Germany, in marle or flint, ſometimes the impreſſion only: in the *contracted* ſtate, called the *ſtone-lily*, it is found entire, or in parts, in England, Switzerland, Saxony, Germany, &c.

Phytolithus, the laſt genus of the claſs Petrifactions, includes vegetables, or ſome of their parts, changed into a foſſil ſubſtance. Of this there are ſix

Species.

TOTALIS; the whole plant. Found in various parts of Great Britain, moſt commonly in the ſhale lying over ſtrata of coals or in ſandſtone, and in various parts of Europe: it is always in the form of an impreſſion; of the thirty-one varieties the following only claim notice.

The Hippuris, or mare's-tail, is found in the coal-mines of Sileſia and Germany.

Various graſſes are found in Switzerland, Bohemia, Sileſia, and divers parts of Germany, in ſchiſtoſe ſwineſtone and alumina lying over beds of coal, rarely in flint.

Stellate plants, as Gallium, Aſperula, &c. in the coal-pits of England, France, and Germany.

The Cactus, in England, Weſtphalia, and Germany, in coal-mines.

The Ornithopodium, or bird's-foot, in the Veroneſe mountains of Venice.

The Pinus, or pine, in Switzerland and various parts of Weſtphalia.

Many genera and ſpecies of ferns are found in ſchiſtoſe and bituminous marle and alumina covering veins of coal, in ſandſtone and other foſſils, in numerous varieties, in many parts of Great Britain, France, Germany, Italy, Bohemia, Saxony, and moſt parts of Europe, generally in impreſſions.

Various moſſes and ſea-weeds are met with in Venice, Saxony, and Sileſia.

RHIZOLITHUS; the roots of vegetables, moſt commonly found underground in a ſtate of decay, ſometimes hollow, or filled with other foſſil ſubſtances; ſometimes covered with a ſtony cruſt; though ſometimes they occur petrified in France, Italy, Germany, Sweden, and Siberia.

TRUNCI. The trunk or ſtalk of vegetables. The trunks of trees are found in almoſt every part of the globe, and in various ſtates of decay and appearance; ſometimes forming ſubterraneous woods, the pieces of which are found or carious, or perforated by the Teredo. Numerous ſpecimens of theſe were dug up in forming the Highgate archway. Some are in a complete foſſil ſtate, and will admit of a high poliſh: others are converted into charcoal, with or without the bark, and often ſo perfect as to diſtinguiſh the kind, as oak, aſh, fir, &c. Some of them are marmoreous and often filled with ſpar: of theſe, ſpecimens are met with in Ireland and many parts of Germany: ſome in gypſum; ſome in ſilica; ſome in agate: theſe laſt are found in Siberia, Hungary, and Saxony, more or leſs opaque, breaking into coarſe ſplinters or indeterminate fragments, a little ſhining, taking a fine poliſh, fibrous internally, of a conchoidal texture, variegated, ſpotted or ſtriate, blackiſh or of a ſmoke colour, ſometimes red, ochraceous or green: ſome are found in opal, in Upper Hungary, hardiſh, opaque or nearly ſo, breaking into indeterminate fragments or long ſplinters, ſeparating into cruſts, generally a little ſhining, moſtly variegated with white, greyiſh-brown, or ochraceous and hyacinthine alternate ſtreaks: ſome of theſe ſpecimens are bituminous, which are found frequently forming entire ſubterraneous woods in various parts of England and Ireland, particularly in Lincolnſhire: alſo in almoſt all the countries on the continent of Europe: in Pruſſia they are found in ſtrata that are ſuperincumbent on amber.

LITHOPHYLUM; the leaves of plants. Impreſſions of the leaves of various herbs and trees are very frequent in marble, ſchiſt, marle, clay, and ſandſtone, rarely in flint or indurated oxyd of iron.

ANTHOLITHUS; the flowers of plants. Thus the ſpikes of graſſes are found in Sileſia, Franconia, and Germany, in copper ores, frequently with a ſmall admixture of ſilver: the flowers of herbs, as the galium, heliotropium, ranunculus, and various ferns, are to be met with in England, Sileſia, and Switzerland; impreſſions are found between ſlaty ſtones.

CARPOLITHUS; the naked ſeeds, ſeed-veſſels, cones, nuts, drupas, and legumes of plants, are found in a foſſil ſtate in the coal-mines of England, in ſandſtone in Piedmont, in Bohemia in marle, in Switzerland in turf, in Hungary, Auſtria, &c. always in impreſſions.

The parts of vegetables confined in ſubterranean ſituations ſuffer, according to circumſtances, either a complete revolution of compoſition, the lighter parts becoming volatilized, while the more fixed remain and form the ſubſtance which is termed *humus*; or, as it is ſuppoſed by Mr. Parkinſon, it paſſes through another proceſs which he conſiders as fermentative, and becomes bituminous. Wood thus changed is called *lignum foſſile bituminoſum*, and *Bovey-coal*. By the extenſion of this proceſs, the ſame author ſuppoſes that the ſubſtances denominated bitumens (naphtha, petroleum, and aſphaltum) are formed. To the ſame proceſs he attributes the formation of amber. That jet, cannel coal, and common coal employed in domeſtic purpoſes, have had a vegetable origin, is rendered extremely probable, from the frequency with which they manifeſt the impreſſions of various vegetable bodies.

Thus the formation of the bituminous foſſils may be ſatisfactorily explained, but by far the greater number of vegetable foſſils, are of a lapideous nature, and neceſſarily owe their formation to very different proceſſes, which may be preceded by the proceſs by which bitumen is formed. Many bodies which are evidently of vegetable origin, may be now found exiſting in a lapideous, either calcareous, or ſilicious ſtate; and many others are found poſſeſſing certain marks of the preſence of ſome metallic ſubſtance. To explain theſe formations ſome perſons have ſuppoſed the injection of the impregnating matter in a ſtate of fluidity, by ignition, while others have imagined the gradual abſtraction of the original particles of the body, and the regular depoſition of the impregnating particles in the ſpaces which have been juſt left by the original matter. Mr. Parkinſon attributes the formation of this deſcription of foſſils to the impregnation of vegetable ſubſtances, which have undergone different degrees of bituminization with water, holding the earths or the metals in ſolution. Thus with *lime* is formed calcareous wood, or the wood-marble of Oxfordſhire and Dorſetſhire, of Piedmont and Bohemia: with *ſilex* is formed the calcedoniſied, agatified, and jaſperized wood; and with the addition of alumine, &c. the foſſil woods which now partake of the nature of pitch-ſtone, &c. In other ſituations, metallic impregnations occur, as in ſuch woods as are impregnated with pyrites of iron, ſo frequent in this country, and the beautiful woods of Siberia, containing the hydrate and carbonate of copper. For other particulars, and an account of the diſcovery lately made in the iſland of Guadaloupe, ſee the article RELIQUIÆ.

PETRIFYING WATERS. Alonſo Barba gives an account of ſome petrifying waters of Peru, which greatly exceed all thoſe we have in Europe in the quantity of ſtony matter they contain. He tells us that they ſoon choak up their own paſſage by the ſtony matter they depoſit there; and that all the cattle that drink of them die. He adds another ſtory, which he probably took a little too haſtily upon credit, which is, that they have moulds of the ſhape of our brick, which they fill with this water, and that on being expoſed to the ſun a few days, the water is wholly converted into a ſtone of the ſame ſhape; and that they build their houſes and other buildings with theſe ſtones.

PETRIKOW, PETERKAU, or *Petrkow*, in *Geography*, a commercial, but not large, town of the duchy of Warſaw, in which the kings of Poland were formerly elected, and diets held. It has been twice conſumed by fire; 48 miles E.S.E. of Siradia.—Alſo, a town of Lithuania; 130 miles S.E. of Novogrodek.

PETRILITE, or *Cubic Felſpar of Karſten*, in *Mineralogy*, is the 40th ſpecies of the ſiliceous genus in the arrangement of Kirwan; its colour is reddiſh-brown or red; amorphous; its luſtre 2; its tranſparency partly 2, partly 1; its fracture participates of the ſplintery and foliated, but inclines more to the former; its fragments 2; cubic, or inclining to that form, and without poliſhed faces; it ſeems to conſiſt of thick, indiſtinctly ſeparate, ſtraight, lamellar concretions; its hardneſs 9; brittle. The ſpecific gravity of Kirwan's ſpecimen was 3.081. At 160° it whitened, and barely concreted without any farther ſign of fuſion. As it is ſpecifically different from the other ſtones hitherto called felſpars, Kirwan, to prevent confuſion, calls it petrilite.

PETRINAL, or POITRINAL, in *Artillery*, a kind of medium between the harquebuſs and piſtol, deſcribed by the preſident Fauchet, who lived under Francis I. and died under Henry IV. It had a very ſtrong and quick wheel, and is ſuppoſed to have been invented by the bandouliers of the Pyrenean mountains. Nicot, in his Dictionary, deſcribes it thus: "It is," ſays he, "a ſpecies of harquebuſs, ſhorter than the muſket, but of a greater calibre, and on account of its weight, is carried in a broad baudrick worn over the ſhoulder, and reſted on the breaſt of the perſon who carries it, when he fires it, whence its name. The poitrinalier is the perſon who carries and uſes the poitrinal." This arm is mentioned in the ſiege of Rouen by Henry IV. in 1592.

PETRINIA, in *Geography*, a ſtrong town of Croatia, on the S. ſide of the Kulpa, built by Aſſan Pacha in 1592; 37 miles E. of Carlſtadt. N. lat. 45° 32′. E. long. 16° 35′.—Alſo, a river of Croatia, which riſes near Puſta Petrinia, and runs into the Kulpa near Petrinia.

PETRINIA, *Puſta*, a town of Croatia, near the ſource of the Petrinia; 10 miles S. of Petrinia.

PETRISKI, a lake of European Turkey, in Macedonia; 3 miles N.E. of Jenitza.

PETRIZZI, a town of Naples, in Calabria Ultra; 5 miles from Squillace.

PETROBRUSSIANS, in *Eccleſiaſtical Hiſtory*, a religious ſect, which aroſe in France, and the Netherlands, about the year 1110; ſo called from their leader, Peter de Bruys, a Provençal, who made the moſt laudable attempt to reform the abuſes and remove the ſuperſtitions that diſgraced the beautiful ſimplicity of the goſpel: and after having engaged in his cauſe a great number of followers, during a laborious miniſtry of twenty years' continuance, was burnt in 1130, by an enraged populace, ſet on by the clergy. The chief of Bruys' adherents was a monk, one Henry; from whom the Petrobruſſians were alſo called Henricians.

Peter the Venerable, abbot of Clugny, has an expreſs treatiſe againſt the Petrobruſſians; in the preface to which, he reduces their opinions to five heads.

1. They denied that children before the age of reaſon can be juſtified by baptiſm; in regard it is our own faith that ſaves by baptiſm. 2. They held, that no churches ſhould be built, but that thoſe that already are ſhould be pulled down; an inn being as proper for prayers as a temple, and a ſtable as an altar. 3. That the croſs ought to be pulled down, and burned, becauſe we ought to abhor the inſtrument of our Saviour's paſſion. 4. That the real body and blood of Chriſt are not exhibited in the Euchariſt! but merely repreſented by their figures and ſymbols. 5. That ſacrifices, alms, prayers, &c. do not avail the dead.

F. Langlois objects Manicheiſm to the Petrobruſſians; and ſays, they maintained two gods, the one good, the other evil: but this we rather eſteem an effect of his zeal for the Catholic cauſe, which determined him to blacken the adverſaries of it, than any real ſentiment of the Petrobruſſians.

PETROCALLIS, in *Botany*, from πετρος, *a ſtone*, or *rock*, and καλλος, *beauty*, a new genus, founded by Mr. R. Brown upon the *Draba pyrenaica* of authors, which owes the above appellation to its place of growth, and the decoration it affords to many an alpine precipice, of which a garden ſpecimen can give but an inadequate idea. Brown in Ait. Hort. Kew. v. 4. 93.—Claſs and order, *Tetradynamia Siliculoſa*. Nat. Ord. *Siliquoſæ*, Linn. *Cruciferæ*, Juſſ.

Gen. Ch. *Cal.* Perianth of four elliptical, concave, ſlightly ſpreading, keeled, deciduous leaves, with a dilated, coloured margin. *Cor.* cruciform, of four obovate, ſpreading, ſlightly emarginate petals, twice the length of the calyx. *Stam.* Filaments ſix, awl-ſhaped, ſimple, about the length of the calyx, two oppoſite ones rather ſhorter; anthers ſimple, elliptical, incumbent. *Piſt.* Germen ſuperior, ſeſſile, elliptical, compreſſed; ſtyle very ſhort, angular; ſtigma ſmall, capitate, flat. *Peric.* Pouch oval, compreſſed, entire, veiny, ſomewhat oblique, crowned with the permanent ſtyle, of two cells; the partition parallel to the valves, which are nearly flat. *Seeds* two in each cell, almoſt orbicular, flat, without a border, pendulous, their ſtalks capillary, attached to the partition.

Eſſ. Ch. Pouch oval, entire; its valves flattiſh. Seeds two in each cell, without a border, their capillary ſtalks attached to the parallel partition. Stamens without teeth.

1. P. *pyrenaica*. Pyrenean Rock-bloſſom. Ait. n.° 1. (Draba pyrenaica; Linn. Sp. Pl. 896. Willd. Sp. Pl. v. 3. 428. Jacq. Auſtr. t. 228. Curt. Mag. t. 713.)—Native of the Pyrenees, as well as of the mountains of Dauphiny, always in the moſt elevated ſituations, flowering about the middle of ſummer. We have gathered it in ſeed upon Mount Cenis in Auguſt. In gardens it flowers in May, and may ſerve to adorn rock-work, but we doubt whether it will not require the ſhelter of a frame in winter. The *ſtems* form denſe perennial tufts, and are much branched and leafy. *Leaves* crowded into a roſe-like form, wedge-ſhaped, three-cleft half way down, obtuſe, light green, ſhining, ribbed, fringed, not half an inch long, permanent though finally faded, and partly bleached. *Flowers* but few together, on ſolitary, corymboſe, erect, hairy ſtalks; their *petals* at firſt white, but ſoon turning, like the edges of the *calyx*, to a roſe-colour.

Though, in compliance with the ideas of our learned friend, we have adopted this genus, there ſeems but little pretence to ſeparate it from *Draba*, with which the whole habit and appearance of the plant accord.

PETROCARYA, a name given by Schreber to the *Parinari* of Aublet, derived from πετρος, *a ſtone*, and καρυον, *a nut*, in alluſion to the remarkable hardneſs and ſolidity of the large ſtony ſeed. Schreb. 245. Willd. Sp. Pl. v. 2. 287. Mart. Mill. Dict. v. 3. (Parinarium; Juſſ. 342. Lamarck Illuſtr. t. 429. Parinari; Aubl. Guian. v. 1 514.)

514.)—Claſs and order, *Heptandria Monogynia*. Nat. Ord. *Heſperideæ*, Linn. *Roſaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, turbinate, five-cleft; its ſegments ovate, acute, rigid, ſpreading. *Cor.* Petals five, ovate, acute, unequal, ſmaller than the teeth of the calyx, and alternate with them. *Stam.* Filaments fourteen, capillary, longer than the teeth of the calyx, and inſerted into its rim within the petals, ſeven of them, all on one ſide of the calyx barren; anthers ſeven only, roundiſh, burſting at the inner ſide. *Piſt.* Germen in the bottom of the calyx, ovate, villous; ſtyle cylindrical, incurved, villous, longer than the ſtamens; ſtigma capitate. *Peric.* Drupa large, ovate, compreſſed, its fleſh fibrous, of one cell. *Seed.* Nut ovate, compreſſed, longitudinally furrowed, with unequal wrinkles and tubercles, of two cells, its ſhell very hard and almoſt ſtony, not burſting; kernels ſolitary, oblong.

Eſſ. Ch. Calyx five-cleft. Petals five, inſerted into the calyx. Seven of the ſtamens abortive. Drupa fibrous. Nut rugged, of two cells.

1. P. *montana*. Willd. n. 1. (Parinari montana; Aubl. Guian. v. 1. 514. t. 204, 205.)—Leaves ovate, on hairy ſtalks.—Gathered by Aublet in the woods of Guiana, forty miles from the ſea-coaſt, flowering in May, and bearing ripe fruit in Auguſt, the nuts of which are ſweet, and excellent eating. The *trunk* of the tree is twenty-four feet high, and two or three in diameter, crowned with many ſpreading branches, which are clothed when young with ruſty down. *Leaves* alternate, on thick downy *ſtalks* about half an inch long, oval, pointed, entire, coriaceous, four or five inches in length, and nearly one and a half in breadth, with one rib, and numerous, parallel, tranſverſe veins; their upper ſurface ſmooth and ſhining; the under white and finely cottony, with reticulated prominent veins. *Stipulas* in pairs, ſheathing, lanceolate, concave, externally downy, above an inch long, deciduous. *Flowers* rather ſmall, whitiſh, numerous, in denſe, terminal, forked, downy and hairy *panicles*, with two or three large ovate *bracteas* at each ſubdiviſion. *Drupa* green, acid, four inches long, and three in its greateſt diameter.

2. P. *campeſtris*. Willd. n. 2. (Parinari campeſtris; Aubl. Guian. v. 1. 517. t. 206.)—Leaves heart-ſhaped, nearly ſeſſile.—Native of the foreſts of Guiana, in the quarter of Timoutou; as well as of the iſland of Mauritius, in the quarter of Moka. *Aubl.* Differs from the laſt in the broader and heart-ſhaped figure of the *leaves*, as well as in the very ſhort *footſtalks*, and much ſmaller ſize of the *fruit*, which is ſcarcely an inch and half long, with very acute points and angles to the ſhell of its nut, which is as hard as the former, and its kernels are likewiſe eatable. This fruit is known among the Creoles by the name of *Neſle*, or Medlar. Its fleſh is pulpy and acid. Its ſeaſon, as well as that of the flowers, is June. By Aublet's ſpecimens of theſe plants, one would almoſt ſuſpect them to be varieties, ſo exactly do all their parts accord in texture and appearance. Their *fruits* indeed are very different in ſize, and their *footſtalks* in length.

Juſſieu mentions two other ſpecies, obſerved by him amongſt Adanſon's ſpecimens from Senegal, called *Mampata* and *Neou*, whoſe nuts however are ovate, and leſs furrowed or wreathed, their *ſtamens* apparently fifteen, three oppoſite to each ſegment of the *calyx*. See MAMPATA.

PETROCOSSYPHUS, in *Ornithology*, a name given by ſome authors to the bird more uſually called from its colour the *cæruleus*.

It lives among the rocks, in woody mountains, and ſings very ſweetly. It is a variety of the Lanius infauſtus.

PETROJOANNITES, in *Eccleſiaſtical Hiſtory*, the followers of Peter John, or Peter Joannis, *i. e.* Peter the ſon of John, who lived in the twelfth century; whoſe doctrine was not known till after his death; when his body was taken out of his grave, and burnt. His opinions were, that he alone had the knowledge of the true ſenſe wherein the apoſtles preached the goſpel; that the reaſonable ſoul is not the form of man; that there is no grace infuſed by baptiſm; and that Jeſus Chriſt was pierced with a lance on the croſs before he expired.

PETROL, or PETROLEUM, in *Chemiſtry*, a fluid ſubſtance, reſembling in a high degree the eſſential oils from vegetables. It is of a browniſh-yellow colour, of a peculiar odour. Its ſpecific gravity varies from .73 to .878. When expoſed to a gentle heat for diſtillation, the fluid which comes over has leſs colour, is much thinner, and has more ſmell. In this ſtate it is called naphtha. It burns with a white flame, and is employed in the vicinity of the Caſpian ſea for lamps. The earths in theſe parts are ſometimes ſo ſaturated with it as to be rendered inflammable.

When it is expoſed to the air, even that obtained by diſtillation, it becomes thick and highly coloured, and puts on the form of bitumen. This no doubt is occaſioned by the gradual diminution of its hydrogen, by the oxygen of the atmoſphere.

It is ſoluble in alcohol and ether, and combines with the fixed and volatile oils. It is hence uſed to diſſolve reſinous bodies and bitumen, and might, in many caſes, anſwer the purpoſes of oil of turpentine.

It is found in different ſtates. According as it has had acceſs to the air, it will thicken and become of a darker colour. See NAPHTHA and BITUMEN.

The more fluid petrolea, ſays Dr. Lewis, have been diſtinguiſhed by the name of *naphtha*; and the thicker by thoſe of *piſſaſphalthum* and *piſſelæum*.

Theſe, according to all appearance, muſt be the work of ſubterraneous fires, which raiſe or ſublime the more ſubtile parts of certain bituminous matters that lie in their way.

Theſe parts, being condenſed into a liquor by the cold of the vaults of rocks, are there collected, and ooze thence through clefts and apertures, with which the diſpoſition of the ground furniſhes them.

Petrol, then, is a liquid bitumen, only differing by its liquidity from other bitumens, as aſphaltum, jet, amber, and the like ſubſtances.

The naphtha, which is either a liquid, or at leaſt a very ſoft bitumen, is nearly allied to petrol.

Hitherto there has been little petrol found, except in hot countries. Olearius ſays, he ſaw above thirty ſprings of it near Scamachia, in Perſia. (See PERSIA.) There are alſo petrols in the ſouthern provinces of France; but the beſt are thoſe in the duchy of Modena, firſt diſcovered by Arioſto, a phyſician, in 1640, in a very barren valley, twelve leagues from the city of Modena.

Three canals are there dug with great expence in the rock; by which three different kinds of petrol are diſcharged into little baſons or reſervoirs: the firſt, as white, clear, and fluid as water, of a briſk penetrating ſmell, and not diſagreeable; the ſecond of a bright yellow, leſs fluid, and of a leſs briſk ſmell than the white; the third of a blackiſh red, of thicker conſiſtence, and a ſmell more approaching that of bitumen.

There are many varieties of theſe oils in regard to colour, fluidity, ſubtility, and the pungency of their ſmell, and taſte; the moſt fluid are, in general, the moſt ſubtile and pungent. With us they are commonly ſophiſticated.

Mr. Boulduc made ſeveral experiments with the petroleum of Modena, an account of which he gave to the Paris Academy.

It eaſily took fire on being brought near a candle, and that without immediately touching the flame; and when heated in any veſſel, it will attract the flame of a candle, though placed at a great height above the veſſel, and the vapour it ſends up taking fire, the flame will be communicated to the veſſel of heated liquor, and the whole will be conſumed. It burns in the water, and when mixed with any liquor, ſwims on the ſurface of it, even of the higheſt rectified ſpirit of wine, which is one-ſeventh heavier than pure petroleum. It readily mixes with all the eſſential oils of vegetables, as oil of lavender, turpentine, and the reſt, and ſeems very much of their nature: nor is this very ſtrange, ſince the alliance between theſe bodies is probably nearer than is imagined, as the eſſential oils of vegetables may have been originally mineral ones, and drawn up out of the earth into the veſſels of the plant.

Petroleum, when ſhaken, yields a few bubbles; but they ſooner ſubſide than in almoſt any other liquor, and the liquor reſumes its clear ſtate again almoſt immediately. This ſeems owing to the air in this fluid being very equally diſtributed in all its parts, and the liquor being compoſed of particles very evenly and nicely arranged.

The extenſibility of this oil is alſo amazing. A drop of it will ſpread over ſeveral feet of water, and in this condition it gives a great variety of colours, that is, the ſeveral parts of which this thin film is compoſed, act as ſo many priſms.

The moſt ſevere froſt never congeals petroleum into ice, and paper wetted with it becomes tranſparent, as when wetted with oil; but it does not continue ſo, the paper becoming opaque again in a few minutes, as the oil dries away.

Spirit of wine, which is the great diſſolvent of ſulphur, has no effect upon petroleum, not even with ever ſo long a digeſtion. It will not take fire with the dephlegmated acid ſpirits, as oil of cloves and other of the vegetable eſſential oils do: and in diſtillation, either by balneum Mariæ, or in ſand, it will neither yield phlegm nor acid ſpirit; but the oil itſelf riſes in its own form, leaving in the retort only a little matter, thick as honey, and of a browniſh colour. Whoever, therefore, would uſe this oil in medicine, muſt take it as nature has prepared it, art having no power to make any alteration in it. Mem. Acad. Paris, 1715.

It is remarkable, that all the petroleum got from the lake of mount Ciaro in Italy is white, whereas that of Modena is yellow, and that of Parma brown. Theſe wells or holes continue to furniſh the oil in different quantities for a conſiderable time, and, when they will yield no more, they pierce the ſlates in ſome other place. Mem. Acad. Scienc. Par. 1736.

The petroleum wells of the Birman empire, ſituated about five miles E. of Yaynangheoum, or Petroleum creek, on the Irrawaddy, ſupply the whole empire, and many parts of India, with this uſeful product. The mouth of the creek, when captain Symes viſited it, was crowded with large boats, waiting to receive a lading of oil; and immenſe pyramids of earthen jars were raiſed within and round the village, diſpoſed in the ſame manner as ſhot and ſhells are piled in an arſenal. This place is inhabited only by potters, who carry on an extenſive manufactory: the ſmell of the oil is ſaid to have been extremely offenſive. (Symes's Embaſſy to Ava, vol. ii.) Of the wells in this diſtrict there are ſaid to be 520, which yield, annually, more than 400,000 hogſheads of petroleum.

Petroleum *Barbadenſe*, *Barbadoes tar*, a ſpecies of *bitumen*, for an account of which, ſee Bitumen. Petroleum is a ſtimulating antiſpaſmodic and ſudorific; and as ſuch it has been given in aſthma and coughs, unattended with inflammation, but it is chiefly uſed for external purpoſes, as a ſtimulant in diſeaſes of the hip-joint, rheumatic, and other chronic pains, chilblains, and to paralytic limbs, applied by friction. It is, however, ſcarcely ever employed in either way, and on this account is not often to be procured in the ſhops. The doſe of petroleum may be from ♏x to fʒſs, in any convenient vehicle. In the Weſt Indies the Barbadoes tar is uſed both as an internal remedy and an external application, in the ſame caſes.

Petroleum *Creek*, in *Geography*, a river of America, which runs into the Ohio, N. lat. 40° 24′. W. long. 80° 40′.

PETROMARULA, in *Botany*, a name given by ſeveral authors to the pyramidal rapunculus of the iſland of Crete, called by Mr. Tournefort, *rapunculus Creticus ſeu pyramidalis alter*.

PETROMYZON, *the Lamprey*, in *Ichthyology*, a genus of fiſhes of the order Chondropterigious, according to the Linnæan ſyſtem, but in the arrangement of Shaw and others, it belongs to the Cartilaginous order. The name is originally Greek, and is derived from the words ϖετρον, *a ſtone*, and μυζαν, *to ſuck*; this fiſh being uſually found in rivers, adhering to the ſtones by ſucking, and ſo keeping its place. The generic character is as follows. The head is ſlenderer than the body; the mouth longer above than beneath; the teeth are orange-coloured, hollow within, and ſurrounded with a fleſhy margin; above it is a little curved, broad beneath; it has ſeven ſpiracles on each ſide the neck; on the nape a fiſtulous opening; it has neither pectoral nor ventral fins. According to the laſt edition of Gmelin, there are only four ſpecies, but Dr. Shaw enumerates nine: we ſhall notice them all, taking firſt thoſe referred to by Gmelin. They all adhere to rocks, and other bodies by the mouth, the edges of which are jagged; the body is eel-ſhaped, ſlippery, and mucous; they live a long time out of the water, and feed on worms, inſects, leſſer fiſh, and dead bodies; the belly is long, and narrow; the vent is near the pinnate tail. They have two dorſal fins; round the eyes are numerous perforations; the tongue is ſemilunar and hard; the teeth ſerrate.

Species.

* Marinus; True Lamprey. Mouth papillous within; ſecond dorſal fin is diſtinct from the tail. In its general appearance this fiſh makes a near approach to the eel tribe, and particularly to the Muræna genus; which ſee. It arrives at a conſiderable ſize, and to the length of more than three feet: the generality of the Britiſh ſpecimens, however, are not ſo large. The uſual colour of the lamprey is a dull-browniſh olive, clouded with yellowiſh-white variegations; the back, as in moſt fiſhes, is darker than the other parts, and the abdomen paler; the fins are tinged with dull orange, and the tail with blue; the eyes are rather ſmall; the mouth large, oval, ſituated beneath, deeply concave, and lined or paved, as it were, with ſeveral circular rows of ſharp, triangular, orange-coloured teeth; the tongue, which is ſhort and creſcent-ſhaped, is alſo furniſhed with a row of very ſmall teeth round its edge; on the top of the head is a ſmall orifice or ſpout-hole, through which is diſcharged the ſuperfluous water taken in at the mouth and gills; near each eye are two rows of much

ſmaller foramina, one row conſiſting of five, and the other of ſix; theſe are ſuppoſed to be the orifices of the glands which ſecrete the viſcid moiſture neceſſary for lubricating the ſkin; on each ſide the neck, commencing at a ſmall diſtance beyond the eyes, is a row of ſeven pretty large, equidiſtant, round ſpiracles or breathing-holes, each leading to a deep ſacculus, lying in an oblique direction towards the head: theſe ſeven ſacculi on each ſide are lined with a red plaited membrane, and have no communication with each other, but paſs by their reſpective double ducts to the inſide of the mouth: towards the lower part of the back commences the firſt dorſal fin, which is rather ſhallow, with a rounded outline; the ſecond, which commences at a very ſmall diſtance from it, is nearly of the ſame extent, but with a ſubtriangular outline; the tail is ſhort and ſlightly rounded.

The lamprey is an inhabitant of the ocean, aſcending rivers chiefly during the latter end of winter and the early months of ſpring; and after a reſidence of a few months in freſh water, again returns to the ſea: it is viviparous, and the young are obſerved to be of ſlow growth; contrary to the aſſertions of ſome writers, who have ſuppoſed the lamprey to be a ſhort-lived fiſh. When in motion this fiſh is obſerved to ſwim with conſiderable vigour and rapidity, but it is more commonly ſeen attached by the mouth to ſome large ſtone or other ſubſtance, the body hanging at reſt, or obeying the motion of the current: ſo ſtrong is the power of adheſion exerted by this animal, that a ſtone of the weight of more than twelve pounds may be raiſed without forcing the fiſh to forego its hold. The general habits of the lamprey ſeem pretty much to reſemble thoſe of the eel, and it is ſuppoſed to live principally on worms and young fiſh. Like the eel it is remarkably tenacious of life; the ſeveral parts, when cut in pieces, will long continue to move; and the head will ſtrongly attach itſelf, for ſeveral hours, to a ſtone, though by far the greater part of the body be cut away from it.

Among the cartilaginous fiſhes none is ſo deſtitute of all appearance of real bone as the lamprey, in which the ſpine itſelf is no other than a mere ſoft cartilage, without any proceſſes or protuberances whatſoever. Among other particulars in its anatomy, it is remarkable that the heart, inſtead of being incloſed in a ſoft pericardium, as in other animals, is guarded by a ſtrong cartilaginous one: the liver, which is of an oblong form, is of a fine graſs-green colour, ſomewhat deeper in the female fiſh, and may be uſed for the purpoſe of a pigment.

A vulgar error, ariſing from inattentive inſpection, and total ignorance of the nature of the animal, is ſaid ſometimes to prevail; *viz.* that the lamprey is furniſhed with nine eyes on each ſide: as an article of food, the lamprey has, for many ages, maintained its credit as an exquiſite dainty; and has uniformly made its appearance at the moſt ſplendid of our ancient entertainments. The death of king Henry I., it is well known, is attributed to a too luxurious indulgence in this his favourite diſh. It ſtill continues to be in high eſteem, and we are told by Mr. Pennant, that the city of Glouceſter continues to ſend yearly, at Chriſtmas, a preſent of a rich lamprey pye to the king. It ſometimes happens that the lampries at that ſeaſon are ſo rare, that a guinea is demanded for the price of a ſingle fiſh. They are moſt in ſeaſon during March, April, and May, and are obſerved to be much more firm when juſt arrived from ſea than when they have been a conſiderable time in freſh water. They are found in ſeveral of the Britiſh rivers, but that which is moſt celebrated for them is the Severn. In the mouths of ſome of the larger European rivers they are ſometimes taken in ſuch quantities, that it is impoſſible to uſe them in their freſh ſtate; they are therefore grilled and moderately ſalted, and afterwards barrelled up for ſale, with the addition of vinegar and ſpices.

* FLUVIATILIS; Leſſer Lamprey. Second dorſal fin angulate. The head is greeniſh; behind the row of leſſer teeth there are larger ones; above there are ſeven connected together, and beneath two diſtant; the eyes are ſmall, the iris golden; towards the head is the appearance of a lateral line; the fins are of a violet colour. This ſpecies is, according to Dr. Bloch, an inhabitant of the ſea, and aſcends, in ſpring time, moſt of the European rivers, in which it is found more frequently and plentifully than the great lamprey. With us it is found in conſiderable quantities in the Thames, the Severn, and the Dee. Vaſt numbers are taken and ſold to the Dutch as baits for their cod and turbot fiſheries. In the river Bauſter, in Courland, great quantities are taken from beneath the ice with nets; they are much larger than thoſe found elſewhere, and are packed in ſnow, and ſent to any diſtance; and when put into cold water they will recover. This ſpecies ſpawns in March and April, and it is a very prolific fiſh.

BRANCHIALIS; Pale Lamprey, or Lampern: by Pennant it is named Pride. The ſpecific character is, ſecond dorſal fin linear; mouth lobate. The mouth is without teeth; the fins are ſcarcely a line broad; the tail is lanceolate, ſharp at the end. It inhabits the freſh-water rivers of Europe, particularly the Iſis, near Oxford; it is ſix or ſeven inches long; conceals itſelf under ſtones or in the mud, and does not adhere to ſtones like the others; the body is round, tapering to each end, annulate, above greeniſh, yellowiſh at the ſides, beneath white. This was firſt diſtinctly deſcribed as an Engliſh ſpecies by Dr. Plot in his Hiſtory of Oxfordſhire.

PLANERI. Body annulate; mouth papillous; the length of this fiſh is from five to ten inches; it has a general reſemblance to that of the lampern-colour olive, pale or white beneath; the ſecond dorſal fin has an angular outline; the tail is ſhaped like that of the lamprey or lampern; the mouth is furniſhed with ſmall teeth; native of the rivers of Thuringia, and other parts of the German empire; like moſt of the genus it is tenacious of life, living for the ſpace of a quarter of an hour when incloſed in ſpirits of wine. This was firſt obſerved and deſcribed by profeſſor Planer, of Erford. Hence it is called Planer's lamprey.

RUBER; Red Lamprey, ſpecifically deſcribed as having a browniſh back. Its general appearance is that of the minute lamprey; the colour is red, deepeſt about the gills or reſpiratory foramina; the upper parts are tinged with a duſky hue. It is found in the Seine, where it was obſerved by M. Noel, who ſent it to the count de Cepede.

SANGUISUGA; Leech Lamprey. Characteriſed by its large mouth, very ſmall orange-coloured teeth, and ſhallow fins; the body is cylindric; the mouth very wide; teeth very numerous, orange-coloured, and a ſemi-circular range of nine double teeth near the throat. It has been found in the Seine, and in many points it ſo nearly reſembles the common lamprey as to leave a ſuſpicion that it was the young of that ſpecies, but M. Noel was convinced of its being ſpecifically different: it is ſaid to be found only at thoſe times in which the ſhad, CLUPEA *Aloſa*, (which ſee,) is in the river: theſe fiſhes it perſecutes, by faſtening beneath their bellies, and ſucking their blood with the avidity of a leech; its body being conſtantly found full of that fluid: they ſometimes attack ſalmon in a ſimilar manner.

ARGENTEUS; Silvery Lamprey. This has a bright ſilvery

very body, and a ſlightly yellowiſh back ; the mouth is large ; the teeth orange-coloured, and ſituated in the fore part of the mouth ; the eyes are very large, with ſilvery irides ; both the dorſal fins are very ſhallow, and without any angular outline ; the lateral line is very diſtinct ; the tail is lanceolate. It is a native of the Indian ſeas.

Plumbeus ; Lead-coloured Lamprey. Yellowiſh-white beneath, with ſpatule-ſhaped tail. The body of this fiſh decreaſes from head to tail in a conical manner, the mouth is large, the dorſal fins rounded. It has been ſeen in the Seine, where it is rather plentiful.

Bicolor ; Brilliant Lamprey. This ſpecies is eaſily diſtinguiſhed by its colours, the upper part being of a fine black, and the under of a brilliant ſilver colour ; the mouth is very ſmall ; both the dorſal fins are rounded, and each nearly as ſhort as the caudal, which is ſpatule-ſhaped : it is found in the Seine, in conſiderable quantities.

PETRONA, in *Geography*, a town of Croatia ; 14 miles N. of Carlſtadt.

PETRONEL, a ſort of harquebuſs, or hand-gun.

Petronel, or *Poitrinal.* See Petrinal.

PETRONELL, in *Geography*, a town of Auſtria ; 7 miles N.E. of Brugg.

PETRONELLUS, in *Ornithology*, a name under which ſome have deſcribed the bunting, or Emberiza *Miliaria ;* which ſee.

PETRONIA, a ſpecies of *Fringilla ;* which ſee.

Petronia *Marina*, the name of a ſmall bird of the œnanthe kind, or nearly allied to that genus. Its beak is ſtrong and ſharp, like that of the chaffinch ; its head is a browniſh-grey, but has uſually a long whitiſh ſtreak running along it ; its neck is aſh-coloured, and at the bottom is variegated with black ; the rump is of a browniſh-green ; the long wing-feathers are blackiſh; with edges and tips of green, and are white underneath ; the breaſt is of a duſky white, and the tail browniſh, variegated with yellow. It is, however, diſtinguiſhed from all other birds by a fine large yellow ſpot, which it has on the middle of its throat.

PETRONIUS, Arbiter, in *Biography*, the author of a Latin work entitled "Satiricon," which has come down to modern times in a very imperfect ſtate, is commonly ſuppoſed to be the ſame perſon as A. Petronius, mentioned by Tacitus in the 16th book of his Annals, under the reign of Nero, as a favourite of that tyrant, and at length a victim to his ſuſpicion : "He was one," ſays that hiſtorian, "who paſſed his days in ſleep, and his nights in buſineſs and pleaſure : and as others acquire celebrity by active exertions, he obtained it by his indolence. He was regarded not as a common debauchee and ſpendthrift, but as a proficient in ſtudied luxury ; and his words and actions, the more they were marked with an air of careleſſneſs and negligence, the more they pleaſed, as denoting a ſimplicity of character. In the ſtation of proconſul of Bithynia, and afterwards of conſul, he diſplayed vigour and talents for public buſineſs, but relapſing into vicious habits, or, at leaſt, affecting it, he was received among the few intimates of Nero as the director of his pleaſures ; and the emperor conſidered nothing as peculiarly delicate and refined, which had not the approbation of Petronius." This degree of favour proved fatal to him : it excited the envy of Tigellinus, who accuſed him to Nero, as being the friend of one of the perſons condemned for a conſpiracy. He was detained in cuſtody at Cumæ, where, impatient of the ſuſpence between hope and fear, he opened his veins, and died. This was in the year 66 : he ſent as a laſt legacy to the emperor a ſealed paper, reproaching him with his infamous and unnatural debaucheries.

It is a matter of conſiderable doubt, whether it was this Petronius who was author of the "Satiricon ;" for while its contents are not at all unſuitable to a man of ſuch a character, the ſtyle and circumſtances have been more appropriate to a later period of Roman literature. "The work itſelf," ſays an able critic, "is a farrago of verſe and proſe, of topics and ſtories, ſerious and ludicrous, intermixed with the moſt deteſtable obſcenity, and ſo mutilated, that no connection can be made out." It has been thought that ſome of the ſcenes in it were intended as a ſatire againſt Nero, written by Petronius in his laſt moments. A new fragment was diſcovered at Traw, in Dalmatia, and publiſhed in 1664 : its genuineneſs was warmly diſcuſſed among critics, but it has generally obtained an admiſſion among the reſt. The difficulties of this author, and, it is probable, the nature of his ſubjects, have cauſed him to be much ſtudied by the curious literati, and have produced numerous editors and commentators, chiefly French, German, and Dutch ; but ſays the critic already referred to, "it is to the credit of England that none of her ſcholars have contaminated themſelves with the attempt to elucidate him." The moſt elaborate edition is that of Burmann, in 1709, 2 vols. 4to. Moreri. Gen. Biog.

PETROPAVLOVSKAIA, in *Geography*, a fort of Ruſſia, in the government of Irkutſk ; 16 miles W.S.W. of Selenginſk.—Alſo, a fort of Ruſſia, in the government of Upha ; 52 miles E.N.E. of Verchouralſk. See alſo *St.* Paul and *St. Peter.*

PETROPAVLOVSKOI, a town of Ruſſia, in the government of Tobolſk, on the Iſchim ; 40 miles E. of Iſchim.

PETRO-PHARYNGEUS, in *Anatomy*, a name given by Winſlow to ſome fibres of the conſtrictor pharyngis ſuperior.

PETROPHILA, in *Botany*, ſo named by Mr. R. Brown, from πέτρος, *a ſtone*, and φιλέω, *to love*, becauſe the ſhrubs of this genus are always found in rocky expoſed ſituations. Brown Tr. of Linn. Soc. v. 10. 67. Prodr. Nov. Holl. v. 1. 363. Ait. Hort. Kew. v. 1. 186.—Claſs and order, *Tetrandria Monogynia.* Nat. Ord. *Aggregatæ*, Linn. *Proteaceæ*, Juſſ.

Gen. Ch. *Cal.* none. *Cor.* of four petals, linear, cohering at their baſe, ſomewhat dilated and concave at the ſummit, and falling off together. *Stam.* Filaments four, ſhort, inſerted towards the ſummit of each petal ; anthers erect, oblong, two-celled, lodged in the cavities of the petals. *Piſt.* Germen ſuperior, ſmall, compreſſed, without ſcales at the baſe ; ſtyle cylindrical, rigid, permanent at the baſe ; ſtigma ſpindle-ſhaped, taper-pointed. *Peric.* none. *Seed.* Nut lenticular, crowned with the baſe of the ſtyle, ſeſſile, hairy, either on one ſide or at the baſe only.

Eſſ. Ch. Petals four, cohering below, falling off entire. Anthers in the hollows of the petals. No ſcales under the germen. Stigma ſpindle-ſhaped, pointed. Nut compreſſed, crowned with the permanent baſe of the ſtyle, and partly hairy.

The habit is rigid and ſhrubby. *Leaves* ſmooth, various, either thread-ſhaped or flat, undivided, lobed or pinnatifid, ſometimes differing on the ſame individual. *Flowers* in denſe ſpikes, with a ſcale-like *bractea* to each, which is permanent and finally hardened, ſo that the infloreſcence aſſumes the nature of a *ſtrobilus* or cone ; yet analogy, and the preſence of a corolla, forbid us to conſider theſe ſpikes as catkins. Mr. Brown defines ten ſpecies in his *Prodromus*, chiefly the produce of dry heathy and ſtony ground, on the ſouthern coaſt of New Holland. The two following are known in our gardens.

P. *pulchella.* Fennel-leaved Petrophila. Brown n. 5. (Protea pulchella; Willd. Sp. Pl. v. 1. 507. Schrad. Sert. Hannov. t. 7. Curt. Mag. t. 796. Cavan. Ic. v. 6. 33. t. 550.)—Leaves doubly pinnatifid, cylindrical, erect. Petals ſilky; downy at the point.—Native of New South Wales, from whence it is ſaid by Mr. Aiton to have been introduced by ſir Joſeph Banks, about the year 1790. It is a green-houſe ſhrub, flowering in July and Auguſt. The *leaves* are glaucous, reſembling thoſe of fennel, but ſhorter, thicker, and more rigid. *Spikes* terminal, ſometimes aggregate, cylindrical, of numerous, crowded, inodorous, white *flowers*, with yellow *anthers*.

P. *diverſifolia.* Various-leaved Petrophila. Brown n. 8.—Leaves doubly or triply pinnate, flat; their ſegments pointed. Petals bearded. Spikes axillary, ſtalked. Bracteas woolly, combined.—Native of Lewin's land, from whence it was ſent to Kew in 1803, by Mr. Peter Good, but has not yet flowered. The *nut* is ſaid to be thin, leafy and dilated.

We ſtill feel much diſpoſed to unite Isopogon, ſee that article, with *Petrophila*, as forming one natural genus, for which we would retain the latter name; yet Mr. Brown hints an inclination even to ſubdivide both genera. There are two ways of viewing every ſubject. Very acute and laborious obſervers naturally incline to make nice and multiplied diſtinctions. It requires a peculiar talent to combine without confounding; and to judge, by taking enlarged views of the matter, what genera are founded in nature, which is perhaps the moſt difficult part of the philoſophy of natural hiſtory.

PETROPSKOI, in *Geography*, a town of Ruſſia, in the government of Perm; 56 miles E.S.E. of Kraſnouphimſk.

PETRO-SALPINGO-STAPHYLINUS, in *Anatomy*, the name given by Winſlow to the levator palati mollis muſcle.

PETROSELINUM, in *Botany*, from πετρος, *a ſtone*, and σελινον, *parſley*, appears, by the deſcription in Dioſcorides, to be a plant of the umbelliferous order, which, according to him, was originally found on rocky precipices in Macedonia. The early commentators have differed concerning it, from the uſual cauſe, of ſeeking the plants of ancient Greece, in the narrow limits of their own neighbourhood. Thus Fuchſius ſuppoſed our *Siſon Amomum* to be the πετροσελινον, whilſt Lobel and others, converſant with gardens, have, with more probability, fixed upon *Bubon macedonicum.* Linnæus retains the above word as the ſpecific name of the common Garden Parſley, *Apium Petroſelinum*; which is unqueſtionably the σελινον of Dioſcorides, ſpoken of by him as a garden plant. Dr. Sibthorp thought the ſame plant in a wild ſtate, growing on rocky mountains and precipices, might be the ορεοσελινον of that ancient author; but we find little to countenance ſuch an opinion. The deciſion of Linnæus is ſupported merely by that of various preceding writers, cited under *Apium hortenſe*, in Bauhin's Pinax, 153. Theſe were chiefly early German botaniſts, to whom *Bubon macedonicum* was probably unknown, and who merely fixed on any plant that, in the narrow range of their acquaintance, anſwered beſt to the deſcription of Dioſcorides. It is thus that many ancient ſynonyms have become miſapplied, which, by long uſe, are now but too firmly eſtabliſhed in their erroneous acceptation.

Petroselinum *Macedonicum*, in the *Materia Medica*, the name of a ſeed uſed in medicine.

PETROSILEX, Hornstone, in *Mineralogy*, a ſpecies of the ſiliceous genus. Its colour is commonly dark blue, yellowiſh, or pearl-grey, ſometimes yellowiſh-white, fleſh, or browniſh red, or mountain blue, or blackiſh-brown, or greeniſh-brown, or dark green, or olive-green, often variegated. Amorphous for the moſt part, but lately found cryſtallized by Mr. Beyer in Schnecberg, either in hexahedral priſms, or in double triangular pyramids, or cubic or hexahedral plates; the ſurface of theſe cryſtals being moſtly rough and uneven, ſome hollow, ſome ſolid, ſometimes as thin as paper. Its luſtre, 0: tranſparency, 1.2: the cryſtallized ſometimes 0. Its fracture generally ſplintery, more rarely conchoidal, ſometimes from the fine ſplintery paſſing into the even, but of a coarſer grain than flint: fragments, 2.3: hardneſs, from 7 to 9: ſpecific gravity, from 2.532 to 2.653. Mr. Bergman counts this ſtone among thoſe that are fuſible *per ſe*, even by a blowpipe: but Mr. Kirwan, after many trials, found only one that gave any ſign of fuſion: but they moſt frequently decrepitate and whiten. M. Sauſſure found the hornſtones of Switzerland generally infuſible; and only thoſe lying in calcareous ſtrata to be fuſible in a high degree of heat. Of the hornſtone there are many varieties. The hornſtones are frequently found in a ſtate of decompoſition. Its tranſitions are into flint, calcedony, chryſopraſium, jaſper, quartz, opal, ſiliceous ſchiſtus, argillite, toadſtone, and even into granular limeſtone, and indurated clay.

Hornſtone differs from jaſper, often by its ſplintery fracture; always by its tranſparency, though imperfect, and want of luſtre:—from flints, by its fracture, dulneſs, and hardneſs; but when its fracture happens to be conchoidal, by its dulneſs, leſs tranſparency, and hardneſs:—from quartz, by its dulneſs and inferior hardneſs:—from ſerpentine, generally in hardneſs, ſpecific gravity, and fuſibility:—from heliotropium, by the aggregate of its properties. The hornſtone, being a greeniſh-white, with reddiſh ſpots, from Lorraine, whoſe ſpecific gravity was 2.532, fracture conchoidal, luſtre 0, hardneſs 10, whitening and becoming brittle at 127°, and melting at 144° into a ſemitranſparent compact enamel, was analyſed by Mr. Kirwan; and found to contain 72 *per cent.* ſilex, about 22 argill, and about ſix, or rather more, of mild calcareous earth. The infuſible hornſtones probably contain no calx, or leſs. The ſchiſtoſe hornſtone has three varieties, *viz.* ſiliceous ſchiſtus, Lydian ſtone, and hornſlate. Kirwan's Mineralogy.

PETROSUM Sal, in *Natural Hiſtory*, a name given by ſome of the old writers to the nitre of Ægypt, uſed in the ancient times: and by others to the common nitre, which we uſe at preſent, and call by a ſimilar name, *ſaltpetre.*

PETROVATZ, in *Geography*, a town of Croatia; 22 miles S.S.E. of Carlſtadt.

PETROUS Portion, in *Anatomy*, a part of the temporal bone, ſo called from its irregular ſurface. See Cranium.

PETROVSK, in *Geography*, a town of Ruſſia, in the government of Jaroſlavl; 52 miles S. of Jaroſlavl. N. lat. 56° 45′. E. long. 40° 14′.—Alſo, a town of Ruſſia, in the government of Saratov, on the Medveditza; 40 miles N.W. of Saratov. N. lat. 52° 40′. E. long. 44° 54′.

PETROVSKAIA, a town and fort of Ruſſia, ſituated on a bay of the ſea of Azof, or Azoph, with a harbour, 24 miles S.W. of Mariupol.—Alſo, a bay on the N. coaſt of Ruſſia, in the Frozen ocean. N. lat. 76° 10′. E. long. 106° 14′.

PETROWITZ, a town of Bohemia, in the circle of Konigingratz; 8 miles E.N.E. of Konigingratz.—Alſo, a town of Bohemia, in the circle of Moldau; 6 miles S. of Seltſchan.

PETROWNAH, a town of Hindooſtan, in Bahar; 28 miles S.S.W. of Patna.

PETROZAVODSK, a town of Ruſſia, in the government of Olonetz, on the W. coaſt of the Onezſkoe lake; 132 miles N.E. of Peterſburg. N. lat. 61° 40′. E. long. 34° 14′.

PETSCHAKEN, a town of Bohemia, in the circle of Bechin; 8 miles S. of Pilgram.

PETSCHANOI, a fort of Ruſſia, in the government of Kolivan; 188 miles W.S.W. of Kolivan. N. lat. 53 . E. long. 76° 34′.—Alſo, a cape on the north coaſt of Ruſſia, in the Frozen ſea. N. lat. 75° 25′. E. long. 165° 14′.

PETSCHNECZA, a town of the duchy of Carinthia; 12 miles S.W. of Clagenfurt.

PETSKA, a town of Bohemia, in the circle of Koningratz; 11 miles E.N.E. of Getſchin.

PETSKAU, a town of Bohemia, in the circle of Saatz; 22 miles E. of Eger. N. lat. 50° 4′. E. long. 12° 55′.

PETSMO, a ſmall iſland on the E. ſide of the gulf of Bothnia. N. lat. 63° 14′. E. long. 21° 33′.

PETTAL, a town of Hindooſtan, in Madura; 10 miles E. of Coilpetta.

PETTAPOLLY, a town of Hindooſtan, in the circar of Guntoor, ſituated on the coaſt of Bengal; 42 miles S.W. of Maſulipatam.

PETTAPOUR, a town of Hindooſtan, in the circar of Rajamundry; 30 miles N.N.E. of Rajamundry.—Alſo, a town of Hindooſtan, in Guzerat; 12 miles N.W. of Amedabad.

PETTAW, a town of the duchy of Stiria, on the Drave, containing one pariſh church, and three cloiſters. This is an ancient place, as it is frequently mentioned both by Roman as well as other authors of antiquity. Its manufactories are conſiderable; 13 miles E.S.E. of Marpurg. N. lat. 46° 34′. E. long. 15° 53′.

PETTEIA, Πεττεια, in the *Ancient Muſic*, a Greek term to which we have no correſponding one in our language.

The melopœia, *i. e.* the art of arranging ſounds in ſucceſſion, ſo as to make melody, is divided into three parts, which the Greeks call *lepſis*, *mixis*, and *chreſis*; the Latins *ſumptio*, *mixtio*, and *uſus*; and the Italians *preſa*, *meſcolamento*, and *uſo*. The laſt of theſe is called by the Greeks πεττεια, *petteia*, and by the Italians *pettia*.

Petteia or *pettia*, then, is the art of making a juſt diſcernment of all the manners of ranging or combining ſounds among themſelves, ſo as they may produce their effect, *i. e.* may expreſs the ſeveral paſſions intended to be raiſed, thus: *e. gr.* it ſhews what ſounds are to be uſed, and what not; how often any of them are to be repeated; with which to begin, and with which to end; whether with a grave ſound to riſe, or an acute one to fall, &c.

It is the petteia that conſtitutes the manners of the muſic; it being this that chooſes out this or that paſſion, this or that motion of the ſoul, to be awakened; and whether it be proper to excite it on this or that occaſion. The petteia, therefore, is in muſic much what the manners are in poetry.

We do not ſee whence the denomination ſhould have been taken by the Greeks, unleſs from πεττεια, their game of cheſs; the muſical petteia being a ſort of combination and arrangement of ſounds, as cheſs is of pieces called πεττοι, calculi, or cheſs-men.

PETTENAW, in *Geography*, a town of Tyrol, near the Inn; 12 miles W.S.W. of Inſpruck.

PETTENDORF, a town of Germany, in the principality of Culmbach; ſix miles S.W. of Bayreuth.

PETTERKAW, a town of Pruſſia, in Oberland; 24 miles E.S.E. of Marienwerder.

PETTERSDORF, a town of Pruſſia, in the province of Natangen; 28 miles E. of Königſberg.

PETTERSWALDT, a town of Pruſſia, in the province of Natangen; 24 miles S.S.W. of Brandenburg.—Alſo, a town of Pruſſia, in the province of Ermeland; 10 miles W. of Heilſberg.

PETTERWITZ, a town of Pruſſia; in the province of Oberland, four miles S.S.E. of Neidenberg.

PETTICOTTA, a town of Hindooſtan, in the Carnatic; 27 miles S. of Tanjore.

PETTINCO, a river of Sicily, in the valley of Mazara, which runs into the ſea; ſix miles N.W. of Miſtrella.

PETTINI, a ſmall iſland in the gulf of Venice. N. lat. 24° 37′. E. long. 44° 49′.

PETTORANO, a town of Naples, in Abruzzo Citra; five miles S. of Salmona.

PETTSTATT, a town of Bavaria, in the biſhopric of Bamberg; three miles S. Bamberg.

PETTUS, *Sir* JOHN, in *Biography*, a native of Suffolk, was member of parliament for Dunwich in the reign of Charles II., and one of the deputy governors of the royal mines. He died about the year 1690. He was author of the "Hiſtory, Laws, and Places of the chief Mines and Mineral Works in England and Wales;" "England's Independency of the Papal Power;" "Fleta Minor, or the Laws of Art and Nature in knowing, judging, aſſaying, &c. of Metals," tranſlated from the German, which he executed while he was in the Fleet priſon.

PETTY, *Sir* WILLIAM, was the eldeſt ſon of a clothier at Rumſey, in Hampſhire, where he was born in 1623. At a very early period he ſhewed a diſpoſition for the mechanical arts, and was eager in attending to the performances of artificers, ſuch as ſmiths, carpenters, &c. and copying them. He received the elements of his education at the grammar ſchool of his native place, and from thence, at the age of 15, he was ſent to Caen, in Normandy, for farther improvement in modern languages, and the mathematics. On his return he entered into the ſervice of the royal navy, but it does not appear in what particular capacity, and his ſervice in it muſt have been very ſhort, ſince, on the commencement of the civil wars in 1643, he went again on the continent, and paſſed three years in France and the Low Countries. It was at this period that he directed his ſtudies chiefly to anatomy, and the profeſſion of medicine, and at Paris he diſſected in company with the celebrated Hobbes. As in his former viſit to France he is ſaid to have maintained himſelf by means of a ſmall ſtock of merchandize, ſo in the preſent he muſt have followed ſome gainful traffic, ſince he has recorded, that he returned ten pounds richer than when he went out. In 1647 he gave the firſt public proof of his inventive talents, by ſoliciting and obtaining a patent from parliament for an invention of the art of double writing, which appears to have been by means of a copying inſtrument. In the following year he publiſhed a piece entitled "Advice to Mr. Samuel Hartlib, for the Advancement of particular Parts of Learning," the general ſcope of which was to extend education to a variety of objects of utility in common life. About this time he went to Oxford, whence the parliamentary viſitors had ejected the royaliſts, and gave inſtructions in anatomy and chemiſtry to the younger ſtudents. Here he was appointed deputy to the profeſſors of anatomy, and in 1649 he was created doctor of phyſic by diſpenſation from the delegates of the univerſity. About the ſame time he was elected a fellow of Brazen-noſe college, and became a member of that

Oxford ſociety for cultivating natural knowledge, out of which the Royal Society took its riſe. In 1650 he ſucceeded to the anatomical profeſſorſhip in Oxford; and ſoon after employed his intereſt ſo effectually as to be choſen profeſſor of muſic at Greſham college, which was probably then, as it is now, almoſt a ſinecure place. The chief ſource of his fortune was his appointment, in 1652, to be phyſician to the army in Ireland, and in 1654 he entered into a contract for regulating the admeaſurement of lands forfeited by the rebellion, and intended by way of recompence to the ſoldiery. By his peculiar ſkill in practical, as well as theoretical mathematics, he performed this work with great exactneſs, and at the ſame time he obtained ſuch a knowledge of the ſtate and value of property in that country, as enabled him to lay out to great advantage, in purchaſes of land, the ſavings of his economy. After this he was appointed one of the commiſſioners for dividing the lands which he had ſurveyed among the army; clerk of the council; and ſecretary to Henry Cromwell, when lord-lieutenant of Ireland. In Richard's parliament of 1658, he ſerved for Weſt-Looe, in Cornwall; and in the next year he was impeached by ſir Heiſome Sankey, for certain mal-practices in his diſtribution of the Iriſh lands. He was, it appears, at the time in Ireland, but returned to anſwer the charge in his place, but parliament being adjourned, the matter was not brought to iſſue. He was, after this, removed from his public employments, though the lord-lieutenant continued his friend, and ſpoke handſomely of him. When the reſtoration took place he was in Ireland, but upon his return he was graciouſly received by Charles II., and made one of the commiſſioners of the court of claims. In 1661 he received the honour of knighthood, and alſo a patent, conſtituting him ſurveyor-general of Ireland; and, what was probably of much more importance to him, all the forfeited lands which had been allotted to him, were confirmed by new grants to himſelf and his wife. Such is a brief ſketch of the political character of ſir William Petty. We come now more particularly to his claims on public notice as a man of ſcience. He had been made a fellow of the College of Phyſicians, and when the Royal Society was firſt incorporated he was in the liſt of the council. In 1663 he engaged the public attention by his invention of a double bottomed ſhip, to ſail againſt wind and tide. His trial-veſſel went very well in a voyage from Dublin to Holyhead, and back; but on a ſecond voyage it was loſt in a great ſtorm, and no further experiment was made. He preſented a model of this ſhip to the Royal Society, to which body he, in 1665, communicated a paper on ſhip-building, which was kept by the preſident, lord Brownlow, as an important ſtate ſecret. It ſeems not to be well aſcertained whether it was this or another work that was printed after his death, under the title of "A Treatiſe on Naval Philoſophy." The principal and moſt valuable of the writings of this author, were on the ſubject of political arithmetic. Of theſe he publiſhed a number of ſeparate tracts, which were reprinted collectively in 1699. Some of them relate to the growth and population of London, and compariſons between that city and Paris, and other capitals. In one of them, entitled "Political Arithmetic," he diſcuſſes all the topics connected with national wealth and improvement, with the particular view of pointing out the means of augmenting the power and proſperity of England. The ſtate of Ireland is conſidered in ſome of his other pieces, particularly in a treatiſe on taxes and contributions, which paſſed through ſeveral editions. Some of his papers inſerted in the Philoſophical Tranſactions are on mathematical ſubjects, and ſome on chemiſtry, as it was then known. The uncommon activity and vigour of his mind are ſtrikingly diſplayed by the great variety of the productions of his pen, while at the ſame time he was indefatigable in buſineſs, and in the improvement of his fortune. With this view he eſtabliſhed upon his Iriſh eſtates iron-works and fiſheries, opened lead mines, and carried on a large timber trade. He was of great ſervice to the poor, by providing them with employment, in which he juſtly thought the moſt uſeful charity towards them conſiſted. He died in the month of December 1687, at his houſe in Weſtminſter, and his remains were interred at Rumſey. He was regarded as a perſon of great worth, as well as of extraordinary talents and acquirements. He left a widow, the daughter of ſir Hardreſs Waller, who was created baroneſs of Shelburne in 1688, which title, as we ſhall ſee, became hereditary in the family. Sir William Petty thus ſpeaks of his religious opinions in has laſt will: "I die in the profeſſion of that faith, and in the practice of ſuch worſhip, as I find eſtabliſhed by the laws of my country; not being able to believe what I myſelf pleaſe, nor to worſhip God better than by doing as I would be done unto, and obſerving the laws of my country, and expreſſing my love and honour of Almighty God, by ſuch ſigns and tokens as are underſtood to be ſuch by the people with whom I live, God knowing my heart, even without any at all. Grant me, O Lord, an eaſy paſſage to thyſelf, that as I have lived in thy fear, I may be known to die in thy favour."

Three children ſurvived ſir William, *viz.* Charles, who ſucceeded to his mother in the barony of Shelburne, and dying without iſſue the title became extinct. But in June 1699, it was revived in Henry, the ſecond ſon; and in 1718-19, king George I. advanced him to the further titles of viſcount Dunkeron and earl of Shelburne. He died in 1751, immenſely rich. The preſent family is from Anne, the only daughter of ſir William Petty, who married Thomas Fitzmaurice, baron Kerry, created in 1722 earl of Kerry.

Under the articles Arundelian *Marbles*, and Parian *Chronicle*, we have mentioned a gentleman under the name of W. Petty, who was employed by the earl of Arundel, in the year 1624, for the purpoſe of collecting marbles, books, ſtatues, and other curioſities in Italy, Greece, and Aſia Minor. We have been anxious to aſcertain ſome authentic particulars relating to a perſon of ſo diſtinguiſhed a character, as to warrant this employment, and who was ſo laudably engaged. But though we have been aided in our reſearches by the ingenious and learned Mr. Hewlett, ever anxious to promote the cauſe of literature, we have not ſucceeded in our wiſhes. The Bibliotheca Manuſcripta Lanſdowniana, depoſited in the Britiſh Muſeum, has been examined; and we find in vol. ii. p. 104. the following notices. Art. 806. A Collection of Theological and other Papers of the Rev. Mr. William Petty of Thorley, in the Iſle of Wight, with the dates of 1613, 17. Alſo, The Commentary of George Aeropolita, compriſing the ſtate of the oriental church and empire for about three-ſcore years, tranſlated out of an original Greek MS. by that late induſtrious and learned man, William Pettie, dated 6th February, 1644. From A. D. 1183 to 1262, an interval of 79 years. This Mr. William Pettie is ſuppoſed to be the ſame with the Rev. Mr. William Petty of the preceding article; and to have been an uncle of ſir William Petty, of whom we have already given an account. He was alſo, not improbably, the ſame Mr. Petty who is mentioned in ſir Thomas Roe's letters from Conſtantinople, as having been ſent to the Levant by Villiers, duke of Buckingham, to collect Grecian antiquities for Charles I. This Mr. Petty appears to been ſhipwrecked, and to have loſt all he had collected at Samos in his way to Epheſus. He was lodged in priſon as a ſpy, but releaſed on the teſtimony of ſome Turks, who knew him, and that he had loſt his credentials in the ſea. With great induſtry he recovered his ſtatues and 22 Greek MSS., and raked together 200 pieces.

PETTY, WILLIAM, marquis of Landſdown, deſcended from the two noble families of Fitzgerald, duke of Leinſter, and Fitzmaurice, earl of Kerry. The adopted name of Petty is derived from his maternal great uncle, Henry, earl of Shelburne, ſon of the celebrated ſir William Petty, the ſubject of the preceding article. The marquis of Landſdown was born in May 1737, and ſucceeded to the Iriſh honours of his father in the month of May 1761, but in the preceding year his majeſty had created the late marquis, then viſcount Fitzmaurice, an Engliſh peer, by the title of baron Wycombe. In February 1765, he was married to lady Sophia Carteret, daughter of the late earl Granville, by whom he became poſſeſſed of large eſtates, particularly that beautiful ſpot Landſdown Hill, Bath, from which he took his laſt title. By this lady, who died in 1771, he had a ſon, John Henry, who ſucceeded him in his titles, and who is ſince dead, leaving no male heir. The marquis married, ſecondly, lady Louiſa Fitzpatrick, by whom, who died in 1789, he had another ſon, lord Henry, the preſent marquis of Landſdown. His lordſhip being intended for the army, he, at a fit age, obtained a commiſſion in the guards, and ſerved with the Britiſh troops in Germany under prince Ferdinand, and gave ſignal proofs of great perſonal courage at the battles of Campen and Minden. In December 1760, he was appointed aid-de-camp to the king, George III., with the rank of colonel. As a political man, he joined the party of the earl of Bute; and in 1762, he eagerly defended the court on the queſtion reſpecting the preliminaries of peace. In the following year he was appointed firſt lord of the board of trade, which he ſoon quitted, and with it, his connection with the court and miniſtry, and attached himſelf, in a ſhort time, to lords Chatham and Camden. When the Rockingham adminiſtration was diſplaced in 1766, and lord Chatham was called upon to form a new adminiſtration, he appointed lord Shelburne ſecretary of ſtate of the ſouthern department, to which was annexed the department of the colonies. But finding a train of meaſures was ſecretly purſuing, hoſtile to the liberties of America, he reſigned. The American war ſucceeded, during which he acted with firmneſs and energy againſt the miniſtry. Among other projects to ſupport this war, was the appointment of a Mr. Fullarton, ſecretary to lord Stormont, when abroad, to the rank of lieutenant-colonel in the army, and to the command of an intended new regiment. When this matter came before the houſe of lords, lord Shelburne ſpoke of it in terms of contempt, denominating the new made commander a *commis*, *a clerk* taken from the deſk. Mr. Fullarton, judging theſe epithets derogatory to his rank, ſent a challenge to lord Shelburne, a duel was fought, and the noble lord wounded. This affair happening very ſoon after a ſimilar one between Mr. Fox and Mr. Adam, and being attributed to the ſame cauſes and motives, occaſioned a great ſenſation throughout the kingdom. Addreſſes of congratulation from the cities of London and Weſtminſter, and from ſeveral of the counties, were ſent to earl Shelburne on his recovery, all of which held out the idea, that his life had been endangered by the faithful diſcharge of his duty as a peer of parliament. The death of lord Chatham placed him at the head of his political connection, and he continued in oppoſition to the meaſures of the court till the termination of lord North's miniſtry, in the ſpring of 1782. He was then appointed ſecretary of ſtate in the Rockingham adminiſtration, and upon the death of that nobleman he ſucceeded to the office of miniſter. This meaſure gave great offence to Mr. Fox and his friends, but his lordſhip did not quit his poſt. His firſt object was to make peace; but when the treaty was brought before the parliament, lord North and Mr. Fox had united in a moſt diſgraceful coalition, and the treaty meeting with the diſapprobation of the repreſentatives of the people, lord Shelburne reſigned, and Mr. Pitt was appointed his ſucceſſor. His lordſhip now received the title of marquis of Landſdown, with the honours of the Garter.

When the French revolution took place he earneſtly deprecated our interference, but his eloquence and ſound reaſoning had no weight, and we were in 1793 involved in a war, which, with a very ſhort interval, has continued to this preſent time (Dec. 1813). His lordſhip died on the 7th of May 1805.

Through life he reſiſted the increaſing influence of the crown, and he ſuggeſted at various times enquiries into the public expenditure: he propoſed the abolition of uſeleſs places, and brought forward plans which tended to eſtabliſh a rigid ſyſtem of public economy. With foreign politics, and foreign courts, no ſtateſman in Europe was better acquainted. He had deeply ſtudied the hiſtory and laws of his country, and they had taught him that the conſtitution of England is not the grant of princes, but an inheritance obtained by the virtue and wiſdom of Engliſhmen. Monthly Mag. 1805.

PETTY *Bag*, an office in chancery; the three clerks of which record the return of all inquiſitions out of every ſhire, and make all patents of cuſtomers, guagers, comptrollers, &c. See CLERK.

PETTY-*Chaps*, in *Ornithology*. See MOTACILLA *Hippolais* and *Hortenſis*.

PETTY *Conſtables*. See CONSTABLE.

PETTY-*Fogger*, formed from the French, *petit*, *little*, and the Saxon, *fogere*, *ſuitor*, or *wooer*, a little ſtickling ſolicitor or jobber in law-diſputes, without either ſkill or conſcience.

PETTY *Harbour*, in *Geography*, a bay on the eaſt coaſt of Newfoundland. N. lat. 47° 30′. W. long 52° 20′.

PETTY, or PETIT *Larceny*, in *Law*. See LARCENY.

PETTY *Orders*. See ORDERS.

PETTY *Patees*, among *Confectioners*, a ſort of ſmall pies, made of a rich cruſt, and filled with ſweet meats.

PETTY-*Singles*, among *Falconers*, are the toes of a hawk.

PETTY *Tally*, in the *Sea Language*, a competent allowance of victuals, according to the number of the ſhip's company.

PETTY, or *Petit Treaſon*, in *Law*. See TREASON.

PETTY *Whin*. See FURZE and GENISTA.

PETTYCUR, in *Geography*, a harbour and landing-place from Leith, on the coaſt of Fife, in Scotland, weſt of Kinghorn.

PETULANTIUM FESTUM, in *Antiquity*, a feſtival celebrated by the Athenians and Lacedæmonians in honour of the moon, under the name of Venus: at which the men aſſiſted, dreſſed in women's clothes; and the women in the habits of men.

PE-TUNG, in *Metallurgy*, a name given by the Chineſe to their white copper, which has a beautiful ſilver-like appearance, and a very cloſe grain. It takes a fine poliſh; and many articles of neat workmanſhip, in imitation of ſilver, are made from it. An accurate analyſis has determined it to conſiſt of copper, zinc, a little ſilver, and in ſome ſpecimens, a few particles of iron and of nickel have been found. The artiſts at Canton, in making their pe-tung, reduce the copper into as thin ſheets or laminæ as poſſible, which they make red-hot, increaſing the fire to ſuch a pitch, as to ſoften, in ſome degree, the laminæ, and to make them almoſt ready to flow. In this ſtate they are ſuſpended over the vapour of their pureſt tutenag, or zinc, placed in a ſubliming veſſel over a briſk fire. The vapour thus penetrates the heated laminæ of the copper, ſo as to remain fixed with it, and not to be eaſily diſſipated or calcined by the ſucceeding fuſion it has to undergo. The whole is ſuffered to cool gradually, and is then found to be of a brighter colour, and of a cloſer grain than when prepared in the European way. Lord Macartney's Embaſſy, &c. by Sir G. Staunton, vol. ii.

PETUNTSE, or, as it is uſually called, *petunſe*, one of the two ſubſtances of which the porcelain ware of China is made. The other is named *kaolin*.

The petuntſe is ſprinkled all over with bright glittering particles; it is beaten to powder, and afterwards made up into a ſort of bricks, and in that form it is ſent to the places where it is to be wrought; it is of a hard texture, and of a ſomewhat greeniſh colour. M. Reaumur, of the Academy of Sciences of Paris, who was extremely induſtrious in ſearching into the nature of porcelain, obtained ſome ſpecimens of the petuntſe, both in its native ſtate, and in form of the brick, which is given it after it is powdered and reduced to a paſte.

M. Reaumur found that the petuntſe was ſo far from being an earth, as uſually ſuppoſed, that it was truly of the nature of the European flint or pebble, as he eſtabliſhes the character of that body: but to underſtand this rightly, it is to be obſerved, that this author makes the flints and pebbles a very large claſs of bodies, ſome of which are more, ſome leſs tranſparent; and that this petuntſe is of the nature of the coarſer, or leſs tranſparent kind, the ſurface of which, when broken, is not ſo ſmooth and poliſhed as that of the ordinary flint. Some have ſuppoſed that this ſubſtance is a ſpecies of gypſum, rather than of flint or talc. By ſome experiments of Mr. Scheffer, in the Swediſh Tranſactions, for the year 1753, it appears to be a glittering, flaky, ſemitranſparent maſs, like the *lapis ſpecularis*, of a light greeniſh-grey colour, and remarkably heavy. It was not acted upon by acids, and in the fire it burſt and fell in pieces, and calcined into a white powder, interſperſed with a red ferruginous matter. Calcined in contact with the fuel, it emitted ſtrong ſulphureous vapours, like the other gypſa, and became quite white, conſiderably firm and coherent, and ſemitranſparent.

The great character of theſe ſtones for the porcelain manufactures is, however, that they are very eaſily vitrified without the aſſiſtance of any ſalt, and without the immediate contact of the fire, the operation ſucceeding in a crucible, which is not at all the caſe in regard to the European flints, they very difficultly melting alone in a crucible, and then only into a whitiſh opaque glaſs.

It being certain from hence, that one of the two ingredients of the china-ware is eaſily vitrifiable, it follows, from the experiment of the whole mixture, or china-ware, not being reducible into a glaſs in a large fire, that it is a compoſition of a vitrifiable and a not vitrifiable (or at leaſt not eaſily vitrifiable) ſubſtance; and, conſequently, that the kaolin is a ſcarcely vitrifiable body, and that the reſult of the action of fire on a mixture of theſe two is a ſemivitrification; which is what we call the china-ware.

If we, therefore, could, in Europe, provide the materials of China, or ſuch as were like them, we might reaſonably hope to ſucceed; and this appears far from improbable. The petuntſe is eaſily ſupplied by many of our own earths, ſtones, and ſands, as nothing is required in it more than a property of running eaſily into a white glaſs. The kaolin ſeems moſt to be reſembled by our European talcs. Mem. Acad. Par. 1727.

The petuntſe, according to Chaptal, is that ſpecies of ſilex, known by the names of feldſpar, rhomboidal quartz, and ſpathum ſcintillans. It very frequently forms one of the principles of granite, and the cryſtals which are found ſeparate, ariſe from the decompoſition of this primitive rock. The texture of feldſpar is cloſe, lamellated, and it is leſs hard than quartz. It fuſes without addition into a whitiſh glaſs. The ſpecific gravity of white feldſpar is 25.946: 100 parts of white feldſpar contain, according to Chaptal, about 67 ſilex, 14 alumine, 11 barytes, and 8 magneſia. See FELSPAR, KAOLIN, and PORCELAIN.

PETWORTH, in *Geography*, a market-town, in the hundred of Rotherbridge, rape of Arundel, and county of Suſſex, is ſituated on a ſmall branch of the river Arun, 49 miles S.W. by S. from London. Its ſcite is conſidered very ſalubrious, and the houſes are well built, though the ſtreets are irregular. The living is one of the richeſt in the county, and in the gift of the earl of Egremont. The church, in which are interred the remains of many of the Percies, earls of Northumberland, is built of ſtone, and has a ſquare tower; but there are no monuments worthy of notice, except two very ancient tombs, the one completely defaced, the other in a very dilapidated ſtate. In the centre of the town is a handſome market-houſe of ſtone, adorned at one end with a buſt of William III. The lower part conſiſts of piazzas, with an open ſpace for the market, over which is the room where the quarter-ſeſſions are held. Cloſe to the church-yard is a charity-ſchool, for the education of twenty boys, and the ſame number of girls, founded by the Rev. Mr. Taylor, who alſo left donations of twelve pounds a-year each to two clergymen's widows of the neighbourhood, and ſix pounds each to two poor tradeſmen, to aſſiſt them in buſineſs. The alms-houſes, founded by the ducheſs of Somerſet, are built of brick, and adapted for the accommodation of twenty widows, each of whom has an allowance of twenty pounds a-year. Thompſon's hoſpital, another benevolent inſtitution of the ſame kind, affords lodging for ſix poor men, and as many women, who annually receive ten pounds each. At a ſmall diſtance ſouth-eaſt of the town is the bridewell for the county, a brick edifice, on Howard's plan.

Petworth was the reſidence of Joſceline of Louvaine, the progenitor of the renowned Percies of Northumberland; and it was their family-ſeat till the extinction of the title, when it devolved by marriage to Charles, duke of Somerſet; from whom, alſo by marriage, the manor and manſion-houſe have been tranſmitted to the family of Egremont, the preſent poſſeſſors.

Petworth-houſe, the magnificent family-manſion of the earl of Egremont, is cloſe to the town, the back front opening into the church-yard. It was erected on the ſcite of the ancient houſe belonging to the duke of Somerſet. The front of freeſtone, adorned with ſtatues on the top, forms one unbroken range, having twenty-one windows in each ſtory. The interior is elegant, and all the principal apartments are decorated with paintings, antique ſtatues, and buſts, ſome of which are of the firſt excellence. Some of the rooms are noble, well contrived, and richly furniſhed, and the diſpoſitions of the ſpecimens of art taſteful and judicious. The park is very extenſive, the wall being about twelve miles in circumference. In front of the manſion is a ſheet of water, which has been formed at a vaſt expence. It is ſupplied by the ſprings collected from the neighbouring hills. This park, which commands delightful views of the Downs of Surrey and Suſſex, is well ſtocked with deer and game. There are alſo various breeds of cattle and ſheep fattened in the park: beſides the native breeds of the latter, the preſent earl has imported the Calmuck and Aſtracan race, and likewiſe the ſhawl goat of Thibet, from the fleece of which ſome of the moſt valuable manufactures of the Eaſt Indies are produced.

The petty ſeſſions are holden at Petworth. The market is on Wedneſday, and there is an annual fair. By the cenſus of 1811, the houſes amounted in number to 453, and the inhabitants to 2459. Beauties of England, vol. xiv. Carliſle's Topographical Dictionary, vol. ii.

PETZENKIRCHEN, a town of Auſtria; 8 miles E. of Ips.

PETZENSTEIN, a town of Germany, in the territory of Nuremberg; 35 miles N.N.E. of Nuremberg.

PEUCEDANUM, in *Botany*, πευκεδανος of the ancient Greeks, is evidently, by the account in Dioſcorides, and the plants with which he ranges it, ſomething of the umbelliferous order; but what preciſe ſpecies, we find little to aſſiſt us in determining; neither has Dr. Sibthorp formed any decided opinion reſpecting this point. The *Peucedanum officinale*, which this learned traveller gathered on the ſea-coaſt of Laconia, is full as likely as any thing elſe to be the ancient πευκεδανος, or, as ſome have it, πεκεδανον. Concerning the derivation of the name, etymologiſts are not agreed; but the moſt probable ſeems to be from πευκη, *a Fir*, or *Pitch-tree*, which its leaves reſemble, and δανος, *dry*, or *burning*, in alluſion to the very pungent qualities of the root and gum, for which this plant is celebrated. Linn. Gen. 134. Schreb. 184. Willd. Sp. Pl. v. 1. 1405. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 304. Prodr. Fl. Græc. Sibth. v. 1. 188. Ait. Hort. Kew. v. 2. 134. Juſſ. 223. Tourn. t. 169. Gærtn. t. 21. — Claſs and order, *Pentandria Digynia*. Nat. Ord. *Umbelliferæ*.

Gen. Ch. *General umbel* of numerous, very long and ſlender rays; *partial* ſpreading. *General involucrum* of many, ſmall, linear, reflexed leaves; *partial* ſmaller. *Perianth* of five minute teeth. *Cor. Univerſal* uniform; flowers of the diſk abortive; *partial* of five equal, oblong, incurved, entire petals. *Stam.* Filaments five, capillary; anthers ſimple. *Piſt.* Germen inferior, oblong; ſtyles two, ſmall; ſtigmas obtuſe. *Peric.* Fruit ovate, ſurrounded with a wing, ſtriated at each ſide, ſeparable into two parts. *Seeds* two, ovate-oblong, compreſſed, moſt convex outwardly, marked with three elevated lines; ſurrounded by a broad, membranous, undivided border; emarginate at the ſummit.

Eſſ. Ch. Fruit ovate, ſtriated at each ſide, encompaſſed with a wing. Calyx of five teeth. Involucrum very ſhort. Flowers of the diſk abortive.

1. P. *officinale.* Sea Sulphur-wort, or Hog's Fennel. Linn. Sp. Pl. 353. Engl. Bot. t. 1767. (Peucedanum majus; Ger. Em. 1054.)—Leaves five times deeply three-cleft; ſegments linear, undivided.—Native of ſalt marſhes and ditches on the ſea-coaſt of the ſouth of Europe; very rare in England, and chiefly found below Feverſham and Whitſtable in Kent, flowering from July to September. The whole plant is ſmooth, and when bruiſed emits a ſtrong ſulphureous ſmell, eſpecially the *root*, which is perennial, tap-ſhaped, very reſinous and fœtid, reported to be uſeful in coughs, obſtructions of the viſcera, and nervous diſorders. Theſe virtues ſeem to have been handed down from Dioſcorides. *Stem* nearly a yard high, erect, round, ſtriated, branched, leafy, tough. *Leaves* narrow and rigid, forming a copious *coma*, or tuft, at the root, as Dioſcorides ſays of his πευκεδανος; each is divided five or ſix times ſucceſſively, into three deep diviſions, the ultimate ſegments flattiſh, linear, acute, entire. *Umbels* large, rather concave, pale yellow, of innumerable flowers. *Fruit* tawny, broadly elliptical, flat.

2. P. *alpeſtre.* Alpine Sulphur-wort. Linn. Sp. Pl. 353. (Peucedanum; Riv. Pentap. Irr. t. 11. Ger. Em. 1054?)—Leaves twice or thrice deeply three-cleft; ſegments linear, pinnatifid.—Native of Germany. The authentic Linnæan ſpecimen is marked *P. germanicum*, and ſeems to have been obtained from ſome Dutch herbarium or garden. On reviſing the ſynonyms of the firſt ſpecies, we have no ſcruple in removing ſome of them to this; eſpecially that of Rivinus, whoſe plate accords with this ſpecies, and not with the former, in the diviſions of its *leaves*, as well as in the ſize and whole aſpect of the plant. This ſynonym therefore ought to be ſtruck out of Prodr. Fl. Græc., and a reference to Engl. Bot. t. 1767, ſubſtituted in its ſtead. A correction of Linn. Sp. Pl. as well as of Willdenow and Aiton, is alſo neceſſary; *P. germanicum* being no other than *P. alpeſtre;* and the large ſuppoſed variety called *italicum*, is the very identical *officinale* itſelf, above deſcribed, anſwering to the Linnæan character and authentic ſpecimen. *P. alpeſtre* is a much ſmaller plant than *officinale*, and eſſentially characterized by the ultimate diviſions of its *leaves* being pinnatifid, and ſomewhat decurrent, while the general diviſions are fewer. The *umbel* is very much ſmaller, of fewer but ſtouter rays. *Seed* with a broader and pale border.

We have ſome ſcruple reſpecting Gerarde's ſynonym. His firſt figure may probably be only a ſmaller repreſentation of the *officinale*, with which the ſtructure of its leaves agrees.

3. P. *capillaceum.* Capillary Cape Sulphur-wort. Thunb. Prodr. 50. Willd. n. 3. — "Leaves doubly pinnatifid; ſegments capillary, furrowed."—Native of the Cape of Good Hope. *Thunberg.*

4. P. *tenuifolium.* Slender-leaved Cape Sulphur-wort. Thunb. Prodr. 50. Willd. n. 4—"Leaves doubly pinnatifid; ſegments lanceolate, bordered, oppoſite or alternate."—From the ſame country.

5. P. *ſibiricum.* Siberian Sulphur-wort. Willd. n. 5.—"Leaves more than twice compound; leaflets linear, acute. Firſt umbels ſeſſile."—Native of Siberia.—*Leaves* ſupradecompoſite; their leaflets long, linear, acute, running down into the partial footſtalk; the lower ſtem-leaves furniſhed at the baſe with an ample ſheath. Firſt *umbel* ſeſſile in the fork of the ſtem; the reſt ſtalked. General *involucrum* wanting; partial ones ſetaceous and very ſhort. *Petals* inflexed. *Styles* permanent, divaricated. Ripe *ſeeds* not ſeen by Willdenow, who referred this plant to *Peucedanum* by its habit. We have a ſpecimen of a plant from Pallas, who found it in dry ſituations about the Wolga frequent, which may poſſibly be the ſame with what Willdenow deſcribed. In ours indeed there is no ſeſſile *umbel*, but the infloreſcence is ſo irregular, ſome *umbels* being proliferous juſt below their baſe, that, as the other characters agree with tolerable exactneſs, we feel little uncertainty on the ſubject. Pallas ſays Cuſſon meant to call his plant *P. anagymnodes*. Its radical *leaves* are deſcribed as four times ternate. There is a minute roughneſs on the foliage of the ſpecimen.

6. P. *japonicum.* Japaneſe Sulphur-wort. Thunb. Jap. 117. Willd. n. 6. (San boſu; Kæmpf. Amoen. Exot. 825.)—"Leaves five times deeply three-cleft; ſegments three-cleft, wedge-ſhaped."—Native of the ſea-coaſts of Japan, flowering in September and October. Whole *plant* ſmooth. *Stem* ſcarcely a foot high, as thick as a gooſe-quill, erect, branched, zigzag. *Leaves* with a broad, ſtriated, ſheathing baſe to the footſtalk. *Seeds* ovate, furrowed, with a ſlight border. *Thunb.*

7. P. *Silaus.* Meadow Sulphur-wort. Linn. Sp. Pl. 354. Engl. Bot. t. 2142. Mart. Ruſt. t. 128. Jacq. Auſtr. t. 15.—Leaflets pinnatifid; their ſegments oppoſite, decurrent. General involucrum of barely two leaves.—Not unfrequent in rather moiſt paſtures, throughout Europe, flowering in Auguſt and September. A dark-green, rigid, nearly ſmooth plant, varying very much in the breadth and decompoſition of its *leaves*, fœtid when bruiſed, and ſuppoſed to give a bad flavour to butter in ſome parts of Norfolk; but there is a doubt whether cattle will eat it. The *ſtem* is from one to two feet high, very ſtraight. *Flowers* greeniſh-white. *Fruit* but obſcurely bordered.

8. P. *alſaticum.* Alſatian Sulphur-wort. Linn. Sp. Pl. 354. Jacq. Auſtr. t. 70. (Daucus alſaticus; Bauh. Prodr. 77.)—Leaflets pinnatifid; their ſegments three-cleft, bluntiſh, palmate.—Native of various parts of Auſtria, Alſatia, and the Palatinate, in moiſt ground. The *leaflets* are much ſhorter and broader than the laſt, with more apparent roughneſs at the edges. *Umbels* very copious, ſmaller, yellowiſh.

9. P. *aureum.* Golden Sulphur-wort. Ait. n. 5. Willd. n. 9.—Leaves triply pinnate; thoſe on the ſtem with linear-lanceolate, thoſe from the root with oblong, many-cleft, leaflets.—Native of the Canaries, from whence Mr. Maſſon brought it to Kew in 1779. It is a greenhouſe biennial plant, flowering in June. We have ſeen no ſpecimen.

10. P. *obtuſifolium.* Blunt-leaved Sulphur-wort. Sm. Prodr. Fl. Græc. n. 659. Fl. Græc. t. 277, unpubliſhed.—Leaflets pinnatifid, coriaceous; their ſegments oppoſite, obovate, obtuſe.—Gathered by Dr. Sibthorp in Bœotia, and on the ſhores of the Euxine. *Root* perennial, with a fibrous crown. *Stems* a foot high, bowed, round, leafy. *Leaves* ſmooth, a foot long, firſt three-cleft, then pinnatifid, of a thick leathery texture. *Footſtalks* with a hollow ſheathing baſe. *Umbels* yellowiſh-white, of ſtout, not numerous, rays. General and partial *involucrum* of ſeveral ſhort, broad, acute leaves. *Corolla* a little irregular. *Seeds* with a thickiſh border. This plant has much of the aſpect of an *Heracleum.*

11. P. *microphyllum.* Small-leaved Sulphur-wort.—Leaves thrice pinnate; leaflets three-cleft, fleſhy. General involucrum ſcarcely any.—Gathered plentifully in the ſalt deſerts about the Wolga, by Pallas, who ſent it to Linnæus as a new *Peucedanum,* but we do not find that it has been any where publiſhed. It is ſmaller than the laſt, with differently compounded *leaves,* and much ſmaller *leaflets.* *Stem* glaucous. General *involucrum* ſometimes of a ſingle ſetaceous leaf, but oftener wanting, as the partial ones alſo ſeem moſtly to be. We have ſeen no *ſeeds,* ſo that the genus muſt remain doubtful.

12. P. *nodoſum.* Knotty Sulphur-wort. Linn. Sp. Pl. 354. Willd. n. 10.—"Leaflets alternately many-cleft."—Found in Crete, by Tournefort, who defines the *ſtem* as knotty, and the *leaves* like fennel. We know nothing more of this ſpecies.

13. P. *geniculatum.* Bent Sulphur-wort. Forſt. Prodr. 22. Willd. n. 11.—"Leaves roundiſh kidney-ſhaped, crenate."—Native of New Zealand. This is alſo unknown to us. Analogy would lead us to preſume that the word *leaflets,* not *leaves,* ſhould be uſed in the ſpecific character.

PEVENSEY, in *Geography,* a member of the town and port of Haſtings, in the rape of Pevenſey, and county of Suſſex, is ſituated on the Engliſh channel, 60 miles S.E. by S. from London. Though of little note now, Pevenſey was formerly of importance as a commercial port, but the gradual receding of the ſea, from which it now ſtands at ſome diſtance, has occaſioned its decline. Boats with difficulty aſcend to the village by a ſmall rivulet. It is a place of great antiquity, and according to Richard of Cirenceſter, was the Anderida Portus of the Romans. It is reckoned among the ſea-ports ravaged by Godwin, earl of Kent, in the time of Edward the Confeſſor. It is alſo celebrated in hiſtory, as the place where William the Conqueror landed with his invading army. From Madox's Hiſtory of the Exchequer, it appears that in the ſixth year of the reign of king John, Pevenſey, among other trading towns, paid a quinxieme, or tax, for its merchandiſe, and that three years afterwards the barons of Pevenſey fined forty marks for licence to build a town upon a ſpot between Pevenſey and Langley; which ſhould enjoy the ſame privileges as the cinque-ports, and have a yearly fair to laſt ſeventeen days, commencing on the anniverſary of St. John Baptiſt; alſo a market every Saturday. Whether any part of this grant was ever carried into effect, we are not informed. The only relic of the ancient conſequence of Pevenſey is the caſtle, which ſtands on the eaſt ſide of the town. The name of the builder, and the date of its erection, are alike unknown; but from the quantity of Roman bricks employed in the works, there is much reaſon to believe that it was conſtructed out of ſome Roman fortreſs. The external walls, of which the towers are tolerably entire to the height of 20 or 25 feet, are circular, and incloſe an area of ſeven acres. The principal entrance is from the weſt or land ſide, between two round towers, in which are conſiderable layers of Roman brick, ſome ſingle, others double, about twenty feet from the ground, and four or five aſunder. Many ſuch layers of white brick or ſtone hewn into that form, lie between the ſtrata of red, or in place of them, in the walls between the other towers to the north-weſt, and in the north-eaſt tower are ſome ſtones laid herring-bone faſhion towards the bottom. Within is a ſmaller fortification, of a quadrangular form, moated on the north and weſt. It has round towers and a drawbridge, which correſponds with the outer gate, and, like the latter, is not in the centre of the weſt ſide, but rather more to the ſouth. The eaſt wall of both is the ſame, and ſtands on a kind of cliff, that appears to have been once waſhed by the ſea, which, however, muſt have receded before the town was built. There are no Roman bricks in the inner work, and only in the north and weſt ſides of the outer. Several of the turrets in the latter are of ſolid maſonry, and ſeem to have been deſigned, not for defence, but to deceive an enemy. In the area of the outer caſtle, are two culverins without carriages; one of them meaſures eleven feet in length, is hooped, has a roſe and crown, and the letters E.R. marked on it, probably for Elizabetha Regina; the other is twelve feet long, and is marked W.P. They lie within two yards of one another, ſunk into the earth and pointing to the ſea. Sir William Burrell relates, that in 1710, a workman, engaged in conveying water from the moat of the caſtle into the town, was obliged for that purpoſe to make his way under the wall, the thickneſs of which he computed to be about ten feet. The foundation he diſcovered to conſiſt of piles, planked over with ſlabs of an extraordinary ſubſtance, but notwithſtanding the length of time ſince the erection of the caſtle, there appeared to be no decay in the ſlabs. The colour only ſeemed to be changed, and the leaves of faggots found there were ſtill ſound. William the Conqueror gave the town and caſtle to his half brother Robert, earl of Mortaigne, in Normandy, and created him earl of Cornwall. Theſe honours he enjoyed during the life of that king, but having taken part under his ſucceſſor in an inſurrection excited by his brother Odo, earl of Kent, in favour of Robert Courthoſe, an army was ſent againſt this caſtle, on which he thought proper to ſurrender, and make his peace. He was ſucceeded in his poſſeſſions by William, earl of Mortaigne and Cornwall, who, on being refuſed the earldom of Kent by Henry I., joined in a rebellion with Robert de Beleſme, earl of Shrewſbury. The king in conſequence ſeized all his eſtates, demoliſhed moſt of his caſtles, and exiled him from the realm. He gave to Gilbert de Aquila the town and caſtle of Pevenſey, which thence was called the "Honour of the Eagle," with all their dependencies, in whoſe deſcendants it remained veſted for ſome time, but being again forfeited to the throne, Henry III. granted it to his ſon prince Edward, and his heirs, kings of England, that it ſhould never more be ſeparated from the crown. It, however, came into the family of Lancaſter, and from them to that of Pelham, till about the middle of the laſt century, when it came to earl Wilmington, on being created baron of Pevenſey, from whom, by an intermarriage, it has devolved to lord Cavendiſh. The eccentric and celebrated Andrew Borde was a native of this place. (See BORDE, ANDREW.) The church is dedicated to St. Nicholas. By the cenſus of 1811, the number of houſes was 149, and the inhabitants amounted to 838. The Haſting's Guide, 2d edit. 1797.

PEVEREL POINT, a cape or point of land on the coaſt of Dorſetſhire, in the Engliſh channel, S. of Pool harbour, having at its end a ledge of rocks, which extends far into the ſea. On this point is a battery; 12 miles W.S.W. from the Needles. N. lat. 50° 34'. W. long. 3° 3'.

PEVET. See PIVOT.

PEVETS, in a *Watch*, the ends of the ſpindle of a wheel in a watch. The holes into which they run are called *pevet-holes*.

PEUMUS, in *Botany*, *Peumo* of the inhabitants of Chili, a tree belonging to the *Hexandria Monogynia*, for which Molina has retained this name. Juſſieu ſuppoſes it to be allied to his *Rubentia*, the *Elæodendrum* of Jacquin, Murray, Schreber, &c.

PEUTINGER, CONRAD, in *Biography*, a learned German, was born at Augſburg in 1465. He purſued his ſtudies in the principal univerſities of Italy, and returned a graduate in civil and canon law. In the year 1493 the ſenate of Augſburg appointed him to the ſecretaryſhip of the city, and he was its deputy at the diets held during the reign of the emperor Maximilian. After the death of the emperor in 1519, he was ſent to Bourges to compliment Charles V. on his acceſſion to the empire. He employed all his credit with theſe ſovereigns for the benefit of his native city, and procured for it the privilege of coining money. He was through almoſt the whole of a long life an active and uſeful member of the ſtate to which he belonged, and died in the year 1547, at the age of 82, having paſſed his latter years in a ſtate of ſecond childhood. He left a large and well choſen library, which remained many years in the family, but which finally came to the Jeſuits of Augſburg. The name of this author is beſt known from the ancient Peutingerian table, of which the following is the hiſtory. It is a rude chart drawn by an unknown hand during the reign of Theodoſius the Great, and marking the Roman military roads through the greateſt part of the weſtern empire; it was found in a German monaſtery by Conrad Celtes, who preſented it to Peutinger. He intended to publiſh it, but did not execute his deſign, and after his death it diſappeared for ſeveral years. At length fragments of it were found and publiſhed at Venice in 1591, under the title of "Fragmenta Tabulæ antiquæ ex Peutingerarum bibliotheca." In the eighteenth century, it was diſcovered entire among Peutinger's MSS., and a fine edition of it was given at Vienna in 1753 by Scheib, illuſtrated with notes and diſſertations. Peutinger was the author of "Romanæ vetuſtatis Fragmenta in Auguſta Vindelicorum," &c. 1508, which was reprinted under the title of "Inſcriptiones vetuſtæ Romæ et eorum Fragmenta in Auguſta Vindelicorum:" "Sermones Conviviales," which have been frequently reprinted, and many other works. Moreri.

PEWET ISLAND, in *Geography*, a ſmall iſland in the German ſea, near the coaſt of Eſſex; five miles S.S.W. from the entrance into Harwich harbour.—Alſo, a ſmall iſland in Poole harbour.

PEWIT, in *Ornithology*, the Engliſh name of a common bird of the *larus*, or ſea-gull kind, called by ſome authors *larus cinereus*, and by others *cepphus*, and in ſome of the counties of England the *black-cap*, and *ſea-crow*: this is the LARUS *ridibundus* (not *rudibundus*, as miſprinted) of Linnæus.

It has its Engliſh name from its note, which ſeems to expreſs the word *pewit*, and is a kind of hoarſe laugh. It is affirmed by many, that the head of this bird is only black at a certain ſeaſon of the year.

Pewits are birds of paſſage, reſorting to pools and fens in ſome of the inland counties, particularly Staffordſhire, in the ſpring, and after the breeding ſeaſon diſperſing to the ſea-coaſts. The young were formerly much eſteemed and fattened for the table. Plot relates, that at the death of the lord of the ſoil, they ſhift their quarters for a certain time. There was a piece of ground near Portſmouth, which formerly produced 40*l.* a-year to the owner, by the ſale of pewits. Ray and Pennant.

PEWIT is alſo a name given to the baſtard plover, or *lapwing*; which ſee. See alſo TRINGA *Vanellus*.

PEWSUM, in *Geography*, a town of Eaſt Foreſland, the principal place of a bailiwick; ſix miles N.N.W. of Emden.

PEWTER, a factitious metal uſed in domeſtic utenſils. It is very uncertain in its compoſition. The common utenſils of the loweſt price are made from an alloy compoſed of about 20 of tin, 3 of lead, and 1 of braſs. The lead is of no uſe, but to make it cheaper, and doubtleſs on this account is often uſed in larger proportion. The braſs is intended to give ſtiffneſs and hardneſs, the tin being of itſelf much too ſoft.

Another alloy of this kind is made without lead, conſiſting of tin combined with antimony, and copper in ſmall proportion, to give it hardneſs. This is manufactured into almoſt all the articles which are uſually made of plated copper, and is known by the name of Britannia metal.

The practice of putting lead into theſe alloys is extremely dangerous. Malt liquor, and particularly porter, always contains more or leſs acetic acid, which cannot fail to diſſolve ſome of that deleterious metal.

The baſis of this metal is, as we have already ſaid, tin, and it conſiſts of three different ſtandards: *viz.* that which is called plate-metal, of which plates and diſhes are made, which is formed of tin and regulus of antimony, in the proportion of one hundred and twelve pounds of the former to ſix or ſeven pounds of the latter. Wallerius gives for this fineſt kind of pewter, the proportions of 12 parts of tin, 1 of antimony, and about $\frac{1}{48}$ of copper. A very fine metal is made of 100 parts of tin, 8 of antimony, 1 of biſmuth, and 4 of copper. The uſe of theſe additions to the tin is to harden it, and preſerve its whiteneſs, and this fine kind of pewter takes a very high poliſh, has a beautiful ſilvery luſtre, and is not readily tarniſhed. Tin, with a little zinc or braſs, makes a very fine hard alloy. The antimony is ſo intimately united to the tin, that it is not volatilized when ſtrongly heated, or only in a very ſmall degree, and it is not eaſily diſſolved by any weak acid, ſo that in the uſe of this kind of pewter there is no danger of incurring the common effects of this metal.

The next metal inferior to this is called trifling metal, and is lowered one half-penny *per* pound in worth, by alloying it with lead; of this metal ale-houſe pots are made; the lower ſort of metal is ſtill farther alloyed by lead, ſo as to reduce the value two-pence in a pound lower than plate-metal; of this, which is called lay-metal, wine-pots are made.

Lead may be mixed with tin in any proportion, without deſtroying the malleability of the compound metal, whereas the brittle metals, and copper, impart a brittleneſs to the alloy, when they exceed certain proportions. Hence lead and tin, with or without other ſmaller additions, form the pewter in ordinary uſe. Lead being the cheapeſt of the two metals, the manufacturer finds it his intereſt to employ it in as large a proportion as poſſible; but danger having been apprehended from this noxious metal, the French government appointed a commiſſion of ſome very able chemiſts to examine the ſubject; and they found, that when wine or vinegar is allowed to ſtand in veſſels compoſed of an alloy of tin and lead in different proportions, the tin is firſt diſſolved; whilſt the lead is not ſenſibly oxydated by theſe liquors, except at the line of contact of the air and the liquor; and no ſenſible quantity of lead is diſſolved even by vinegar, after ſtanding for ſome days in veſſels that contained no more than about 18 *per cent.* of lead. Hence it was concluded, that as no noxious effect is produced by the very minute quantity of tin which is diſſolved, a pewter may be conſidered as perfectly ſafe, which contains about 80 or 82 *per cent.* of tin; and where the veſſels are employed merely for meaſures, a much leſs proportion of tin may be allowed. But the common pewter of Paris was found to contain no more than about 25 or 30 *per cent.* of tin, and the remainder was lead. For the reſults of the proceſſes of Meſſrs. Bayen and Charlard for aſcertaining the nature and proportions of the ſeveral alloys uſed by the pewterers of Paris, we refer to Chaptal's "Elements of Chemiſtry," vol. ii. See Tin.

Pewter has occaſionally ſerved for money. In the Philoſophical Tranſactions, M. Putland informs us that king James II. turned all the pewter veſſels, &c. of the Proteſtants in Ireland he could ſeize, into money; half-crowns were ſomewhat bigger than halfpence, and other pieces in proportion.

He ordered it to be current in all payments: whence, our author obſerves, people abſconded for fear of being paid their debts: he alſo mentions crown pieces of this metal, with this legend on the rim, *melioris teſſera fati.*

PEYAUNNY, in *Geography*, a town of Hindooſtan, in Oude; 18 miles S. of Mahomdy.

PEYERBACH, a town of Auſtria; 7 miles W. of Efferding.

PEYERI Glandulæ, in *Anatomy*, the mucous glands of the ſmall inteſtine, ſo named from Peyer of Schaffauſen, who deſcribed them in a work entitled "Exercitatio Anatomico-Medica de glandulis inteſtinorum," 1677. Reprinted in the Bibliotheca of Mangetus.

PEYERSON's Point, in *Geography*, a cape on the N. coaſt of Antigua. N. lat. 17° 18′. W. long. 61° 32′.

PEYJUREE, a town of Hindooſtan, in the circar of Kitchwara; 14 miles S.S.W. of Ragoogur.

PEYRAC, a town of France, in the department of the Aude; and chief place of a canton, in the diſtrict of Carcaſſonne. The place contains 1370, and the canton 13,109 inhabitants, on a territory of 307½ kiliometres, in 18 communes.

PEYREHORADE, a town of France, in the department of the Landes, and chief place of a canton, in the diſtrict of Dax; 10 miles S. of Dax. The place contains 1986, and the canton 9949 inhabitants, on a territory of 172½ kiliometres, in 13 communes.

PEYRELAU, a town of France, in the department of the Aveyron, and chief place of a canton, in the diſtrict of Milhau; 9 miles N.E. of Milhau. The place contains 261, and the canton 3921 inhabitants, on a territory of 255 kiliometres, in 9 communes.

PEYRERE, Isaac la, in *Biography*, a French writer, was born at Bourdeaux about the year 1594. He was educated a Proteſtant, and at one time had an employment under M. de la Thuillerie, ambaſſador from France to the court of Denmark. After this he obtained a poſt in the eſtabliſhment of the prince of Conde. He was a hard ſtudent, but thought to be very deficient in enquiry. He publiſhed a work in 1655, with the title of "Præadamitæ, ſive Exercitatio ſuper verſibus 12, 13, 14, cap. xv. Epiſt. Pauli ad Romanos," in which he attempted to prove that it is the origin of the Jewiſh nation, and not of the human race, which we find recorded in the book of Moſes, and that our globe was inhabited by many nations before Adam, whom he conſidered as the father of the Jews. The book was, almoſt as ſoon as it made its appearance, condemned to be burnt by the common executioner. Though the author had not ſubſcribed his name to it, the fact was well known, and he was arreſted at Bruſſels, and thrown into priſon. Through the interpoſition of the prince of Conde he was ſet at liberty. Smarting under this proſecution he determined to run no more riſks on account of his hereſy, and with this view he went to Rome to avow a change in his principles: here, in 1656, he abjured the Proteſtant religion, and alſo his treatiſe on the præadamites, and was, of courſe, favourably received by pope Alexander VII. His motives were always ſuſpected, as well by Catholics, whom he joined, as by the Proteſtants whom he left. After his return to Paris he was patronized by the prince of Conde, who made him his librarian, which poſt he kept till he entered the ſeminary of our Lady of the Virtues, where he died at the age of 82. He was author of another ſingular treatiſe "Concerning the Recall of the Jews," in which he endeavoured to maintain, that after their reſtoration to the land of Canaan, they would be ſubject not only to the ſpiritual authority of Jeſus, but to the government of a temporal king, the grand inſtrument of bringing about that event; and he concluded that king to be the king of France. M. Peyrere was author alſo of two works entitled "An Account of Greenland;" and "An Account of Iceland." Bayle. Moreri.

PEYROLLES, in *Geography*, a town of France, in the department of the Mouths of the Rhone, and chief place of a canton, in the diſtrict of Aix; 9 miles N.E. of Aix. The place contains 1750, and the canton 6164 inhabitants, on a territory of 210 kiliometres, in 5 communes. This town is celebrated for its medicinal waters.

PEYRUIS, a town of France, in the department of the Higher Alps; 15 miles S.W. of Digne.

PEYSONNEL, Charles, in *Biography*, born at Marſeilles in 1700, was ſon of a phyſician in that city: he received the elementary parts of his education under the fathers of the Oratory in Marſeilles, and was ſent to Paris for its completion. He returned to his native place juſt before the dreadful plague, ſo well known in hiſtory, to which calamity, his father, in fulfilling the duties of his office, fell a victim. The young man was deſtined for the practice of the law, and having ſtudied at Aix, he was admitted an advocate in the year 1723. He exerciſed his profeſſional talents with much credit at Marſeilles during fifteen years, at the ſame time that he purſued, with avidity, his literary ſtudies. He, together with his elder brother, was principally inſtrumental in founding the Academy of Belles Lettres in that city. After this he went out a ſecretary to the French embaſſy at the Porte; and then accompanied the marquis de Villeneuve as plenipotentiary to negociate the peace of Belgrade. He employed himſelf, while abroad, in compoſing works on the commerce of the Levant; the embaſſy in which he engaged; and the remains of antiquity which he obſerved in his travels. In a tour which he made to Nicomedia and Nicæa, he obtained many medals, which he placed in the rich cabinet of M. Pellerin, and likewiſe ſome curious marbles tranſmitted to the royal cabinet of antiquities, with their explanations. He was, in the year 1747, nominated to the conſulſhip of Smyrna, and, in the next year, the Academy of Inſcriptions elected him a foreign aſſociate. He employed perſons, at his own expence, to ſurvey the countries of Leſſer Aſia, ſouth of the Meander, and made ſome journies thither for the ſame purpoſe, in order that he might throw light on thoſe parts of the globe which, at that time, were little known to Europeans. Though leſs attached to natural hiſtory than to antiquities, he communicated ſome uſeful and intereſting facts to Duhamel for his Treatiſe on Trees and Shrubs. He died in the year 1757. As a commercial reſident he was highly eſteemed for his intelligence and diſintereſtedneſs, and ſome papers, publiſhed in the Memoirs of the Academy of Inſcriptions, eſpecially one "On the Kings of the Boſphorus," exhibit abundant proofs of his learning and diligence of reſearch.

The eldeſt ſon of M. Peyſonnel was alſo a conſul at ſeveral ports, and he made himſelf known by ſeveral hiſtorical and political works: of theſe one of the moſt important is entitled "Obſervations Hiſtoriques et Geographiques ſur les Peuples Barbares qui ont habitè les Bords du Danube, et du Pont Euxin; ſuivies d'un Voyage fait a Magneſie, à Thyatire, à Sardes, &c. avec Figures." The tour in Aſia Minor deſcribed in this volume, is illuſtrated with ancient monuments, inſcriptions, and medals. Among his other literary performances are "Obſervations on Baron de Tott's Memoirs," and a "Treatiſe on the Commerce of the Black Sea." He died at the advanced age of 80, in the year 1790. Gen. Biog.

PEYSTORF, in *Geography*, a town of Auſtria; 12 miles W.S.W. of Feldſburg.

PE-YU, a ſmall iſland near the coaſt of China, in the Chineſe ſea. N. lat. 30° 20′. E. long. 120° 20′.

PEZ, a town of Italy, in the department of the Adda and Oglio; 20 miles N. of Breno.

PEZA, a river of Ruſſia, in the government of Archangel, which riſes in lake Varzeſkoi, and runs into the Mezen; 12 miles S.E. of Oſokolſkoi.

PEZENES, a town of France, in the department of the Herault, and chief place of a canton, in the diſtrict of Beziers. The town, which is large and commercial, contains 8070, and the canton 11,796 inhabitanst, on a territory of 35 kiliometres, in four communes. N. lat. 43° 27′. E. long. 3° 31′.

PEZIZA, in *Botany*, ſomewhat altered from the Greek *πεζικη*, which is derived from πεζα, *the ſole of the foot.* Pliny ſpeaks of *Pezicæ* as the Greek appellation of ſuch *Fungi* as grow without any ſtalk, or apparent root. Linnæus has adopted the above word for a genus to which that character is, for the moſt part, applicable. Linn. Gen. 568. Perſ. Syn. 631. Mart. Mill. Dict. v. 3. Hudſ. 633. Juſſ. 4. Lamarck Illuſtr. t. 886. (Octoſpora; Hedw. Crypt. v. 2. 4. t. 3—10. Schreb. 770.)—Claſs and order, *Cryptogamia Fungi.* Nat. Ord. *Fungi.*

Eſſ. Ch. Receptacle hemiſpherical, concave, ſlightly tumid, lined with a ſmooth coloured hymenium. Caſes imbedded, inconſpicuous to the naked eye, each containing eight volatile ſeeds.

The celebrated Perſoon, ſo deep and ſcientific in this natural order of plants, has juſtly reſtored the original genus of *Peziza*, only removing from it that of *Cyathus*, called by ſome authors *Nidularia*, which belongs to a totally different tribe of *Fungi*, and of which *Peziza lentifera* of Linnæus, Hudſon, &c. is the moſt common ſpecies. *Cyathus* has been omitted in its proper place by our predeceſſor, and *Nidularia* being not received by writers in general, though ſurely preferable as a name, we have paſſed it over. Hedwig determined to retain the appellation of *Peziza* for that genus, and therefore invented the word *Octoſpora*, alluding to the eight ſeeds in each cell, for our *Peziza*, in which Schreber has followed him; but we rather follow Perſoon, who takes the lead in this order, and who is not wanting in authorities, among preceding authors, to ſupport him.

This writer defines one hundred and fifty-one ſpecies of *Peziza*, diſpoſed in ſeven ſections, of each of which we ſhall give an example or two. The reſemblance between their fructification and the ſhields of a *Lichen*, is too ſtriking to be overlooked; there is indeed ſcarcely a difference between them; for the number of the minute ſeeds is too obſcure, and indeed too uncertain, a character, to be reſorted to. Hedwig ſays they are invariably eight in the genus before us; but they appear to be often double, and their number is ſo different in different *Lichenes*, that nothing is to be depended upon concerning it in that tribe. With regard to habit, the diſtinction is more abſolute. A *Lichen* has a vegetating ſtem, herb, or cruſt, moſtly of perennial duration, extending itſelf without end; a *Peziza* has but a ſhort exiſtence, periſhing as ſoon as it has perfected the one ſolitary fructification, which is the end of its creation. Hedwig moreover obſerves, that a fibrous texture, highly bibulous in its nature, is interwoven with the ſeed-caſes of a *Lichen;* while thoſe of a *Peziza* are ſeparated, if at all, only by unconnected vertical fibres. In a word, the one plant has the fleſhy evaneſcent nature of a *Fungus*, the other the permanent, reviveſcent, and vegetative conſtitution of an *Alga*.

Section 1. *Tremella-like; more or leſs of a gelatinous ſubſtance.* Fourteen ſpecies.

P. *inquinans*. Perſ. n. 1. (P. nigra; Bulliard Fr. t. 460. f. 1. P. polymorpha; Lightf. 1055. Tremella turbinata; Hudſ. 563. Elvela; Schæff. Fung. t. 158. Octoſpora elaſtica; Hedw. Crypt. v. 2. t. 6. f. E.)—Gregarious, viſcid, ſtaining black; at length convex and obconical; externally rugged, downy, and of a lighter brown. Not uncommon on the trunks of felled oak trees, eſpecially in autumn and winter, or in a wet ſummer, always growing, as Perſoon remarks, in longitudinal rows. Its ſubſtance is leathery, but internally pulpy; hard when dry; its diameter an inch, more or leſs. When touched, its *diſk* ſtains the fingers with a black ſlimy moiſture. In a dry ſtate, the fine velvet-like downineſs of the outſide is moſt conſpicuous, and aſſumes a much lighter hue.

P. *ſarcoides*. Perſ. n. 5. (P. tremelloidea; Bull. Fr. t. 410. f. 1. Helvella ſarcoides; Bolt. Fung. t. 101. f. 2.

Octoſpora carnea; Hedw. Crypt. v. 2. t. 7. f. B.)—Cluſtered, juicy; deep fleſh-coloured externally, with elevated veins; diſk purple, lobed at the margin. Frequent on rotten wood in autumn. Its ſhape is tolerably regular, obconical, with a dilated lobed margin, and a deep hollow *diſk* of a purple or vinous hue; the outſide, or ſtalk, pale, with branching elevated veins or plaits. Perſoon confounds with this the *Tremella ſarcoides* of Withering, v. 4. 78. Engl. Bot. t. 2450, to which laſt moſt of his ſynonyms refer. The ſize of the preſent ſpecies is uſually leſs than half that of the foregoing; ſubſtance more tender and gelatinous.

Section 2. *Helvella-like; larger, partaking of a fleſhy and membranous ſubſtance, brittle, externally rather powdery.* Thirty-five ſpecies.

P. *aurantia.* Perſ. n. 21. (Peziza; Fl. Dan. t. 657. f. 2. P. coccinea; Bull. Fr. t. 474. Sowerb. Fung. t. 78. Helvella coccinea; Bolt. Fung. t. 100.)—Cluſtered, ſeſſile, obliquely wavy; whitiſh externally; diſk orange-ſcarlet.—Common in autumn about the roots of decayed oaks, ſometimes on gravel walks in gardens, after much wet, growing in cluſters of various ſizes. The plants are from half an inch to two or three inches in diameter, variouſly cup-ſhaped, without any *ſtem*, often wavy, and oblique, or convoluted; the *diſk* of an orange hue inclining to ſcarlet, but paleſt in wet weather; the outſide ſomewhat glaucous, with a kind of bloom. Withering confounds this with *P. coccinea*, hereafter mentioned in the next ſection, and we believe Hudſon fell into the ſame error.

P. *veſiculoſa.* Perſ. n. 31. Sowerb. Fung. t. 4.—Cluſtered, hemiſpherical, rather contracted at the margin; diſk brown, ſeparating from the ſlightly downy, whitiſh, outer coat.—Very common on expoſed dunghills, according to Mr. Sowerby, who detected the eſſential character, conſiſting in a ſeparation, and hollow ſpace, between the *hymenium* and the *receptacle* or outer coat. In a young ſtate the fungus is globular, white or cream-coloured, and rather downy; as it expands, the mouth ſtill remains for ſome time much more contracted than the reſt. The full-grown plant is two inches wide; the *diſk* of an umber brown. The above intelligent author ſeems to have erred in citing Bulliard's t. 457. f. 1, unleſs that figure be very faulty and defective. Perſoon omits it.

P. *Sowerbæana.* Perſ. n. 34. (P. radiculata; Sowerb. Fung. t. 114.)—Cluſtered; externally white, downy, with a long tapering root; diſk concave, yellow.—Found by Mr. Sowerby in Wanſtead garden, Eſſex, in the autumn of 1794 and 1795. No other botaniſt ſeems to have obſerved this ſpecies. It grows in cluſters, apparently ſeſſile, the long tapering *root* being concealed amongſt earth and dead leaves. The *cup* is above an inch wide, of a bright ochraceous yellow in the *diſk*; externally white, downy, reticulated with prominent veins.

P. *Acetabulum.* Perſ. n. 39. Linn. Sp. Pl. 1650. With. v. 4. 346. Sowerb. Fung. t. 59. Bull. Fr. t. 485. f. 4.—Solitary, hemiſpherical, brown on both ſides; with elevated, branching, pale, external veins, and a pale fluted ſtalk. A rare ſpecies, and one of the largeſt; found in ſandy hedge bottoms, or on very rotten wood in the ſhade, in winter. Its furrowed *ſtalk*, like that of an *Helvella*, ſending up branching elevated veins over the lower half of the large thin cup, and the brittle, ſmooth, waxy nature of the whole fungus, well mark this ſpecies, which preſerves its appearance and characters ſufficiently well in drying.

Section 3. *Moſtly ſmall. The outſide of the cup either briſtly, hairy, downy, or woolly.* Thirty-five ſpecies.

P. *hemiſphærica.* Perſ. n. 51. (P. hiſpida; Hudſ. 635. With. v. 4. 354. Sowerb. Fung. t. 147. P. Labellum; Bull. Fr. t. 204. Elvela; Schæff. t. 151.)—Cluſtered, ſeſſile, hemiſpherical, clothed with cluſtered brown hairs; diſk glaucous-white.—Found in autumn, after rains, growing amongſt moſs on the ground, but not common. This is among the larger ſpecies of the preſent ſection, being ſometimes an inch or more in diameter, though occaſionally not bigger than a pea. The inflexed margin gives the whole fungus nearly an orbicular ſhape, though ſomewhat depreſſed. The outſide is brown, with a tawny caſt, and clothed with cluſtered, ſhort, prominent hairs; the *diſk* concave, of a ſingular pearly or glaucous white.

P. *ſcutellata.* Perſ. n. 58. Linn. Sp. Pl. 1651. Hudſ. 637. With. v. 4. 353. Sowerb. Fung. t. 24. Bull. Fr. t. 10. (Octoſpora hirta; Hedw. Crypt. v. 2. 12. t. 3. f. B.)—Seſſile, nearly flat, orange-red; rough externally with black ſpreading briſtles.—This pretty ſpecies is not uncommon on wet rotten wood. It grows generally more or leſs diſperſed, about the ſize of a large ſplit pea, and is nearly hemiſpherical at firſt, fixed by a central, black, fibrous *root*. The beauty of the pale ſcarlet diſk, which becomes gradually flattened, and the remarkable black briſtles, which riſe from the outſide and overtop the margin, cannot fail to ſtrike the moſt incurious obſerver. If by the manner in which Withering cites Bolton and Sowerby, the firſt is meant to be preferred, nothing can be more erroneous. His ſuppoſed varieties moreover include ſeveral moſt diſtinct plants.

P. *ſtercorea.* Perſ. n. 60. (P. ſcutellata; Bolt. Fung. t. 108. f. 1. Octoſpora ſcutellata; Hedw. Crypt. v. 2. 10. t. 3. f. B.)—Seſſile, concave, orange-coloured; rough externally with ſhort, nearly upright, brown briſtles.—Common upon the dung of horſes and cows, in low wet paſtures. Moſt authors confound this with the laſt, from which it differs in its place of growth, ſmaller ſize, more concave and paler *diſk*, as well as in the ſhortneſs, bluntneſs, and lighter hue, of the external briſtles.

P. *coccinea.* Perſ. n. 67. Jacq. Auſtr. v. 2. 40. t. 163. Bolt. Fung. t. 104. (P. epidendra; Bull. Fr. t. 467. f. 2. Sowerb. Fung. t. 13. P. cupularis; Linn. Sp. Pl. 1651?)—Stalked; turbinate or funnel-ſhaped, white and downy; diſk concave, crimſon; margin ſomewhat crenate.—Found on rotten ſticks, imbedded among dead leaves, early in the ſpring. This is one of the moſt elegant of the whole order of *Fungi*, whether we conſider its delicate downy outſide, whoſe pure white is partly tinged with a pale bluſh, or the vivid deep crimſon of the diſk, of both which Mr. Sowerby's inimitable figure alone gives any adequate idea. Jacquin's is truly miſerable. If this be, as Perſoon believes, the real *cupularis* of Linnæus, it is ſingular that neither he nor Vaillant ſhould have noticed the colour of the diſk. Hudſon, Withering, and others have confounded the preſent plant with the very different *P. aurantia*, ſee our ſecond ſection. The *ſtalk* is often an inch long, or more, and the diameter of the cup an inch and half.

P. *virginea.* Perſ. n. 71. (P. nivea; Dickſ. Crypt. faſc. 1. 21. Sowerb. Fung. t. 65. Fungoides, &c.; Mich. Gen. t. 86. f. 15.)—Cluſtered, ſtalked, hemiſpherical, white; externally downy.—Frequent on decaying plants, rotten ſtumps, &c. growing ſometimes in a pendulous or reverſed poſture. The *ſtalk* is ſcarcely half a quarter of an inch in height, the *cup* about twice that diameter. Every part is white, and the outſide finely downy.

Many other curious and minute ſpecies cloſe this ſection.

Section 4. *Entirely ſmooth, or at leaſt not manifeſtly downy, of a rather waxy texture. Moſtly of a ſmall ſize.* Forty-four ſpecies; twenty-four of which are ſtalked, the reſt ſeſſile.

P. *firma*. Perſ. n. 87. (P. ochroleuca; Bolt. Fung. t. 105. f. 1. Sowerb. Fung. t. 115.)—Rather ſcattered, leathery, pale brown, cup-ſhaped; at length dilated, wavy, and flattened. Stalk longer than the cup, blackiſh at the baſe.—Said to be not uncommon in the damp receſſes of moiſt woods, growing on dead ſticks; but it ſeems not to have been obſerved out of England. The full-grown *cup*, when expanded nearly flat, is almoſt an inch wide; its *diſk* of a pale reddiſh-brown; the outſide and internal ſubſtance of a light yellowiſh hue. *Stalk* an inch high, rather ſlender, ſwelling upwards. The texture is leathery and elaſtic, but by drying becomes hard, the whole plant ſhrinking much.

P. *Tuba*. Perſ. n. 94. Bolt. Fung. t. 106. f. 1.—Stalked, entirely yellow, funnel-ſhaped, deeply umbilicated, with a flat entire border. Stalk thread-ſhaped.—Found, by Mr. Bolton only, on rotten ſtems of plants, in moiſt places near rills of water, growing rather diſperſed. Each plant is about three quarters of an inch high, of a bright pale yellow, "like a trumpet in miniature," with a ſlender, ſlightly curved, *ſtalk*. The *diſk* a quarter of an inch broad.

P. *citrina*. Perſ. n. 106. Sibth. Oxon. 386. With. v. 4. 347. Sowerb. Fung. t. 151. (Octoſpora citrina; Hedw. Crypt. v. 2. 28. t. 8. f. B.)—Crowded, entirely lemon-coloured, cup-ſhaped, thick-edged. Stalk inverſely conical, the length of the cup.—Found by Hedwig, on rotten oak wood, in ſhady places, in September. Dr. Sibthorp met with the ſame in Shotover plantations, in Oxfordſhire. A pretty ſpecies, growing in conſiderable cluſters, and conſpicuous for its bright uniform lemon hue, like *Lichen vitellinus*, Engl. Bot. t. 1792, but never tinged with green or olive. Its uſual diameter is a line, more or leſs, and height about the ſame. Sometimes the *cup* is obſcurely lobed or notched. Mr. Sowerby repreſents ſeveral ſpecimens without any ſtalk, but we cannot conceive his plant to be materially different from Hedwig's.

P. *lenticularis*, Perſ. n. 110, for which Bulliard t. 300. f. AC, and Sowerby's *P. aurea*, t. 150, are quoted, the laſt indeed with doubt, appears rather an obſcure ſpecies. Though ranged among thoſe with a ſeſſile *cup*, it has actually a ſtalk; ſee *Helvella aurea*, Bolt. t. 98. f. 2, and Sowerby's figure. The colour of the *diſk* being a deeper more tawny yellow than the outſide, and the thin edge, ſeem beſt to diſtinguiſh this from the laſt.

P. *granuloſa*. Perſ. n. 119. (P. granulata; Bull. Fr. t. 438. f. 3. P. ſcabra; Fl. Dan. t. 655. f. 2.)—Seſſile, cluſtered, reddiſh-orange, flattiſh; externally paler, granulated and rugged.—Perſoon mentions this as frequent in autumn upon cow-dung. It ſeems not to have been noticed in England, but may have been confounded with ſome other. The rugged or granulated outſide is a remarkable character. The *diſk* is of a bright but pale orange-red, a line broad, with an inflexed margin, which finally diſappears, and the whole becomes nearly flat.

P. *confluens*. Perſ. n. 120. Obſ. Mycol. v. 2. 81. t. 5. f. 6, 7.—Seſſile, confluent, ſomewhat imbricated, orange-coloured, flattiſh, connected by downy whitiſh fibres.—Found on the ground, in dry burnt-up ſpots, by Perſoon, the only author who mentions this ſingular ſpecies, which is among the ſmalleſt, though from its aggregate mode of growth very conſpicuous. The *ſeeds*, flying off like ſmoke, have been obſerved by its diſcoverer.

Section 5. *More or leſs coriaceous, dry, either ſmooth or powdery, for the moſt part ſeſſile.* Fifteen ſpecies.

P. *patellaria*. Perſ. n. 131. (Lichen atratus; Hedw. Crypt. v. 2. 61. t. 21. f. A. Ach. Prod. 62.)—Cluſtered, quite ſeſſile, flat, bordered, black, ſomewhat coriaceous.—Not uncommon, according to the authors cited, upon dead branches of Lime and Oak, forming patches, more or leſs ſcattered, and entirely black. The plants appear like the ſhields of a *Lichen*, of the Acharian genus *Lecidea*, but totally deſtitute of a cruſt. Each is fixed by copious fibrous *roots*, and is about the diameter of a ſmall pin's head; the *diſk* very ſlightly elevated, the *margin* conſiderably thickened, and rather raiſed above the diſk. Hedwig, obſerving the minute oblong *ſeeds* to be diſcharged ſeparately from their fibrous *receptacle*, without any appearance of the eight-ſeeded cells of a *Peziza*, referred this diminutive production to *Lichen*; but he is generally ſuppoſed to have erred in this point. We have ſought for the plant in vain in England, nor can we decide any thing concerning it, though moſt inclined to the opinion of Perſoon, in which Acharius now concurs.

Several minute, and to us often obſcure and uncertain ſpecies, cloſe this ſection. The laſt of them is

P. *carpinea*. Perſ. n. 144. Ehrh. Crypt. n. 130. (Tubercularia faſciculata; Tode Fung. faſc. 1. 20. t. 4. f. 32.)—Cluſtered, ſtalked, paliſh, capitate, ſlightly flattened.—Found on the bark of Hornbeam, through the cuticle of which it protrudes in little denſe oblong cluſters; gelatinous, and of a fleſh-colour, with a yellow tinge, when freſh; brown and hard when dry. Each plant reſembles a minute round-headed Agaric, with a thick *ſtalk*. The ſurface of the head, or *diſk*, is ſaid to be covered with pale yellow grains, thought to be the *ſeeds*.—In Ehrhart's ſpecimen theſe ſuppoſed *fungi* evidently ſpring from the freſh internal bark, not from any decayed layer, which is ſo contrary to the nature of the whole natural order, that we greatly incline to rank this ſpecies with *Tremella*, if not, to diſcard it altogether as a mere exudation from the bark of the tree!

Section 6. *Receptacle nearly membranous, dry, cup-ſhaped, ſunk into the ſurface of wood, with a prominent border.* Three ſpecies, which Perſoon ſeems to have inclined to eſtabliſh as a genus, by the name of *Stictis*. One example will ſuffice.

P. *radiata*. Perſ. n. 146. (P. marginata; Sowerb. Fung. t. 16. With. v. 4. 351. Lycoperdon radiatum; Linn. Sp. Pl. 1654. Patellaria excavata; Hoffm. Pl. Lich. t. 23. f. 3. Sphærobolus roſaceus; Tode Fung. faſc. 1. 44. t. 7. f. 57, 58.)—Oval, immerſed, internally brown; border prominent, ſpreading, ſnow-white.—On the bark of dead branches of trees. Found by Mr. Relhan at Whitwell, Cambridgeſhire. Very conſpicuous in conſequence of its white, lobed or notched, border. If Linnæus and Tode be correct, this ſpecies diſcharges the ſeeds elaſtically, in the form of a ball; conſequently it can have no right to be eſteemed a *Peziza*, but ranks with the *Lycoperdon Carpobolus*, in a ſeparate genus. Hoffmann, Sowerby, and Perſoon, have deſcribed merely the empty receptacle.

Section 7. *Receptacle nearly membranous, elongated, bladder-like, hollow at the baſe.* This, in ſome books, forms the genus *Solenia*. Four ſpecies.

P. *ochracea*. Perſ. n. 149. (Solenia ochracea; Hoffm. Germ. v. 2. t. 8. f. 2.)—Rather crowded, ſlender-pear-ſhaped, downy, yellow.—Found on the old barks of trees, in rows or cluſters, not much crowded, the plants not quite erect, very minute; but viſible by their variegated hue of orange and yellow. Each is tubular, white within; the mouth much contracted.

P. *candida*. Perſ. n. 151. (Solenia candida; Hoffm. ibid. t. 8. f. 1.)—Very ſlender, cylindrical, ſnow-white, with a revolute margin.—Found on rotten wood. It ſeems even more minute than the laſt, from which it is very diſtinct.

Albertini and Schweiniz, in their learned *Conſpectus Fungorum Agri Niſkienſis*, have figured and deſcribed ſeveral ſpecies of *Peziza* not in Perſoon, and have furniſhed valuable remarks on ſome of his minute or obſcure ones. They confirm the account of the fruit of *P. radiata*, n. 146, as being at firſt gelatinous, then waxy, and finally intermixed with fibres. The ſame acute obſervers have ſeen the *P. carpinea*, n. 144, twice; in April it had little convex cloſed cups, and in October a flat open diſk. If there be no deception in this, we muſt allow it to remain here. After all, great obſcurity muſt attend theſe diminutive productions; nor can ſuch be put to the teſt of diſplaying their volatile ſeeds, in the form of ſmoke, from an organized diſk, which is the only true mark of a *Peziza*.

PEZO *de Rega*, in *Geography*, a town of Portugal, in the province of Tras los Montes, a celebrated depot of Port wine; 7 miles N.W. of Lamego.

PEZOS, a town of Spain, in Aſturia; 40 miles W. of Oviedo.

PEZRON, Paul, in *Biography*, a learned French abbot, who flouriſhed in the 17th and 18th centuries, was born at Hennebon, in Bretagne, in the year 1639. At the age of 22 he embraced the monaſtic life, and went to purſue his ſtudies at the college of the Bernardins in Paris. He ſoon became diſtinguiſhed for his ardour in the purſuit of knowledge, as well profane as ſacred; and his early proficiency ſecured to him the reſpect and eſteem of the abbot, who appointed him his ſecretary, and procured for him the degree of bachelor of divinity from the faculty of Paris. Honours now flowed in upon him: in 1682 he received the degree of doctor, and in 1690 he was elected vicar-general of the reformed houſes belonging to his order in the iſle of France. In 1697, Lewis XIV., in order that he might reward literary merit, beſtowed on him the abbey de la Charmoye, which he retained till the year 1703, when he reſigned it, that he might devote his whole time to ſtudy. The intenſeneſs of his application ruined his health, and he died in 1706, in the 67th year of his age. His principal works are; 1. "The Antiquity of Time, reſtored and defended againſt the Jews and the New Chronologiſts:" in which he maintains the chronology of the Septuagint, in preference to that of the Hebrew text of the bible, which he ſuppoſes to have been corrupted by the Jews ſince the deſtruction of Jeruſalem: he alſo claims for the world a much higher antiquity than is allowed by any other modern chronologer. 2. "An Attempt at a Literal and Hiſtorical Commentary on the Prophets." 3. "The Evangelical Hiſtory confirmed by thoſe of the Jews and Romans," in 2 vols. 12mo. 4. "A Treatiſe concerning the Antiquity of the Nation and of the Language of the Celts, otherwiſe called Gauls," &c. Moreri.

PFAFF, in *Geography*, a mountain of Auſtria, bordering on Stiria.

PFAFFENBERG, a town of Bavaria; 16 miles N. of Landſhut.

PFAFFENDORF, a town of Bavaria, in the biſhopric of Bamberg; five miles E. of Weiſmain.—Alſo, a town of Bavaria, in the ſame biſhopric; five miles S.E. of Lichtenfels.—Alſo, a town of the duchy of Wurzburg; ſix miles N. of Ebern.—Alſo, a town of Pruſſia, in the palatinate of Culm; 10 miles E.S.E. of Culm.

PFAFFENHAUSEN, a town of Bavaria, in the biſhopric of Augſburg, on the Mindel; 21 miles S.W. of Augſburg.—Alſo, a town of Bavaria; 13 miles N.N.W. of Landſhut.

PFAFFENHOFEN, a town of Bavaria, on the Ilm; 14 miles S.S.E. of Ingolſtadt. N. lat. 48° 25′. E. long. 11° 28′.—Alſo, a town of Bavaria; 13 miles S.W. of Amberg.—Alſo, a town of France, in the department of the Lower Rhine; nine miles W. of Haguenau.

PFAFFENHOVEN, a town of Wurtemberg; eight miles W. of Heilbronn.

PFAFFENREUT, a town of Germany, in the principality of Culmbach; five miles S.S.E. of Wonſiedel.

PFAFFEYEY, a town of Switzerland, in the canton of Friburg; 10 miles S.E. of Friburg.

PFAFRODA, a town of Saxony, in the circle of Erzgebirg; 76 miles from Freyberg.

PFALDORF, a town of Bavaria, in the principality of Aichſtatt; ſix miles N.E. of Aichſtatt.

PFALZEL, a town of France, in the department of the Sarre, and chief place of a canton, in the diſtrict of Treves; three miles N.E. of Treves. The place contains 860, and the canton 8370 inhabitants, in 40 communes.

PFANBERG, a town of the duchy of Stiria; 10 miles N. of Gratz.

PFANHEIM, a town of the duchy of Wurzburg; three miles E.N.E of Aut.

PFANNER, Tobias, in *Biography*, ſon of a counſellor of the count de Oetingen, was born at Augſburg in 1641. He ſtudied at Altdorf, Gotha, and Jena, and acquired a profound knowledge of juriſprudence, philoſophy, and other branches of learning. After having been ſucceſſively governor to ſeveral young gentlemen, the duke of Saxe-Gotha made him ſecretary of his archives, and employed him to inſtruct his ſons in hiſtory and politics. In the year 1686 he was nominated counſellor to all the Erneſtine line. He was ſo well verſed in public affairs, that he obtained the name of "The living archives of the houſe of Saxony:" he bore an eſtimable character, but had, through exceſſive ſtudy, contracted a melancholy diſpoſition. He died in the year 1717, at the age of 76. He was author of many works written in the Latin language, of which the principal are, "A Hiſtory of the Peace of Weſtphalia;" "A Treatiſe on German Princes;" "A Treatiſe on the Principle of Hiſtorical Faith," &c. &c. Moreri.

PFASKIRCHEN, in *Geography*, a town of Auſtria; five miles N.E. of Putzeinſtorf.

PFEDDERSHEIM, a town of France, in the department of Mont Tonnerre; 24 miles N.N.W. of Spire.

PFESSIKON, a town of Switzerland, in the canton of Zurich; 10 miles E. of Zurich.

PFETER, a town of Bavaria, on a ſmall river of the ſame name; 14 miles E. of Ratiſbon.

PFIN, a town of Switzerland, in the Valais; 12 miles E. of Sion.

PFLAU, a town of Tyrol; 16 miles W. of Bolzano.

PFORING, a town of Bavaria, encompaſſed with walls, on the Danube; 14 miles E. of Ingolſtadt.

PFORTEN, a town of Luſatia; 12 miles S. of Guben.

PFORZHEIM, a town of Baden, on the Entz, which here receives the Nagold and Warm. It comprehends a ſpecial ſuperintendance, a grammar-ſchool, and an orphan-houſe; 8 miles S.S.E. of Durlach. N. lat. 48° 58′. E. long. 8° 50′.

PFRAME, a town of Auſtria; 6 miles S.S.W. of Marcheck.

PFREIMBDT, a town of Bavaria, in the principality of Leuchtenberg, on the Nab; 15 miles S.W. of Leuchtenberg.

PFULLENDORF, a town of Baden, made imperial in 1204, and continued ſuch till the year 1802, when it was given among the indemnities to the margrave of Baden; 14 miles W.N.W. of Ravenſpurg. N. lat. 47° 52′. E. long. 9° 18′.

PFUNT, a town of Tyrol; 15 miles W. of Bolzano.

PFYN, a town of Switzerland, in the canton of Zurich, and capital of a bailiwick; 7 miles W. of Conſtance.

PHACA, in *Botany*, a name borrowed by Linnæus from Dioſcorides, whoſe φακος, nevertheleſs, the Lentil *Ervum* (or more properly *Cicer*) *Lens*, agrees no further with the Linnæan genus, than in being a papilionaceous and leguminous plant.—Linn. Gen. 384. Schreb. 507. Willd. Sp. Pl. v. 3. 1251. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 4. 358. Sm. Prodr. Fl. Græc. Sibth. v. 2. 84. Juſſ. 358. Gærtn. t. 154. (Aſtragaloides; Tourn. t. 223.) —Claſs and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Cal. Perianth inferior, of one leaf, tubular, five-toothed. *Cor.* papilionaceous: ſtandard obovate, ſtraight, largeſt; wings oblong, obtuſe, ſhorter; keel ſhort, compreſſed, obtuſe. *Stam.* Filaments diadelphous, one ſet of nine, the tenth ſolitary; anthers roundiſh, aſcending. *Piſt.* Germen oblong; ſtyle awl-ſhaped, aſcending; ſtigma ſimple. *Peric.* Legume oblong, inflated, half divided into two cells; the upper ſuture depreſſed towards the lower. *Seeds* ſeveral, kidney-ſhaped.

Obſ. The legume in ſome is ſtraight, but in others recurved, inſomuch that the point ſometimes touches the baſe. As the partition of the legume of ſome *Aſtragali* is not actually attached to the lower ſuture, though brought very near to it, the cloſe affinity between theſe two genera is evident.

Eſſ. Ch. Calyx with five teeth; the two upper ones moſt diſtant. Legume divided half way into two cells, inflated.

1. Ph. *bœtica*. Hairy Baſtard Vetch. Linn. Sp. Pl. 1064. (Aſtragalus primus, five bœticus; Cluſ. Hiſt. v. 2. 233, 234. A. luſitanicus Cluſii; Lob. Ic. v. 2. 78. Ger. Em. 1238.)—Hairy. Stem erect. Leaflets numerous, oval. Stipulas linear-lanceolate. Legume oblong, boat-ſhaped, ſomewhat depreſſed.—Native of Portugal, Spain, and Greece. Dr. Sibthorp found it plentifully on mountains in the iſle of Cyprus. We have a ſpecimen gathered by the late Dr. Brouſſonet in Barbary. Cluſius ſaw it flowering in the end of January, in Spain. Though this noble plant ſtands on the liſt of our horticultural riches, it is only from having been cultivated here in Parkinſon's days. Some traveller would do well to reſtore it to us. The *root* is perennial, ſpindle-ſhaped, very thick and ſtrong. *Stems* herbaceous, erect, about two feet high, as thick as the little finger, nearly ſimple, leafy, ſlightly angular, a little zigzag, reddiſh, clothed, like every other part of the herbage, with fine, ſoft, hoary hairs. *Leaves* alternate, about ſix inches long, pinnate, of nine pair, with an odd one, of ſtalked, elliptical, uniform, entire *leaflets*, of a hoary or glaucous green. *Stipulas* not quite an inch long, linear-lanceolate, almoſt awl-ſhaped, erect, reddiſh. *Flowers* copious, large, and handſome, pure white, pendulous, in long, ſolitary, axillary, ſtalked, upright *cluſters*, about the length of the leaves. *Legume* near two inches long, ſtraight, cylindrical, ſlightly depreſſed, channelled along the back. The modern Greeks know this plant by a name equivalent to Wild Lupine; the Portugueſe call it Dog Lupine. The taſte of the leaves, and eſpecially the ſeeds, is ſaid by Cluſius to be acrid and burning.

Whatever may become of *Robinia veſicaria*, Jacq. Ic. Rar. t. 148, we cannot follow Willdenow in introducing it here.

2. Ph. *ſalſula*. Salt Baſtard-Vetch. Willd. n. 3. Linn. Suppl. 336. Pallas Reiſe v. 3. append. n. 115. t. B, b.—Hoary. Stem erect. Leaflets numerous, obovate; ſmooth above, ſtipulas oblong. Legume globoſe, pendulous.—Gathered by Pallas in ſalt ground, about the lake *Tareï*, in Dauria.—This is, in all its dimenſions, ſcarcely half the ſize of the preceding, and diſtinguiſhed by being finely hoary in every part, (except the upper ſurface of the *leaves*, which is glaucous,) with fine, cloſe-preſſed, ſhort pubeſcence. The *flowers* are much fewer, not above ſix or eight in each cluſter, and of a fine red. *Legumes* globoſe, ſtalked, pendulous. It flowers in its native country about the end of June, and has never been obſerved in any other ſpot than the above-mentioned.

3. Ph. *alpina*. Alpine Baſtard Vetch. Linn. Sp. Pl. ed. 1. 755. Willd. n. 4. Jacq. Ic. Rar. t. 151. Villars Dauph. v. 3. 472. (Ph. leguminibus pendulis, ſemiovatis; Gmel. Sib. v. 4. 35. t. 14. Aſtragalus n. 410; Hall. Hiſt. v. 1. 175. Aſtragaloides alpina hirſuta erecta, foliis viciæ, floribus dilutè luteis; Till. Piſ. 19. t. 14. f. 2.)—Erect, branched; ſomewhat hairy. Leaves of many pair of elliptic-lanceolate obtuſe leaflets. Legumes half-ovate, acute. Stipulas linear-lanceolate.—Native of the mountains of Switzerland, France, Savoy, Auſtria, and Siberia, from all which countries we have ſpecimens. The *root* is perennial, woody, very long and ſtrong, ſubdivided. *Stems* erect, about two feet high, branched, leafy, more or leſs clothed with ſhort, cloſe-preſſed, white hairs. *Leaves* alternate, two or three inches long, compoſed of from ten to fourteen pair, with an odd one, of elliptic-oblong, or ſomewhat lanceolate, obtuſe *leaflets*, whoſe medium length is half an inch, clothed, eſpecially beneath, with ſuch hairs as the ſtem. *Stipulas* nearly linear, broad at the baſe, from a quarter to half an inch long, ſmooth on both ſides, but fringed at the edges. *Flowers* yellow, in ſhortiſh, long-ſtalked, axillary *cluſters*, with linear, fringed *bracteas*. *Partial footſtalks* ſhort, ſlightly drooping, clothed, as is the *calyx* in ſome degree, with ſhort black hairs. The *germen* is very denſely ſo clothed, but the *legumes* become ſmooth, and are ſtalked, pendulous, ſcarcely an inch long, inflated, half-ovate, the back being nearly a ſtraight line. *Seeds* uſually three or four.

This being certainly the original *Ph. alpina* of Linnæus, that name is properly retained for it, though he ſometimes confounded this and the following.

4. Ph. *frigida*. Northern Baſtard-Vetch. Linn. Syſt. Nat. ed. 10. 1173. Fl. Lapp. ed. 2. 227. Willd. n. 5. Jacq. Auſtr. t. 166. (Ph. alpina; Linn. Sp. Pl. 1064. Fl. Suec. ed. 2. 256. Ait. n. 2. Fl. Dan. t. 856. Aſtragalus n. 402; Hall. Hiſt. v. 1. 176.)—Stem erect, unbranched, ſmooth. Leaves of about five pair of ovate, ſlightly hairy, obtuſe leaflets. Legumes oblong. Stipulas broad-ovate, reflexed.—Native of the alps of Lapland and Norway, as well as of the more lofty mountains of Auſtria and Switzerland. Differs from the laſt in being uſually of a more humble ſtature, though in its ſeparate parts much larger. The above characters ſufficiently mark the eſſential diſtinctions. The *leaflets* are an inch long, and nearly half as broad, ſmooth above. *Stipulas* very large and broad, fringed, or hairy. *Flowers* cream-coloured, drooping. *Legumes* pendulous, ſomewhat boat-ſhaped, ſlightly hairy, narrower, and ſcarcely longer than the former.

The *ſtem* in our two Lapland ſpecimens appears to have been two feet high, and the *flowers* are much more numerous than in thoſe from Auſtria and Switzerland, whoſe utmoſt height is ten or twelve inches. Hence the plants look very different, and that difference gave riſe to the obſervation in the *Fl. Lapponica*; but we ſubmit to the opinion of thoſe who conſider them as one and the ſame. We agree moreover with Willdenow, that the *leaves* are incorrectly ſhaped in *Fl. Dan.* The *flowers* alſo are too yellow. Haller miſapplies Tilli's t. 14. f. 2. to this ſpecies.

5. Ph. *auſtralis.* Cloven-winged Baſtard-Vetch. Linn. Mant. 103. Willd. n. 6. Ait. n. 3. Jacq. Miſc. v. 2. 43. t. 3. (Ph. Halleri; Villars Dauph. v. 3. 473. t. 41. Aſtragalus n. 403; Hall. Hiſt. v. 1. 176. Aſtragaloides alpina ſupina glabra, foliis acutioribus; Till. Piſ. 19. t. 14. f. 1.)—Stems decumbent, branched. Leaves of about eight pair of elliptic-lanceolate leaflets, ſmooth above; the odd one nearly ſeſſile. Wings of the corolla cloven at the extremity.—Native of the alps of Switzerland, Dauphiny, and Auſtria. The *ſtems* are ſeveral, more or leſs decumbent, branched, from three to twelve inches long, generally almoſt entirely ſmooth. *Leaflets* clothed beneath only with cloſe-preſſed minute hairs; the terminal one uſually on the ſame kind of ſhort ſtalk as the reſt, without any elongation of the common ſtalk. *Flowers* white, with purple-tipped keel, their wings remarkable for being deeply cloven at the ſummit. *Legumes* pendulous, oblong, ſmooth, as is even the *germen*.

6. Ph. *Gerardi.* Trailing Baſtard-Vetch. Villars Dauph. v. 3. 474. (Phaca; Ger. Gallopr. 519?)—Stems decumbent, branched. Leaves of about ten pair of elliptical leaflets, hairy on both ſides. Wings of the corolla linear, entire. Germen hairy.—Native of the alps of Dauphiny and Switzerland. This is certainly eſſentially different from the laſt, in its entire *wings*. The *ſtems*, as well as both ſides of the *leaves*, are hairy; *leaflets* more elliptical, and rather more numerous; the odd one attended by an elongation of the common ſtalk. *Flowers* white; their *ſtalks*, *calyx*, and eſpecially *germen*, clothed with black hairs. *Wings* certainly entire. Villars ſays the *legume* is a little hairy.

A ſpecimen of Mr. Chamier's plant, obtained from Kew garden in 1781, has the young *leaves* very hairy on both ſides, and the *calyx* alſo black, woolly, and hairy. But its ſmooth *germen* and cloven *wings* prove it the true *Ph. auſtralis.* We cannot decide poſitively concerning Gerard's plant, as he unluckily ſays nothing about the *wings*.

7. Ph. *arenaria.* Sand Baſtard-Vetch. Willd. n. 7. Ait. n. 4. Pallas Reiſe v. 3. append. n. 116. t. C, c. f. 1, 2.—Stems aſcending, ſmooth, nearly ſimple. Leaves of about five pair of lanceolate ſmoothiſh leaflets; the odd one nearly ſeſſile. Legumes globular, erect.—Native of ſandy ground in Siberia, about the Uda, flowering in May. The form and poſition of the *legumes* diſtinguiſh this from the two laſt, to which it ſeems otherwiſe nearly akin. We have ſeen no ſpecimen.

8. Ph. *halicacaba.* Reticulated Bladder Baſtard-Vetch. Willd. n. 8.—"Stems procumbent. Leaves of about five pair of oblong, acute, hoary leaflets; the odd one nearly ſeſſile. Calyx inflated, ovate, reticulated, hairy."—Native of Galatia. *Stems* ſeveral, ſhort. *Leaflets* clothed on both ſides with ſhaggy hoary hairs. *Cluſters* axillary, ſtalked, of from three to five yellow *flowers*. *Calyx* ovate, inflated, as big as a gooſeberry. Like *Ph. incana* hereafter deſcribed, but cauleſcent, with ſmaller *leaflets*, and larger *calyx* and bracteas. *Willd.*

9. Ph. *denſifolia.* Crowded-leaved Baſtard-Vetch.—Stem decumbent, branched, ſmooth. Leaflets numerous, crowded, obovate, emarginate, villous beneath. Calyx woolly. Legume turgid, ovate, nearly ſmooth.—Gathered by Mr. Menzies in California. The habit and ſize of this curious nondeſcript ſpecies ſomewhat approach to the two firſt, but the decumbent mode of growth diſtinguiſhes it from them. The copious *leaves*, about three inches long including their ſtalk, and their crowded, emarginate, folded *leaflets*, conſiſting of from 16 to 20 pair, woolly underneath, are altogether peculiar. The *ſtipulas* are very broad, ovate, concave, ſmooth except the point. *Flower-ſtalks* axillary, thrice as long as the leaves, each bearing an oblong denſe *cluſter*, of reddiſh drooping *flowers*. The *legume* is not unlike that of a *Colutea*, an inch and a half long, ovate, pointed, turgid, poliſhed, with a few minute hairs near the point.

10. Ph. *veſicaria.* Smooth Bladder Baſtard-Vetch. Linn. Mant. 103. Willd. n. 10. Vahl Symb. v. 1. 57. Schreb. Dec. 5. t. 3. (Aſtragaloides orientalis veſicaria, foliis et fructibus glabris; Tourn. Cor. 27.)—Stem none. Calyx of the fruit inflated, ſmooth. Leaflets lanceolate, nearly naked, acute.—Gathered by Tournefort in Armenia. Schreber ſent a ſpecimen to Linnæus. *Root* woody and perennial. *Stem* none. *Leaves* ſeveral, of numerous pairs of narrow acute *leaflets*, quite ſmooth above, but their under ſide bears a few cloſe-preſſed hairs. *Flower-ſtalk* ſolitary, radical, bearing an erect lax *cluſter*, or *ſpike*, three or four inches long, of large handſome *flowers*, whoſe tubular downy *calyx*, after flowering, becomes inflated, nearly globoſe, finely reticulated, quite ſmooth, and tinged with purple. The *legume* within is ſmall and oblong.

11. Ph. *incana.* Hoary Bladder Baſtard-Vetch. Vahl Symb. v. 1. 57. Willd. n. 11. (Aſtragalus anthylloides; Lamarck Dict. v. 1. 320. Aſtragaloides orientalis veſicaria, foliis et fructibus incanis; Tourn. Cor. 27.)—Stem none. Calyx of the fruit inflated, villous. Leaflets ovate, ſilky, obtuſe.—Gathered by Tournefort in Armenia. Habit of the laſt. *Leaves* of about 20 pair of ovate, obtuſe, ſometimes emarginate *leaflets*, hoary on both ſides with ſilky hairs. *Stalks* hoary, taller than the leaves. *Flowers* yellow. *Calyx* ovate, inflated, at length globoſe, coloured, clothed with very ſoft down. An elegant ſpecies, which we have ſeen in Tournefort's herbarium, evidently akin to the laſt, but abundantly diſtinct.

In the *Supplementum* of Linnæus we find *Ph. ſibirica*, *proſtrata*, *microphylla* and *muricata*, the three latter of which are in the Linnæan herbarium. The deſcriptions of Pallas induced the younger Linnæus to refer theſe plants to *Phaca*; but Pallas himſelf afterwards removed them to *Aſtragalus*, where they ſtand in the early part of Willdenow's fifth ſection, with others in the ſame predicament; Willd. Sp. Pl. v. 3. 1298—1301. Their habit certainly accords with other *Aſtragali*. As to the character of the *legume*, it muſt be confeſſed to be very obſcure and uncertain, in almoſt every caſe.

Ph. trifoliata, Linn. Mant. 270. Willd. n. 9, alone remains to be noticed. Of this a ſpecimen from China is in the Linnæan herbarium, nor could any perſon ſurely have gueſſed at the plant without ſeeing the ſpecimen. Its habit is that of a three-leaved *Hedyſarum*, but the inflated ſemiorbicular *legumes* cannot accord with that genus. Theſe *legumes* however are deſcribed on the ſpecimen as unilocular, which they truly are; ſo that the plant has no more of the character than the habit of a *Phaca*, in which genus it can by no means remain. Having no *flowers*, we can determine nothing certain, but according to the Linnæan ideas of *Glycine*, it might be removed to that genus. In many points it accords with the new genus *Flemingia*, Ait. Hort. Kew. v. 4. 349, but the ſeeds are four or five, inſtead of being two only.

The *ſtem* is ſlender, branched, partly downy. *Leaves* ternate, very unequal in ſize; *leaflets* obovate, entire, an inch long at moſt; minutely hairy on both ſides; finely reticulated with veins beneath. *Footſtalks* ſhort, hairy. *Stipulas* half-ovate, ribbed, chaffy, hairy, taper-pointed, deciduous. *Cluſter* terminal, of about 20 flowers, in pairs, on downy glandular ſtalks. *Legumes* half an inch long, tranſverſely veiny, nearly ſmooth.

PHACELIA, a genus of Juſſieu's, to which he applied this name, in alluſion "to the cluſtered ſpikes, from φακελος, *a bundle;*" the figures of both ſpecies nevertheleſs have racemoſe flowers. Juſſ. Gen. 129. Michaux Boreal-Amer. v. 1. 134.—Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Aſperifoliæ*, Linn. *Borragineæ*, Juſſ.

Juſſieu gives the following character.—"Calyx in five deep ſegments. Corolla nearly bell-ſhaped, five-cleft, with five furrows at the baſe internally, whoſe membranous margins embrace the bottom of the filaments. Stamens prominent. Style ſhort. Stigmas two, long. Capſule of two cells, four ſeeds, and two valves each with a partition from its middle, and containing one ſeed in each half cell. The herb is downy; with alternate pinnate leaves. Flowers turned one way, in upright, faſciculated, terminal ſpikes. From an old ſpecimen."—Michaux extracts a part of the above character only, without any alteration or addition. His plate repreſents a very long capillary ſtyle.

1. Ph. *pinnatifida*. Mich. n. 1. t. 16.—"Erect. Leaves pinnatifid; their ſegments cut and lobed. Spikes moſtly cloven, oblong, many-flowered. Corolla blue; its lobes with a nearly ſimple margin."—Native of the weſtern woods of the Allegany and Kentucky mountains. The *ſtem* is round, alternately branched. *Leaves* alternate, ſtalked, deeply pinnatifid, or pinnate, with oppoſite, pinnatifid or cut, ſegments, apparently ſmooth. *Cluſters* terminal, ſolitary, downy, of about ſeven *flowers* turned one way, on partial ſtalks half an inch long. *Fruit* globoſe, crowned with the permanent ſtyle.

2. Ph. *fimbriata*. Mich. n. 2. (Heliotropium pumilum glabrum, naſturtii foliis, americanum; Pluk. Phyt. t. 245. f. 5.)—"Procumbent, ſomewhat aſcending. Leaves pinnatifid; their ſegments undivided. Spike ſolitary, ſhort. Corolla white; its lobes fringed."—Native of lofty mountains in Carolina.

Such is Michaux's account. His latter ſpecies however ſhould ſeem, by the ſynonym, to be no other than *Elliſia Nyctelæa*. The figure cited proves on examination to be the original from whence Moriſon copied his ſect. 11. t. 28. f. 3, which is certainly the ELLISIA; ſee that article. Probably therefore the *Phacelia bipinnatifida* may prove a new ſpecies of *Elliſia;* for moſt aſſuredly nothing is ſaid of it that gives any room to ſuppoſe it a diſtinct genus.

PHACOIDES, a word uſed by the ancient phyſicians to expreſs any thing that in ſize and ſhape approached to a lentil. Thus the cryſtalline humour of the eye was ſo called.

PHACOPTISANA, a medicine often mentioned by the ancient writers as a nouriſhing and ſtrengthening thing: it was a ptiſan with lentils.

PHACO'SIS, from φακη, *a lentil*, a black ſpot in the eye, reſembling a lentil.

PHÆCASIA, in *Antiquity*, a kind of ſhoes.

PHÆDO, in *Biography*, a Greek philoſopher, founder of the ELIAC *ſchool*, to which article we refer our readers for particulars relating to him.

PHÆDRUS, well known for his fables, was a native of Thrace, and probably brought to Rome at an early age, in the condition of a ſlave. He came into the ſervice of the emperor Auguſtus, by whom he was enfranchiſed, as appears from the title prefixed to his work of "Auguſti Libertus." Of his life nothing more is known, except that in the reign of Tiberius he was a ſufferer under the injuſtice and tyranny of Sejanus, whom he ſurvived. It is probable he lived to an advanced age. He was author of five books of fables, compoſed in Iambic verſe. They are valuable for their preciſion, purity, elegance, and ſimplicity. The matter of theſe fables is generally borrowed from Æſop, but Phædrus intermixes ſtories or hiſtory-pieces of his own. This work appears to have been little known in his own time, for no extant writer of antiquity alludes to it. This circumſtance, together with the aſſertion of Seneca, "that the Romans had not attempted Fables and Æſopean compoſitions," might throw a ſuſpicion on the genuineneſs of the work, did not its ſtyle and manner refer it to the beſt age of Roman literature. It remained unknown to the moderns till 1595 or 1596, when Francis Pithou diſcovered a copy in the library of St. Remi at Rheims, and ſent it to his brother Peter, who publiſhed it. Two manuſcripts of Phædrus are ſaid to exiſt, both of which are not only imperfect, but being tranſcribed from the ſame copy very careleſsly, they are full of errors; hence few ancient works have given more trouble and room for conjecture to critics. The beſt editions of Phædrus are thoſe of Burmann 4to. 1727; Hoogſtraten 4to. 1701; and Barbou 12mo. Paris 1754.

PHÆNIX, the name of an ancient muſical inſtrument, which, according to Muſonius, was uſed by the king of Thrace in the national feſtivals: its invention is attributed by ſome authors to the Phœnicians, probably from the analogy between the two names.

PHÆNOGAMOUS PLANTS, in *Botany*, from φαινω, *to ſhew*, or *make apparent*, and γαμος, *marriage;* a term invented, if we miſtake not, by the German botaniſts, for ſuch vegetables as have the parts of the flower, or organs of impregnation, evident and intelligible, like the generality of plants. The term therefore is oppoſed to Cryptogamous Plants. See CRYPTOGAMIA.

PHÆNOMENON, or PHENOMENON, φαινομενον, formed from φαινομαι, *I appear*, ſtrictly an appearance in phyſics, an extraordinary appearance in the heavens, or on earth; either diſcovered by obſervation of the celeſtial bodies, or by phyſical experiments; and whoſe cauſe is not obvious. Such are meteors, comets, uncommon appearance of ſtars and planets, earthquakes, &c. Such alſo are the effects of the magnet, phoſphorus, &c.

The phenomena of comets are inconſiſtent not only with the ſolidity of the heavens, ſuppoſed in the Ptolemaic hypotheſis, but equally with the plenitude of the heavens, aſſerted by the Carteſians.

That hypotheſis is beſt which ſolves moſt phenomena. Sir Iſaac Newton ſhews, that all the phenomena of the heavenly bodies follow from the attraction of gravity, which intercedes thoſe bodies; and almoſt all the phenomena of the leſſer bodies from the attraction and repulſion between their particles; ſo ſimple is nature.

PHÆNOMENON, *Parallax of a.* See PARALLAX.

PHÆOPUS, in *Ornithology*, a ſpecies of *Scolopax;* which ſee.

PHAËTHUSA, in *Botany*, ſo called by Gærtner, from φαω, *to ſhine*, in alluſion to the great ſize of the plant, its very abundant yellow flowers, and conſequently ſtriking appearance. The name is borrowed from heathen mythology; the nymph who bore it having been one of the ſiſters of Phaëton. Gærtn. v. 2. 425. t. 169. f. 3. Schreb. 571.

Willd. Sp. Pl. v. 3. 2221. Mart. Mill. Dict. v. 3. Lamarck Illuſtr. t. 689.—Claſs and order, *Polygamia ſuperflua*. Nat. Ord. *Compoſitæ oppoſitifoliæ*, Linn. *Corymbiferæ*, Juſſ.

Gærtner founded this ſuppoſed new genus on the *Siegeſbeckia occidentalis* of Linnæus, under the following eſſential character.

Calyx nearly cylindrical, of many imbricated unequal leaves, recurved at their tips. Receptacle chaffy. Perfect florets ſeveral in the diſk; female one or two, ovate-oblong, cloven at the point, in the radius; all fertile. Seeds hiſpid, without ſeed-down.

Michaux, finding that the plant in queſtion had awns to the ſeed, referred it to *Verbeſina*, and concluded the *Phaëthuſa* of Gærtner to be ſomething elſe. But it appears to us, from examining original ſpecimens of Linnæus and Gronovius, which leave no doubt of what they intended, that Gærtner's plant is preciſely their's, and that either he has made a miſtake, in overlooking the two very conſpicuous rough briſtly awns which crown the germen and ſeed, or that ſuch may occaſionally be wanting. In either caſe his *Phaëthuſa* cannot be maintained; for no perſon ſurely would inſiſt on the ſmall number of radiant florets. Michaux ſeems right in referring this plant to *Verbeſina*, in which he is followed by Willdenow and Aiton. The younger Linnæus judged it, by the ſeeds, to be a *Coreopſis*, but it wants ſeveral characters, as well as the habit, of that genus. See Verbesina.

PHÆTON, in *Ornithology*, the Tropic bird, a genus of birds of the order Anſeres. The generic character is, bill ſharp-edged, ſtraight, pointed, the gape of the mouth reaching beyond; noſtrils oblong; hind toe turned forwards. Of this genus there are three ſpecies; they inhabit the South-ſea, particularly between the tropics, and are often ſeen upon the backs of porpoiſes. In all of them the bill is compreſſed, and bent a little downwards, the lower mandible angulated. The feet have four toes, which are palmated. The tail is cuneiform, and diſtinguiſhed by the great length of the two intermediate feathers.

Species.

Æthereus; common Tropic bird. White; back, rump, and leſſer wing-coverts ſtreaked with white; the two middle tail-feathers black at the baſe; bill red. It is about 34 inches long, and is the ſize of a wigeon. It flies very high, and at a great diſtance from land; feeds on young ſharks, dolphins, and albicores. On land, where it is rarely ſeen, except in the breeding ſeaſon, it ſits on trees, and builds on the ground, in woods. It is well known to moſt of our navigators, to whom it generally announces their approach to the tropic, though this indication cannot be relied on as infallible, as the ſpecies will wander to the latitude of 47½°. There are two varieties; 1. White; band over the eyes, ſcapulars towards the extremity, band above the wings, and ſhafts of the tail-feathers at the origin, black; 2. Body pale and tawny.

Melanorhynchos; Black-billed Tropic bird. Streaked black and white, beneath white; bill black; quill-feathers tipt with white, tail-feathers with black. It is found in Palmerſton and the Turtle iſlands, and is nearly 20 inches long. There is a fine black ſtreak before and behind the eyes; the front is white.

Phœnicurus; Red-tailed Tropic bird. Roſy fleſh-colour; bill and two middle tail-feathers red. It is found in Mauritius iſland, is 34 inches long, of which the two middle tail-feathers meaſure 21 inches; it builds in hollows in the ground under trees, and lays two yellowiſh-white eggs with rufous ſpots.

PHÆUS, in *Zoology*, a ſpecies of *Mus*; which ſee.

PHAGEDÆNA, from φαγω, *to eat*, a term in *Surgery*, applied to an ulcer, when it preſents an unhealthy appearance, and ſpreads, as it were, by eating the parts away, common remedies not having the power of curing the diſeaſe.

PHAGEDÆNIC Medicines, ſuch as are uſed to eat off fungous or proud fleſh.

Phagedænic *Ulcer*. See Phagedæna, and Ulcer.

The Ephemerides of the academy of the Curioſi Naturæ relate, that phagedænic ulcers have been frequently cured only with ſheep's dung.

Phagedænic *Water*, in *Chemiſtry*, denotes a water made from quick-lime and ſublimate; ſo called from its efficacy in the cure of phagedænic ulcers.

To prepare this water, they put two pounds of freſh quick-lime in a large earthen pan, and pour upon it about ten pounds of rain-water; theſe they let ſtand together two days, ſtirring them frequently: at laſt leaving the lime to ſettle well, they pour off the water by inclination, filtrate it, and put it up in a glaſs bottle, adding to it an ounce of corroſive ſublimate in powder; which, of white, becomes yellow, and ſinks to the bottom of the veſſel. The water, being ſettled, is fit for uſe, in the cleanſing of wounds and ulcers, and to eat off ſuperfluous fleſh, and eſpecially in gangrenes; in which caſe may be added to it a third or fourth part of ſpirit of wine.

PHAGESIA, φαγησια, in *Antiquity*, a feſtival in honour of Bacchus, celebrated during the Dionyſia.

It was otherwiſe called *phageſipoſia*, φαγησιποσια; which names come from φαγειν, *to eat*, and πινειν, *to drink*; becauſe it was a time of good cheer.

PHAGON, φαγων, a feſtival of the ſame nature with that called Phageſia.

PHAGRUS, or Pagrus, in *Ichthyology*. See Sparus.

PHAGUS, in *Botany*, a name given by many authors to the eſculus, or ſweet and eſculent oak, found in Greece and Dalmatia.

PHAIUS, ſo called by Loureiro, Cochinch. 529, from φαιος, *brown*, is evidently, by his deſcription, the beautiful *Limodorum Tankervilliæ*, cultivated in the gardens of China and Cochinchina, for the ſake of its flowers, the upper ſurface of whoſe petals is of a brown hue, very unuſual in thoſe parts of a flower.

PHALACRA, a word uſed by Hippocrates to expreſs all the blunt inſtruments uſed in ſurgery; ſuch as probes and others, with buttons at the ends.

PHALACROCEPHALUS Indicus, in *Ichthyology*, the name of an anadromous fiſh of the Eaſt Indies. Its neck and head appear naked and bald, as it were; it is all over of a greyiſh-white in colour, and is variegated with red ſpots about the mouth; the eyes are large and very prominent, and their iriſes yellow; its uſual ſize is about a foot and a half in length, and it lives part of its time in the ſea, and part in rivers; it is an extremely delicate taſted fiſh, and eſteemed one of the fineſt of that part of the world. It is called by the Dutch *kaelkop*.

PHALACROCOROX, in *Ornithology*. See Pelecanus *Carbo*.

PHALÆNA, *the Moth*, in *Entomology*, a genus of inſects of the order Lepidoptera, whoſe generic character is: Antennæ ſetaceous, and gradually tapering from the baſe to the tip; the tongue is ſpiral; it has no jaws, and the wings, when at reſt, are generally deflected: the flight is nocturnal. There are more than 1500 ſpecies, divided into ſections, which are ſubdivided into ſtill ſmaller aſſortments.

In our enumeration of the ſpecies, we ſhall wholly paſs over thoſe which are the leaſt intereſting to ſcientific readers. Moths fly abroad only in the evening, and during the night, and obtain their food from the nectar of flowers. The larva is active and quick in motion, moſtly ſmooth, more or leſs cylindrical, and it preys voraciouſly on the leaves of plants. The pupa is torpid or quieſcent, more or leſs cylindrical, pointed at the tip or at both ends; and is generally incloſed in a follicle. The following are the diviſions of the moth tribe, according to the Linnæan ſyſtem, which we ſhall follow.

Bombyx. Antennæ filiform; two feelers, which are compreſſed and reflected; tongue ſhort, membranaceous, obtuſe, and bifid; the larva is ſixteen-footed, often hairy; the pupa is pointed at the tip.

Subdiviſions.
a. Wings expanded.
b. —— reverſed.
c —— deflected.
d. —— incumbent.
e. —— convolute.

It ſhould be obſerved that Dr. Shaw and others have divided the ſection Bombyx into two ſections, *viz.* Attaci; and Bombyces properly ſo called. The reader will therefore bear in mind that the Linnæan Bombyces include the Attaci of other naturaliſts.

Geometra. Antennæ filiform; ſeelers cylindrical; tongue projected, membranaceous, ſetaceous, bifid; the larva is from eight to ten-footed, ſix of which are pectoral, two caudal, and ſometimes two ſubcaudal; the pupa is pointed at the tip.

Subdiviſions.
a. Antennæ pectinate.
b. ——— ſetaceous.
c. Wings forked.

Noctua. Antennæ ſetaceous; feelers compreſſed, hairy, the tip cylindrical and naked; tongue projecting, horny, ſetaceous, bifid; larva ſixteen-footed; pupa pointed at the tip.

Subdiviſions.
a. Wings expanded.
b. —— flat incumbent, thorax ſmooth.
c. ————————, ——— creſted.
d. —— deflected, thorax ſmooth.
e. ————————, ——— creſted.

Hyblea. Antennæ ſetaceous; feelers projecting, compreſſed, dilated in the middle; the lip is projecting and acute.

Hepialus. Antennæ moniliform; feelers two, reflected, hairy, between which is the rudiment of a bifid tongue; the larva is ſixteen-footed, feeding on the roots of plants; the pupa is folliculate, cylindrical, and pointed at the tip.

Cossus. Antennæ ſhort, filiform; two feelers, very ſhort, cylindrical, reflected.

Pyralis. Antennæ filiform; the inſects of this diviſion have likewiſe two feelers, which are equal and almoſt naked; they are cylindrical at the baſe, the middle is dilated into an oval, and ſubulate at the tip; the tongue is projected, ſetaceous, and bifid; the wings are very obtuſe, and ſlightly curved at the exterior margin; the larva is ſixteen-footed, and rolling up the leaves to which it attaches itſelf.

Tinea. Antennæ ſetaceous; four feelers, which are unequal; the larva is found in houſes among linen and woollen cloths, and furniture, in which it eats holes, and to which it is very deſtructive.

Alucita. Antennæ ſetaceous; two feelers, that are divided as far as the middle; the inner diviſion is very acute.

Pterophorus. Antennæ ſetaceous; two feelers, that are linear and naked; the tongue is exſerted, membranaceous, and bifid; the wings are fan-ſhaped, divided down to the baſe, and generally ſubdivided as far as the middle; the larva is ſixteen-footed, ovate and hairy; the pupa is naked, and ſubulate at the tip.

The foregoing diviſions, like thoſe of the genus Papilio, are not ſtrictly accurate, and therefore muſt be regarded with a proper degree of allowance.

Bombyx.

a. *Wings expanded.*

Species.

Atlas. This is the largeſt and moſt ſplendid of the Phalænæ known: the ſpecific character is; wings falcate, varied with yellow, white, and ferruginous, with a tranſparent ſpot on each; that on the upper pair with a contiguous ſmaller one. The extent of the wings of this inſect meaſures between eight and nine inches; the ground colour is a very fine deep orange-brown, and in the middle of each wing is a large ſub-triangular tranſparent ſpot or patch, reſembling the appearance of a piece of Muſcovy talc; each of theſe tranſparent parts is ſucceeded by a black border, and acroſs all the wings run lighter and darker bars, exhibiting a very fine aſſortment of varying ſhades; the upper wings are ſlightly curved downwards at their tips, in a falcated manner, and the lower wings are edged with a border of black ſpots, on a pale buff-coloured ground; the antennæ are widely pectinated, with a quadruple ſeries of fibres, exhibiting a highly elegant appearance. This inſect is found in America and the Eaſt Indies, and varies in ſize and colours. The larva is verticillate, with hairy tubercles, and it ſpins a web of ſtrong yellowiſh ſilk, that is difficult to be untwiſted.

Hesperus. Wings falcate, varied with white and yellow, and ferruginous, with an ovate tranſparent ſpot on each; the lower ones are rounded. This is an American inſect, as are the next two.

Aurotus. Wings falcate, both ſurfaces alike, yellowiſh, with a whitiſh band and tranſparent lunule on the diſk. A ſpecimen is in the muſeum of Dr. Hunter.

Cecropia. Wings grey, with a fulvous band; upper pair with a ſub-hyaline ferruginous eye.

Irius. Wings pale orange; upper pair with a tranſparent ſpot; lower ones with a black eye, the pupil is tranſparent. This and the next are Indian inſects, and with many other ſpecies of this genus, ſpecimens are preſerved in the muſeum of Mr. Francillon.

Saturnus. Wings grey, with a tranſparent ſpot; the lower ones have a black eye; the pupil being half cloſed.

Paphia. Wings falcate, both ſurfaces alike, yellow, with rufous ſtreaks and a tranſparent eye. Found in many parts of Aſia.

Polyphemus. Wings falcate, yellowiſh-grey, with a central, ocellate, tranſparent eye on each; that on the lower pair is large and blueiſh. The larva of this inſect is green, and the pupa yellowiſh-brown.

Dione. Wings yellow, with two ſtreaks, the anterior of which is interrupted and of a fleſh colour, with a tranſparent eye. It inhabits Guinea.

Cytherea. Wings grey, with cinereous ſtreaks and a tranſparent eye. Found at the Cape of Good Hope.

Mylitta. Wings falcate, yellow, with a ferruginous ſtreak and divided tranſparent eye. It is found in different parts of India.

PROMETHEA. The wings of this ſpecies are ſlightly falcate, edged with grey, the upper pair is marked with a black eye on each ſide. The larva is of a green colour, dotted with black, with four red ſpines.

ERYTHRINÆ. Wings browniſh, with a waved pale ſtreak. The larva is yellowiſh, with black ſpiracles, and four black ſpines on the collar, and two near the tail.

CONSPICILLATOR. The wings of this are falcate, the upper pair brown, with a paler ſigmoid ſtreak; the lower ones are black, with a large red eye. This is a native of Amboina; a ſpecimen is in the Britiſh Muſeum.

JANUS. Upper wings variegated, with a black eye beneath; lower ones red, with a black eye. It is found in Surinam.

CERTHIA. Wings rounded, brown, the tip cinereous, with white and brown waves. Found at Chuſan.

MEGÆRA. Upper wings blue, ſpotted with white; lower ones white in the middle, the tip blue, with yellow waves. Found in North America.

HIPPODAMIA. Wings ſlightly falcate, brown, with a paler margin, in which is an uninterrupted white ſtreak on the upper pair. It inhabits Surinam.

NICTITANS. Wings brown, fleſh-colour; lower pair with a ferruginous eye, the pupil tranſparent. It inhabits Africa, as do the three following.

SEMIRAMIS. The wings of this ſpecies have very long tails of various colours, with a tranſparent dot on each.

BOREAS. Wings tailed, cinereous, varied with brown; upper pair with two, the lower ones with a ſingle tranſparent dot.

LUNA. Wings tailed, both ſurfaces alike, pea-green, with a tranſparent lunule eye on each ſide. This is a large and extremely beautiful inſect; its colour is a moſt elegant pea-green, with a ſmall yellowiſh eye-ſhaped ſpot, with a tranſparent centre in the middle of each wing, and the lower wings are produced at the bottom into a long and broad tail, or continuation; the ridge of the upper wings is broad, and of a fine purple-brown colour; the head and thorax are of a yellowiſh-white, and the body milk-white.

EPIMETHEA. Wings tailed, browniſh, with a white ſtreak; the lower ones have a fulvous eye on the diſk. This is a native of Guinea.

ARGUS. Wings tailed, of a pale ferruginous colour, with numerous tranſparent ocellar dots; the tail is very long. Found in Africa.

FENESTRA. Both ſurfaces of the wings alike, yellow, with two tranſparent ſpots on the upper pair, and one on the lower. This and the next are natives of India.

PENELOPE. Wings yellowiſh, ſpeckled with brown; they have a tranſparent central eye on each.

TYRRHEA. Wings grey, with white ſtreaks, and a central black eye; the pupil is tranſparent. It inhabits the Cape of Good Hope.

PERSPICUA. Wings brown; upper pair with a ſhort tranſparent band. A native of India.

ARMIDA. Wings yellow, with violet ſpecks, ſpecks and ſtreak behind Found at Cayenne.

MILITARIS. Both ſurfaces of the wings alike; yellow, with violet tip and ſpots; the upper pair is ſpotted outwardly with white. Found in China, and other parts of Aſia.

CASTALIA. Wings rounded, white; upper pair with an eye; lower ones with a brown dot. This inhabits New Holland.

* PAVONIA. Wings rounded, and clouded with grey, and barred with grey beneath; each of them has a nictitant ſemitranſparent eye. In ſome books this is called the P. junonia: it is found in various parts of Europe; it meaſures nearly ſix inches in extent of wings, and is varied by a moſt beautiful aſſortment of colours, conſiſting of different ſhades of deep and light grey, black, brown, &c.; on the middle of each wing is an eye-ſhaped ſpot, having the diſk black, ſhaded on one ſide with blue; ſurrounded with red-brown, and the whole included by a circle of black: laſtly, all the wings are bordered by a deep edging of very pale brown, with a whiter line immediately adjoining to the darker part of the wing; the antennæ are finely pectinated; the larva, which feeds on the apple, pear, &c. is not much leſs beautiful than the perfect inſect; it is of a fine yellowiſh-green colour, with each ſegment of the body ornamented by a row of upright prominences of a bright blue colour, with black radiated edges, and ſurrounded by long black filaments, each of which terminates in a clavated tip. This larva, when ready for its change, envelops itſelf in an oval web, with a pointed extremity, and transforms itſelf into a large ſhort chryſalis, out of which, in due time, emerges the moth. This is finely figured in Dr. Shaw's General Zoology, vol. vi.

ACHELOUS. Wings ferruginous; all of them with a white band, and the upper pair with a white dot. A native of America.

ARGULATA. Wings ſcalloped, indented; the lower ones are truncated, and very obtuſe. A native of Surinam, as is the next alſo.

LIBERIA. Upper wings cinereous or reddiſh, with dark ſpots and ſtreaks, lower ones fulvous, with a black eye.

* TAU. Wings of a brick colour, adorned with an eye of a violet colour, having a white ſpear-ſhaped pupil. It is found in many parts of Europe, as well as in this country. It feeds on the birch. The larva is green, marked on the ſides with oblique white ſtreaks; the back is covered with knots. The pupa is light brown and hairy.

JO. Wings yellow; upper pair with a black eye beneath; lower ones with one above; the pupil is white. It is a native of America.

ABAS. Wings brown; lower ones cinereous, with a rufous eye. This and the next are natives of Surinam.

SALMONEA. Upper wings brown, with a black ſtreak; lower ones rufous, with a black eye, in which is a white lunule.

PROSERPINA. Wings rounded, black, with a white band, in which is a ſubocellar black ſpot. A native of America.

b. *Wings reverſed.*

POPULIFOLIA. Wings teſtaceous, indented, with numerous brown lunules. It is a native of Europe, and found on the white poplar.

* QUERCIFOLIA. Wings indented, ferruginous; mouth and ſhanks black. This is found in our own country on graſs, the ſlow, the pear, apple, and willow trees. The larva is hairy, of a ruſty colour, with a blue neck, and furniſhed with a ſlight tail. The pupa is brown, and marked with red bands.

* ILICIFOLIA. Wings half covered, ſerrate, grey; the hind margin is dotted with white.

PROMULA. Wings ſlightly indented, brown, immaculate; abdomen cheſnut-brown. It inhabits Java.

CASSANDRA. Wings ferruginous, with darker ſtreaks; thorax cheſnut-brown on the fore part.

CAPENSIS. Wings pale red; upper pair with two flexuous ſtreaks, the poſterior of which is joined to a black one. It inhabits Africa.

Orientalis. Wings teſtaceous, with three ferruginous ſtreaks, beneath a ſingle one. This is an Eaſt Indian inſect.

Aluco. Wings brown, cinereous at the tip. It inhabits the Cape of Good Hope.

Australasiæ. Wings orange-red ; lower ones beneath ferruginous at the baſe. This is a native of New Holland.

Quadricincta. Wings cheſnut-brown, with four pale ſtreaks. It inhabits the Eaſt Indies.

* Fagi. Wings reddiſh-cinereous, with two linear, flexuous, yellow bands.

* Trifolii. Wings ferruginous ; upper pair with a pale ſtreak and white dot ; the lower ones are immaculate.

* Quercus. Wings dark brown, with a yellow band ; the upper pair with a central white dot. This is figured and deſcribed by Mr. Donovan.

Stigma. Wings teſtaceous, ſpeckled with brown, and with a central ſnowy dot. Found in America.

Lusca. Wings ferruginous ; upper pair with a black ſpot in the middle. A native of Coromandel.

* Pruni. Wings indented, yellow, with two brown ſtreaks, and a white dot. This is found on the plum. The larva is ſmooth, and of an aſh-colour ; it is marked with blue lines, and furniſhed with tufts of hair on the neck, and along the ſides ; the hind legs are ſtretched out at a diſtance from one another. The pupa is black on the fore part of the body, and of a light brown behind.

Amphimone. Wings entire, pale aſh, with a black ſtreak ; the upper pair with a fulvous dot in the middle. It is a native of Terra del Fuego.

* Potatoria. Wings ſlightly indented, yellow-brown, with an oblique fulvous line, and two white dots, in the upper pair. The larva is tailed, creſted, hairy, dark brown, ſpeckled with white ; the pupa is folliculate, dark brown ; the eggs are oblong, and of a lead colour, with a green ring at each end, and a dot in the middle.

Occulatissima. Wings white, with numerous black ocellar dots. This and the next two are natives of America.

Punctatissima. Wings and body ſnowy, dotted with white ; thorax with a black lunule on each ſide.

Pithecium. Wings clouded with brown, a palmate ſpot on the diſk, acute-angled at the baſe.

Hibisci. Both ſurfaces of the wings alike, yellow, with two brown ſtreaks on the upper, and one on the lower pair. A native of India.

Cynora. Wings yellow, with two brown ſtreaks, and three connected brown rings on the upper pair. Found in Surinam.

Opercularis. Wings yellow ; the anterior margin and diſk brown, with numerous whitiſh lines. This and the next are natives of America.

Pyxidefera. Wings yellow ; the diſk with numerous brown and black flexuous patches.

* Pini. Wings grey, ſpeckled with brown, with a ferruginous band and baſe, and triangular white dot. This is figured and deſcribed by Mr. Donovan.

Velleda. Wings black, with white nerves ; the margin with four white ſtreaks.

* Dumeti. Wings brown ; upper pair with a yellow dot, band, and hind margin.

* Versicolora. Upper wings grey, varied with brown and tranſverſe black and white lines ; the lower ones are ferruginous.

* Rubi. Wings fawn-coloured, marked with two whitiſh ſtreaks on their upper ſurface. It is found on the bramble and willow. The larva is hairy, black on the under ſide, and of a ruſty colour, marked with black rings on the upper ſide. When young, it is covered with a veil of black ſilk. The pupa is blackiſh, marked with three yellow rings, and encloſed in a covering of ſilk.

Lanigera. Wings black, with two whitiſh ſtreaks, and a ſnowy lunule in the middle.

* Vinula. Wings grey, with blackiſh waves and ſtreaks ; thorax and abdomen grey, ſpotted with brown. This is a remarkably elegant inſect, without any gaiety of colour, being a middle-ſized white moth, variegated with numerous ſmall black ſtreaks and ſpecks ; the thorax and abdomen are extremely downy, and the body is marked with tranſverſe black bars. The larva of this moth is far more brilliant in its appearance than the image or complete inſect ; it is of conſiderable ſize, meaſuring above two inches in length, and is of a moſt beautiful green, with the back of a dull purple, freckled with very numerous deeper ſtreaks in a longitudinal direction ; the purple part of the back is ſeparated from the green on the ſides by a pair of milk-white ſtripes, which, commencing from the head, run upwards to the top of the back, that part being elevated conſiderably above the reſt into a pointed proceſs ; and from thence are continued along the ſides to the tail ; the face is flat, and ſubtriangular, yellowiſh, ſurrounded, firſt by a black, and then by a red border ; and it is diſtinguiſhed by two deep black eyes or ſpots on each ſide the upper part : from the tail, which is extended into two long, roughened, ſharp-pointed, tubular proceſſes, proceed, on the leaſt irritation, two long, red, flexible tentacula, the inſect ſeeming to exert them as if for the purpoſe of terrifying its diſturbers ; lifting up the fore-part of the body, at the ſame time, in a menacing attitude, and preſenting a highly groteſque appearance. This creature poſſeſſes the power of ſuddenly ejecting from its mouth, to a conſiderable diſtance, an acrimonious reddiſh fluid, which it uſes as a farther defence, and which produces conſiderable irritation, if it happen to be thrown into the eyes of the ſpectator. It is principally ſeen on willows and poplars, and when the time of its change comes, it deſcends to the lower part of the tree, and envelops itſelf in a glutinous caſe, prepared by moiſtening with its ſaliva the woody fibres of the tree, and covering itſelf with them, attaching the edges very cloſely to the bark, and in this ſtate it remains ſecure throughout the whole winter, it being too cloſe to be affected by the froſt, and too ſtrong to be ſucceſsfully attacked by birds. The chryſalis is thick, ſhort, and black, and in the month of May or June, according to the warmth of the ſeaſon, gives birth to the moth, which, immediately on emerging from the upper part of the chryſalis, diſcharges a quantity of fluid ſufficient to ſoften effectually the walls of its priſon, and effect a ready eſcape.

* Lanestris. Wings of a ruſty colour, marked with a white ſtreak ; the upper wings are white at the baſe, and marked with a white dot. It is a native of this and other countries of Europe, and found on the lime-tree, the ſloe, and the willow. It produces eggs covered with aſh-coloured wool. The larva is hairy and black. It is gregarious, and lives in habitations which it forms for itſelf, compoſed of many cells ; going out in queſt of food, it returns through parallel holes. The pupa is of a ſulphur colour.

Rubicunda. Upper wings roſy, with a broad yellow band. It is a native of Virginia.

* Populi. Brown, the fore part pale ; wings browniſh, with a flexuous whitiſh ſtreak, and contiguous ſmaller one.

Catax. Wings ferruginous, uniform, with a white dot. Native of Europe.

Everia. Wings yellow, with a white dot, and paler at the tip. It inhabits Germany.

* Processionea. Wings cinereous-brown, with a ſingle darker ſtreak on the female, and two on the male. The larva is gregarious and hairy; and the ſkin, which it caſts off, is ſaid to produce inflammation, if touched.

Pithyocampa. Wings grey, with three darker ſtreaks; the lower ones are pale, with a brown dot near the tail. It is found in Auſtria, and ſo is the next.

Varia. Wings brown, with waved paler ſtreaks.

Mori; Silk-worm. Wings pale, with three obſolete brown ſtreaks. This is by far the moſt important of all the moths. It is a native of China or Perſia, and was introduced into Europe by Juſtinian. It varies a little in ſize and colour, the wings being ſometimes yellowiſh, and ſometimes whitiſh. The larva is furniſhed with a tail, is naked, and whitiſh. The pupa is light brown, encloſed in a thick ſilky covering, from which ſilk is manufactured. The firſt perſon who unravelled the cocoons of the ſilk-worm, and manufactured them into ſilk, was Pamphilia, a woman of Coos, the daughter of Latona. See Silk and Silk-*Worm*.

Tricolor. Upper wings ſnowy, with a ſcarlet rib, and a ſtreak of black dots; the lower ones are ſcarlet; thorax ſnowy, with red dots. It is a native of Cayenne.

Ferruginea. Wings ferruginous, immaculate. It is a native of Italy.

* Neustria. Wings pale buff-colour, with two ferruginous ſtreaks, and only one beneath.

* Castrensis. Wings duſky, with two paler bands.

Americana. Wings whitiſh, with patches of brown. A native of North America.

Franconia. Wings hyaline, whitiſh, with a pale ſtreak and black border. It is a native of Auſtria, as is the next.

Taraxaci. Wings pale, both ſurfaces alike; upper pair with a brown dot in the middle; the body is fulvous.

Ilicis. Wings dull grey, with a white band, in which is a waved grey ſtreak. It is found in the oak, in divers parts of France.

Mali. Wings cinereous, with a ſinuate darker band, in which is a black dot. A native of Germany.

Hieracii. Wings entire, ſooty black. It is found in ſome parts of Europe, on the Delphinium hieracium. The larva is hairy, black, with a red dorſal line, and ſecretes itſelf within a follicle, which it makes of dry leaves and ſtraws.

Apiformis. Wings ſooty black; body covered with ferruginous hairs. It is a ſmall inſect, and found in Italy.

c. *Wings deflected.*

Lagopus. Wings yellowiſh, with brown ſpecks and two ſtreaks; the fore legs are projecting, and very hairy. It is a native of China.

Imperatoria. Wings yellow, ſpotted with brown, all of them with a ſubocellar ferruginous ſpot. It is a native of India.

Senatoria. Wings brown, teſtaceous, with a brown ſtreak; the upper pair with a central ſnowy dot. This and the next are natives of America.

Pellucida. Wings brown, teſtaceous, with a purple outer margin; upper pair with a central ſnowy dot.

Crassicornis. Wings cinereous, with brown ſpecks and waved ſtreaks. It is a large inſect, and a native of India.

Hyphinoe. Wings blue; upper pair ſpotted with yellow. This and the next are natives of Amboina.

Cyane. Wings black, with hyaline ſpots; lower ones with fulvous lunules.

Regalis. Wings grey-brown, with fulvous veins and yellow ſpots. It inhabits North America.

* Dispar. Upper wings of the male brown, with black flexuous bands; of the female whitiſh, with tranſverſe flexuous brown lines. The larva is hairy, with white lines and blue ſpots on the fore part, and red ones behind. When handled, it cauſes an unpleaſant itching on the ſkin. The pupa is folliculate, with four black dots.

Lantanæ. Wings ſnowy, with three or four ſtreaks of connected brown rings. It is a native of America.

Amasis. Wings whitiſh, with black ſtreaks; lower ones yellow, ſpotted with black; the abdomen is black, with red belts. It inhabits Surinam.

* Pudibunda. Wings cinereous, with three waved brown ſtreaks.

* Fascellina. Wings cinereous, with black ſpecks and two fulvous ſtreaks.

Leucophæa. Wings brown, upper pair with a broad whitiſh ſtreak, a black line at the baſe, and a white dot at the hind angle. This and the next are natives of America.

Leucostigma. Wings grey, upper pair with black ſtreaks and lines, and a white lunule at the hind angle. The female is apterous.

* Bucephala. Wings grey, with two double brown flexuous ſtreaks, and a large yellow ſpot at the tip.

Helops. Wings clouded; lower ones pale cheſnut; abdomen cheſnut-brown, annulate with white. A native of America.

Oleagina. Wings ſlightly tailed, green-brown, with two white ſpots, the anterior pupillate, the hind one larger. Found in Germany.

Cœrulocephala. Wings brown, marbled with blueiſh, and a double irregular whitiſh ſpot.

Argentina. The wings of this ſpecies are toothed on the back, grey, with two ſilvery ſpots, the anterior heart-ſhaped. Native of Germany.

Decora. Upper wings variegated with red, yellow, and black; the lower ones red, edged with black. It inhabits the Cape of Good Hope.

Celsia. Wings above green, with a ſinuate indented glaucous band. A native of Sweden.

Dione. Wings white, ſtriate, and dotted with black; beneath there is a purple margin. A native of North America.

* Ziczac. Wings toothed on the back, clouded brown and reddiſh-white, with a large clouded ocellar ſpot at the tip; the antennæ are ſcaly. Larva ſolitary, naked, pale roſy, with white lateral lines, and two gibboſities on the back; the tail is red; pupa folliculate, dark brown.

Tritophus. Wings toothed on the back, clouded with brown; in the middle is a ferruginous lunule, ſurrounded with white. It is found in ſeveral parts of Auſtria.

Elegans. Wings glaucous, with two black ſtreaks and ſpot in the middle, in the latter of which is a ferruginous lunule. It is found at the Cape of Good Hope.

Camelus. Wings yellowiſh, with two red ſtreaks, and a line in the middle. It is a native of India.

Dictæa. Wings appearing as if parched with a whitiſh ſtripe; the lower ones whitiſh.

Gnoma. The wings of this ſpecies are ſlightly indented, grey-white, with a marginal black band, in which is a white ſpot. Found at Hamburg.

Dromedarius. Upper wings toothed on the back, clouded, with a yellowiſh patch at the baſe, and near the tail.

Angnina. Upper wings clouded, with tranſverſe pale ſtreak and baſe, the tip with two black dots in a ſubocellar whitiſh ſpot. This and the three next inhabit America.

Concinna. Upper wings clouded, with a blackiſh patch at the baſe and angles, marginal ſtreaks and dots on the diſk.

Unicornis. Upper wings clouded with green and brown, the tip yellowiſh, with a blackiſh patch on the diſk, and marginal dots and ſtreaks.

Aurora. Upper wings yellow, the baſe and margin ſpeckled with red.

* Coryli. Wings glaucous, with a ferruginous band, in which is a black dot, annulate with white; thorax variegated.

Nuda. Upper wings naked, hyaline; lower ones cinereous, with a marginal naked ſpot. It is found in India.

Morio. Wings black, hyaline; abdomen villous, black; the ſegments are edged with yellow. It is found in different parts of Europe, on the Lolium perenne.

Rubea. Wings hyaline, pale reddiſh, with a pale dot in the middle. Found in Auſtria.

Alphæa. Wings ferruginous, with a white dot in the middle, and punctured brown ſtreak. It inhabits New Holland.

* Monacha. Wings white, waved with black, marked with blood coloured rings between the ſegments of the abdomen. It is found on the bramble, the willow, the apple, the oak, and different ſpecies of the pine.

Flava. Wings deep yellow, with three black dots at the tip. It is found in India.

Lutea. Wings deep yellow, immaculate. A native of New Holland.

Ephiphigea. Wings yellow, with a common brown dorſal ſtreak. Found in the South American iſlands.

* Cortula. Wings glaucous, with white ſtreaks, and a teſtaceous immaculate ſpot at the tip.

Reclusa. Wings grey, with whitiſh ſtreaks; the tip with a ferruginous ſpot, in which is a marginal white dot. It is found in Germany.

Anchoreta. Wings grey, with white ſtreaks, the tip with a brown ferruginous ſpot, in which is a waved white ſtreak. A native of Auſtria.

* Anastomosis. Wings grey, with three whitiſh lines, which nearly meet below, the tip is marked with a reddiſh ſpot.

Cippus. Wings brown, with three green ſpots. Found in Surinam.

Reflexa. Wings varied with cinereous and brown; the feelers are reflected, and as long as the thorax. It is found in the South American iſlands.

* Palpina. Wings toothed, whitiſh, with black veins; feelers projecting, feathered.

* Trepida. Wings one-toothed on the back, with an ocellar dot in the middle, and macular brown ſtreaks behind.

Querna. Wings grey, with three black ſtreaks connected to as many white ones. This is a native of Auſtria.

* Capuzina. Wings indented, ferruginous, with a reflected tooth on the back.

* Camelina. Wings indented, ferruginous, with two oblique yellow lines; they have all a ſmall tooth on the back.

* Aulica. Upper wings grey, dotted with yellow; lower ones fulvous, ſpotted with black.

Helvola. Wings pale orange, with regular cinereous ſpots, and a ſtreak behind.

Undata. Wings cinereous, with two brown bands, including a few cinereous ſtreaks. It is a native of Germany.

Aeria. Wings ſnowy, with black dots; thoſe near the rib are larger; the legs are annulate. It inhabits Carolina.

* Erminea. Wings white, with ſcattered black dots; the abdomen is marked with five rows of black dots. The thighs of this inſect are covered with ferruginous wool.

* Lubriciperda. Wings pale orange, with black dots, generally placed in an oblique tranſverſe row.

* Mendica. Wings of the male brown, obſcure; of the female white, pellucid, both dotted with black.

* Papyratia. Wings ſnowy, with black dots at the tip; the abdomen has five rows of black dots.

Advena. Wings brown, with white coſtal dots; the lower ones black, with a fulvous ſpot in the middle, in which is a black dot. This is a native of Spain.

Rutila. Wings pale yellow, with a ferruginous hind margin. It inhabits Siam.

Lactifera. Wings black, yellow at the angle of the tail; abdomen above yellow, with a dorſal line of black dots.

* Leporina. Wings white, with branched black dots; abdomen immaculate.

Lota. Wings cinereous, with a black dot on the diſk, and a purpliſh broken ſtreak behind.

Strigosa. Wings brown, with yellow ſtreaks; lower ones black, with an angular ſubmarginal yellow ſtreak. It inhabits Lapland.

Læta. Upper wings ſnowy, with a broad black band; the antennæ are ſimple. It is a native of Sweden.

Communimacula. Wings pale fleſh-colour, with a common dorſal brown ſpot. Found in the ſouthern parts of Europe.

* Compressa. Wings compreſſed, ſnowy, with a common brown ſpot; grey in the middle, with a white lunule.

Milhauseri. Wings hoary, with two dorſal brown ſpots; antennæ ſetaceous. It is a native of Dreſden.

Spreta. Wings varied with fleſh colour and yellow, and white ſtigmata. It is a native of Germany.

Lineus. Wings black; upper pair fulvous at the tip, lower ones at the baſe. This is found at Surinam.

Ulmi. Upper wings grey, ſtriate, with white at the tip. This inhabits Germany, and is found on the elm.

Begga. Wings white, with a black rib. Found at Surinam.

Obsoleta. Wings yellowiſh, with a darker ſpot in the middle and obſolete ſtreak behind. It inhabits South America.

Lepida. Wings brown, upper pair with a broad green baſe. This is a native of Tranquebar.

Equestris. Wings brown; upper pair with a green band in the middle; the lower ones yellowiſh. It inhabits India.

Grata. Wings ſnowy, the ribs at the baſe and hind margin brown. This is found in Georgia, in America.

V. nigrum. The wings of this inſect are white, marked with a black *v*. It is found in divers parts of Germany.

* Chrysorrhæa. Wings ſnowy; tail bearded, ferruginous. It inhabits this and other countries of Europe. The larva of this inſect is gregarious, hairy, blackiſh, with two red lines down the back; the eggs are covered with a thick fulvous wool.

Auriflua. Wings white, upper pair with a brown rib beneath; the tail is bearded with yellow.

Bicolora. Wings white, with a large yellow ſpot marked with black. It inhabits Saxony.

* Salicis. Wings white; legs black, annulate with white. The larva is very beautiful, being hairy, with white dots down the back, on the ſides of which are red dots.

Cassinia. Wings grey, with abbreviated ſcattered black lines. Native of Auſtria.

Centrolenea. Wings clouded with cinereous and brown, with a central white line edged with a black one. It is a native of Auſtria.

Tessellaris. Yellowiſh; wings abbreviated, with numerous teſſellate deeper bands on the upper pair. This is an American inſect.

* Cratægi. Wings rounded, dark cinereous, with a darker band; tail bearded.

Eridanus. Body and wings ſnowy; abdomen with fulvous rings. It is a native of Surinam.

Tibialis. Wings ſnowy; fore-ſhanks yellowiſh, dotted with black. It inhabits New Holland.

Nitidula. Wings ſnowy; upper pair with two coſtal, ſhining, glaucous ſpots, and a marginal band of the ſame colour. It is found in Coromandel.

Innocua. Wings white; upper pair with four abbreviated black ſtreaks, the hind margin is yellow. It inhabits South America.

Jilibata. Wings white; abdomen and fore thighs red above. This inhabits the American iſlands.

Repanda. Wings pale, with three white ſtreaks, and a pale ferruginous hind margin. This and the next inhabit the South American iſlands.

Exigua. Wings yellowiſh, with ferruginous bands.

Plumigera. Wings ſubferruginous, with a yellowiſh ſtreak; antennæ of the male pectinate. Found in Auſtria.

Obsoleta. Wings whitiſh, with a ferruginous rib; the feelers are ferruginous. It is found in New Holland. Sir Joſeph Banks has a ſpecimen of this inſect, and alſo of the next.

Corones. Upper wings cinereous; the lower ones are ſnowy. It inhabits New Holland.

Festiva. Wings yellowiſh, ſpotted with blue at the baſe, and dotted with black at the tip. It is found in America.

Dryas. Wings brown; abdomen fulvous, with black dots; the tail is black. It inhabits Surinam.

Ramosa. Wings yellow, with black branched lines and marginal dots. It is found in Italy.

* Russula. Wings yellow, with a red margin and brown ſpot; the antennæ are red. This is deſcribed and figured by Mr. Donovan, and ſo is the next.

* Jacobææ. Wings brown, with a red line and two dots; the lower ones are red, edged with black.

* Grammica. Wings yellow; the upper ones are of a deeper, ſtriate with black; the lower ones are marked with a black terminal band.

Pennatula. Wings cinereous on the outer part and cheſnut-brown within, a paler ſtripe dividing the colours. It is a native of the Eaſt Indies, as is the next.

Lineola. Wings white; upper pair with a black line; lower ones with a black dot on the diſk.

* Purpurea. Upper wings yellow, dotted with brown; lower ones red, ſpotted with black.

* Plantaginis. Wings black, with yellow rivulets; lower ones yellow, with black margin and ſpots.

Vittata. Wings black, with three abbreviated white fillets. This is a native of America.

Lugubris. Wings yellow, with black rivulets and dots; lower ones brown.

Heliophila. Wings varied with brown and cinereous; lower ones ſnowy, edged with black. This is found in Lapland.

Parthenias. Upper wings brown, with greyiſh ſpeckled bars; lower ones orange, with a triangular black ſpot at the inner margin and ſmall line. This is an European inſect.

* Matronula. Upper wings brown, ſpotted with yellow; lower ones yellow, with black bands.

* Villica. Wings black, with eight cream-coloured ſpots; the lower ones are fulvous, ſpotted with black.

Hebe. Wings black, with white bands; lower ones red, ſpotted with black. It inhabits Europe.

Tarquinius. Wings cinereous, with a black ſpot in the middle, in which is a branched line. Found at Surinam, as is the next.

Tarquinia. Upper wings black, with a hooked white line between two white ſtreaks.

* Caja; or Great Tyger Moth. Upper wings whitiſh, with irregular blackiſh ſpots; lower ones orange, ſpotted with black. This ſpecies is one of the larger Engliſh moths. The larva is of a deep brown, with white ſpecks; extremely hairy, and feeds on plants. It changes into a chryſalis in June, and the fly appears in July.

Pudica. Wings white; upper pair ſpotted with brown; lower ones immaculate. It inhabits the ſouth of France.

Casta. Wings black, with two indented white bands; the lower ones are red, with marginal brown ſpots. It inhabits Germany.

Maculosa. Wings ſpotted with black; upper pair brown; lower ones red. It is a native of France.

Virgo. Wings black, with reddiſh rivulets; lower ones red, dotted with black. It is a native of America.

Phyllina. Wings black, with reddiſh rivulets; lower ones red, ſpotted with black, and a marginal black line. A native of America, as are the five that follow.

Placentia. Wings black, with three white ſpots; lower ones red, with black ſpots and margin.

Isabella. Wings dotted with black; upper pair fulvous, lower ones roſy.

Echo. Wings ſnowy, with black marginal nerves on each ſide, the back is ſpotted with yellow and black.

Menete. Wings black, with white ſpots; lower ones purple, with a black central ſpot and margin.

Deflorata. Wings white, ſpotted with black; lower ones beneath black, with white bands.

Hyalina. Wings hyaline, cinereous; tail black, bearded. It inhabits Italy.

Albifrons. Wings grey; upper pair with a marginal angular ſnowy ſtreak, ſurrounded with black ſpecks. This and the three following are natives of America.

Ministra. Wings ferruginous; upper pair with five tranſverſe brown lines on the diſk and margin.

Gibbosa. Wings teſtaceous; the upper pair are marked with a double tranſverſe yellowiſh ſtreak, and intermediate double white dot.

Angulosa. Wings grey; the upper pair have black flexuous lines and blotches, and a projecting tooth on the back.

d. *Wings recumbent.*

Crotolarias. Upper wings purple, with ocellar black ſpots; lower ones red, ſpotted with black. This and the two next are natives of India.

Ricini. Wings duſky, with numerous ſubocellar brown ſpots; the lower ones are red, ſpotted with black. It is found on the ricinus.

Sanguinolenta. Wings ſnowy; upper pair with a ſanguineous rib, lower ones with black ſpots.

Puella. Wings brown; thorax dotted with black; tail and legs red. It inhabits Guinea.

Serva. Wings grey, mixed with cinereous and brown: the abdomen is red above

Hera. Wings greeniſh-black, with yellow rivulets; the lower ones are reddiſh, with three black ſpots.

* Dominula. Wings gloſſy-black, with white and reddiſh ſpots; the lower ones are of a dull red, with black ſpots. A native of Europe.

Credula. Wings and body black, dotted with white. Native of America.

Lectrix. Wings black, with blue, yellow, and white ſpots; the lower ones are red, ſpotted with white. Found in China.

* Furcula. Thorax variegated; wings grey, the baſe and tip white, dotted with black. A native of Europe.

Colon. Wings grey-brown, with two black diſtant dots. Found in Germany.

Populeti. Wings ſhining-grey, with a ſtreak of black dots behind. Found on the Populus tremula, in divers parts of Germany.

* Antiqua. Upper wings dull ferruginous, clouded with brown, a white lunule at the poſterior angle; the female is nearly apterous.

* Gonostigma. Wings brown, with two oppoſite white ſpots; female apterous.

Paradoxa. Wings varied with cinereous and brown, marked with a whitiſh central ſpot; the lower ones are black; the female is apterous.

Zona. Wings black, with white bands; the abdomen is black, with the edges of its ſegments red; the female is apterous. A native of Germany.

Pylotis. Wings yellow, with ſix bands of black dots; lower ones dotted with black. Found in New Holland.

Pulchella. Wings white; the upper pair is dotted with black and red; and the lower ones are tipt with black. Found in the Eaſt.

Grisea. The wings of this ſpecies are cinereous, waved with brown; and the lower ones are white. Found at Cayenne.

Priverna. Upper wings brown, with a yellow band; the lower ones are fulvous, edged with black. It inhabits Surinam.

Francisca. Upper wings fleſh-colour, with an interrupted white fillet; the lower ones hyaline. It inhabits Coromandel.

Jesuita. The wings of this ſpecies are black, with a fulvous ſtreak. It is a native of India.

Angulata. Wings angular, teſtaceous, with black ſpecks, and two obſolete cinereous ſtreaks. It inhabits India.

Viciella. Wings cinereous hyaline; the antennæ are brown. The body of this inſect is covered with wool. The female depoſits her eggs while in the pupa ſtate, and never becomes a perfect inſect.

Vestita. Wings black, immaculate; abdomen beneath downy, white. Found in Germany.

Muscella. The wings of this are of a dull hyaline colour; the body is black. It inhabits Auſtria.

Pectinella. Wings cinereous hyaline; the upper pair are marked with obſolete darker ſtreaks. This and the next are natives of Auſtria.

Bombella. Wings cinereous, ſpeckled with brown.

Munda. Wings cinereous hyaline, with a brown dot and band. Found on lichens in various parts of Europe.

Indiana. Wings hyaline, with a yellow border dotted with black. It is a native of India.

Annulata. Wings black, with ſnowy ſpots. The ſhanks are annulate with white. It is a native of Germany.

* Graminis. Wings grey, with a whitiſh line and dot.

Popularis. The wings of this are brown, with white veins; the lower ones are whitiſh. Found in Ruſſia and Germany.

Fulminea. The wings are indented, and variegated with grey and brown; the thorax is white on the fore part, with a black ſtreak. It is found on the Achillea millefolium.

Gloriosæ. The wings of this ſpecies are black, variegated with red and yellow; the lower ones are brown, edged with yellow. It is a native of India.

Crini. Wings black, ſubferruginous before the margin; the lower ones are white.

* Rosea. The wings of this inſect are roſy, with three brown ſtreaks, the ſecond is waved, the third at the tip is compoſed of dots. The larva of this inſect is ſhort and very hairy, with grey tufts; the head is orange; the pupa is incloſed in a thick follicle.

* Rubricollis. Black, with a red collar; the abdomen is yellow.

Fuliginosa. Wings red-brown, with a double black dot; the abdomen is red, and it is black on the back. The larva of this inſect is hairy and ferruginous, with black head and fore-legs; it wanders over the ſnow in winter, and is ſaid to prognoſticate a cold ſummer, and ſcarcity where it appears in conſiderable numbers.

Binotata. Wings cinereous, with two black dots between two brown waved ſtreaks. It is middle-ſized, and inhabits Sweden.

Cribrum. Upper wings white, tranſverſely dotted with black; the tail is yellowiſh. Found in the northern parts of Europe.

Obscura. Both ſurfaces of the wings alike, brown, with three hyaline dots on the upper pair; the abdomen is yellow, with a black line. It is found on the Lichen parictinus, in Germany.

Punctata. In this alſo both ſurfaces are alike; the upper pair is brown, dotted with white; the lower ones are tipt with brown. It is an Italian inſect.

e. *Wings convolute.*

Bella. Wings yellow, with ſix bands of black dots; the lower ones are red, tipt with black. It is a native of North America.

Ornatrix. Wings whitiſh, the margin red dotted with black; the lower ones are varied with white and black. Found in various parts of America.

Umber. Wings black; front and abdomen fulvous. It inhabits Surinam.

Histrio. Wings fulvous, with numerous white ſpots ſurrounded with blue. It inhabits the South American iſlands.

Geometra.

We ſhall in this and the following ſections mention only thoſe that are natives of this country, in order to ſhorten the article as much as poſſible, except in thoſe in which there are not a ſufficient number of Engliſh to illuſtrate the ſections.

a. *Antennæ pectinate.*

* Lactearia. Wings angular, ſnowy, immaculate; antennæ bipectinate, ſetaceous at the tip. Very tender and pellucid.

* Nivearia. Wings ſubangular, white, with a brown hind margin; the under ſurfaces of the upper pair are brown, the lower ones are marked with a central black dot.

* Vernaria. Wings angular, greeniſh, with two white flexuous ſtreaks; the antennæ are ſetaceous at the tip.

* Patatoria. Wings angular, whitiſh, with two full white flexuous ſtreaks; the antennæ are ſetaceous at the tip.

* Punctaria. Wings angular, cinereous, with a ferruginous ſtreak and row of black dots. The larva of this ſpecies is cinereous, with lateral yellow ſpots and marked with red; the pupa is bound to a leaf, above it is of a pale fleſh-colour, and beneath it is yellowiſh.

* Amatoria. The wings of this are angular, and buff-coloured ſpeckled with brown, with a ſtraight purple line and obſolete flexuous brown one on each. The larva is green, with yellow belts above, and red ones beneath.

* Pennaria. Wings ſlightly indented, reddiſh, with two brown ſtreaks, and a white dot at the tip.

* Ustularia. Wings ſlightly indented, ochraceous, with three brown ſtreaks, and ſpot at the baſe and tip.

* Bidentaria. Wings jagged, grey, with a deeper coloured band, in the middle of which is an ocellar dot.

* Falcataria. Wings falcate, glaucous; the upper pair is marked with a grey band and waves, in the band is a brown dot.

* Sambucaria. Wings tailed, angular, yellowiſh, with two darker ſtreaks; the lower ones with two reddiſh dots at the tip.

* Lacertinaria. Wings toothed, yellowiſh, with two brown lines and a dot between them; the lower ones are whitiſh and immaculate.

* Alniaria. Wings angular, toothed, ſpeckled with brown, and croſſed with two brown ſpecks.

* Syringaria. Wings angular, indented, grey, with fleſh-colour ſhades, and two brown ſtreaks on the upper pair meeting at the tip.

* Lunaria. Wings jagged, reddiſh-brown; all with a white ocellate dot; the upper pair is marked with an incurved brown ſtreak.

* Dentaria. Wings angular and indented, above pale, with ferruginous ſtreaks; beneath it is ferruginous, with a darker lunule.

* Dolabraria. Wings angular, yellow, with a ferruginous ſtreak; the angle of the tail is violet.

Suberaria. Wings yellowiſh, deeply indented; the upper pair is marked with a brown ferruginous patch, and two black ſtreaks; the lower ones with a brown ferruginous band and ſingle ſtreak.

Papilionaria. Wings indented, green, with a flexuous white ſtreak, and contiguous ſmaller one. The larva is green, with ten incurved rufous prickles on the back; the pupa is green varied with yellow.

* Prunaria. Wings ſlightly indented, yellow-orange, ſpeckled with brown; the upper pair with a brown lunule. The larva is ferruginous, with two ſpines before and behind.

* Piniaria. Wings ſpotted with yellow, beneath clouded with two brown bands.

* Limbiaria. Wings ferruginous, with a black border; lower ones beneath black ſtreaked with white.

Atomaria. All the wings yellowiſh, with brown ſtreaks and ſpecks.

* Prosapiaria. Wings yellowiſh, with brown ſpecks, and three brown ſtreaks, the laſt of which is compoſed of ſpots.

* Pusaria. Wings ſnowy, with three obſolete brown ſtreaks.

* Defoliaria. Wings grey, ſpeckled with brown, white in the middle, with a brown dot.

* Hirtaria. Wings hairy, grey, with three black ſtreaks, the hinder ones approximate; antennæ black.

* Vespertaria. Wings yellowiſh, with two brown ſtreaks, the firſt angular, the poſterior one ſeparating the darker border.

* Wauria. Wings cinereous; upper pair with four ſhort irregular bands, the middle one reſembling the letter L.

* Ditaria. Wings green, with ferruginous marginal ſpots.

* Viridaria. Wings rounded, green, with whitiſh ſtreaks and a marginal black dot.

* Pulveraria. All the wings powdered with teſtaceous, with a broad ferruginous band.

* Fasciaria. In this ſpecies the wings are reddiſh, with a broad ferruginous band edged with white.

* Diversaria. Upper wings reddiſh, lower ones whitiſh: the margin of all dotted with black.

* Betularia. All the wings white, ſpeckled, and waved with black; the thorax is marked with a black band; the antennæ are ſetaceous at the tip.

* Prodromaria. Wings white, ſpeckled with black; with two broad dark ferruginous bands.

* Plumbaria. Wings plumbeous, with three brown ſtreaks and a dot in the middle.

* Purpuraria. Wings yellow; the upper pair with a purple margin and two bands.

b. *Antennæ ſetaceous.*

* Falcata. Wings falcate, fulvous, with two brown dots between two yellow ſtreaks.

* Dubitata. Wings indented, waved with brown, grey and black; the nerves are dotted with white.

* Dimidiata. Wings indented, yellow before, and brown behind.

* Viridata. Wings angular, all green, with a pale ſtreak.

* Strigata. Wings indented, cinereous, with a broad brown band, in which is a waved black ſtreak.

* Notata. Wings angular, pale, with three browner ſtreaks; upper pair with four approximate dots.

* Emarginata. Wings emarginate, pale, with two grey bands and a brown dot.

* Grossularia. Wings whitiſh, with round black ſpots, and two yellow ſtreaks on the upper pair.

* Undulata. All the wings with numerous, crowded, undulated ſtreaks.

* Populata. Wings pale yellow; upper pair ſubfaſciate at the tip, the lower part is darkened with brown.

* Comitata. Upper wings yellowiſh, with three grey bands, and a brown dot and line at the tip.

* Ulmata. Wings white, with two ferruginous brown bands, the hindermoſt compoſed of ſpots.

* Prunata. Wings grey-brown, with two pale flexuous bands, the poſterior one nearly terminal.

* Cratægata. Wings of a deep yellow, with three ferruginous ſpots on the rib of the upper pair, the middle one ſomewhat ſilvery.

* Ferruginata. Wings orange, with brown ſpots,

waves and ſtreaks, and a line of white dots along the anterior margin.

* MARGINATA. All the wings are white, the exterior margin with a brown interrupted border.

* MIATA. Wings grey, with three green bands, the middle one broader, and waved with brown.

* DECUSSATA. Wings cinereous, with four black ſtreaks, the two middle ones flexuous and croſſing each other.

* ALBICILLATA. Wings whitiſh, with a brown margin and ſpot at the baſe and tip.

* HASTATA. All the wings white, irregularly barred, and ſpotted with black.

* TRISTATA. All the wings black, with two white immaculate bands.

* CLATHRATA. All the wings yellowiſh, with black lines and ſtreaks croſſing each other.

* CHÆROPHYLLATA. Black; wings erect; upper pair white at the tip.

* PROCELLATA. Upper wings white, with three brown bands, the middle one reaching half way acroſs, the hind one marginal, with a white ſpot in the middle.

* FLUCTUATA. Wings pale cinereous, with three abbreviated brown bands on the upper pair.

* BILINEATA. Wings yellow, with teſtaceous waves, and brown flexuous bands and white ſtreaks. The larva is greeniſh, nearly immaculate, and ſometimes with white lines.

* VOLUTATA. All the wings of this inſect are green, with two white ſtreaks.

* LYNCEATA. Wings rounded, white, with two brown bands and a dot at the tip.

* BRUMATA. Wings yellowiſh, with a black ſtreak, and paler behind; the female is apterous and of a brown colour.

* CHENIPODIATA. Upper wings teſtaceous, with three grey bands, a brown prominent dot and line at the tip above.

* HEXAPTERATA. Upper wings varied with grey and brown; lower ones whitiſh, with an additional pair of wings at the baſe.

* DAPLICATA. Upper wings grey, with three brown flexuous bands.

* ALCHEMILLATA. Wings browniſh; the upper pair waved, with a ſnowy band, with cinereous waves, and line within the tip.

* SUCCENTURIATA. Wings whitiſh, with a darker border, and black dot.

* MACULATA. All the wings yellow, with brown ſpots.

* EUPHORBIATA. All the wings browniſh-grey, immaculate.

* PUNCTATA. Wings rounded, ſnowy; upper pair with a brown dot in the middle, the margin is dotted with black.

* MURINATA. Wings cinereous, with three darker ſtreaks; all with a central black dot.

* SOCIATA. Wings deep yellow, with a brown band, in the middle of which is a recurved tooth.

* PURPURATA. Wings greeniſh, with two purple bands on the upper pair.

* IMMUTATA. All the wings ſnowy, with darker waved ſtreaks; the hind margin dotted with black.

* CINGULATA. All the wings are brown, with a ſnowy ſtreak.

* URTICATA. Wings white, with macular brown bands; the thorax and tail yellow.

* LIMBATA. Wings rounded, yellow, with a brown ocellar dot, and hind margin.

* PALUDATA. Wings white, with a brown band or two, and black ocellar dot in the middle.

* STRATIOTATA. Wings with pale bands; upper pair with three black dots. The larva of this inſect is aquatic, ſix-footed, green, with tufted lateral ſpiracles; the pupa is folliculate, tapering both ways, and of a ferruginous colour.

* NYMPHÆETA. Wings cinereous, all of them alike, with reticulate white ſpots.

* LEMNATA. Wings white; lower ones with a terminal black band, in which are four white dots.

c. *Wings forked.*

* FARINALIS. Feelers recurved; wings poliſhed, yellowiſh, with white flexuous ſtreaks, the baſe and tip glaucous. This is found chiefly in bran and meal.

* GLAUCINALIS. Feelers recurved; wings glaucous, with two brown flexuous ſtreaks.

* BARBALIS. Antennæ pectinate, longer than the feelers; fore-thighs with a projecting beard. This is found on the Trifolium pratenſe.

* TENTACULARIS. Antennæ pectinate, as long as the projecting feelers; wings pale cinereous, with brown ſtreaks.

* PROBOSCIDALIS. Feelers projecting, approximate, longer than the thorax; the wings are grey, with ferruginous ſtreaks.

* ROSTRALIS. Feelers projecting, longer than the thorax; wings greyiſh, with two muriate black dots, and line at the tip. This is found on the Carpinus and Humulus.

* NEMORALIS. Feelers recurved; wings grey, with three brown ſtreaks, the middle one flexuous.

* PALPALIS. Feelers projecting, longer than the thorax; wings grey; lower ones white, at the thicker margin.

* FORFICALIS. Wings glabrous, pale, with oblique ferruginous ſtreaks.

* VERTICALIS. Wings glabrous, pale, ſub-faſciate with brown; beneath it is waved with brown. The larva of this inſect is ſixteen-footed, hairy, with yellow head and legs; the pupa is brown, the three laſt ſegments have each a ſmall tooth.

SALICALIS. Wings cinereous, with three oblique fulvous ſtreaks on the upper pair; antennæ pubeſcent. The larva is fourteen-footed, naked, green, with a darker dorſal line. The pupa is of a fine ſhining black.

* STICTICALIS. Wings grey, with a yellow ſpot in the middle, and a marginal ſtreak. The ſpot in the middle is notched on each ſide, and the marginal ſtreak has a contiguous ſmaller one. Beneath it is variegated.

* PURPURALIS. Wings purpliſh, with two yellow bands on each.

* COSTALIS. Wings purpliſh, with two yellow coſtal ſpots, and hind margin.

* ATRALIS. Wings black, with two white ſpots on each.

NOCTUA.

a. *Wings expanded.*

ZENOBIA. Wings variegated; beneath ferruginous, with black waves. It inhabits Surinam.

PATROCLUS. Wings tailed, both ſurfaces alike, brown, with an oblique linear white band and tip. This is found in India.

CAPRIMULGUS. Wings indented, brown, with black waves; the upper pair with a blueiſh eye, and double black pupil. A native of China.

NOCTILIO. Wings ſuberous, browniſh, with waved black ſtreaks ; the lower ones white at the tip, with a black ſpot. This is a native of the Eaſt Indies.

Crepuscula. Wings brown, with a white band, and marginal ſpot ; the upper pair with an eye. This is a native of America. One ſex has a double eye with a pupil, the other a blind eye.

Troglodyta. Wings brown, with black waves, and a common white ſtreak ; on the upper pair is a common ſhining eye. It is found in Guinea. This is a very curious inſect. Upper wings with a large eye dotted with blue, with a large lateral black pupil, blue lunule, and black iris ; behind this is a common white ſtreak, and afterwards a ſtreak of ſmall black lunules. Beneath, it is all brown, with a broad white band behind, which are white lunules joined to the band.

b. *Wings flat, incumbent ; thorax ſmooth.*

Dioscoreæ. Wings indented, grey ; lower ones yellow, with a black lunule and border. It inhabits India.

Paphos. Upper wings brown, with white veins ; the lower ones are varied with white and black. It is a native of Siam, and a ſpecimen is to be found in ſir J. Banks' muſeum.

Eugenia. Body dotted with black ; wings ſnowy, with a hyaline diſk ; the abdomen is red on the back part. It is a native of India.

* Complana. Wings with a paler outer margin ; lower ones entirely yellow. It is found on the oak. The larva is hairy, and black, with two lines of pale dots.

* Quadra. Wings yellow, with two blue dots on the upper pair ; there is a variety that has cinereous wings, and a yellow thorax.

c. *Wings flat, incumbent ; thorax creſted.*

* Sponsa. Upper wings undulate with brown ; the lower ones are red, with two black bands ; the abdomen is entirely cinereous. The larva is ſtudded, the head is blueiſh, and the body variegated.

* Nupta. Wings cinereous, varied with brown ; the lower ones are red, with two black bands ; the abdomen is hoary beneath.

* Pacta. Wings greyiſh, ſlightly waved ; the lower ones are red, with two black bands ; the abdomen is red.

* Fraxini. Wings indented, grey, with waved dark bands ; lower ones above black, with a blueiſh band.

* Pronuba. Lower wings teſtaceous, with a black nearly marginal band.

* Fimbria. The upper wings clay colour, with a paler tip ; lower ones pale orange, with a broad black band. The larva is ſmooth, browniſh, with pale lines, and black ſtigmata ; the pupa is blueiſh-black.

* Straminea. Wings ſtraw-colour, with a double blackiſh ſpot in the middle of the outer margin, and a darker ſub-marginal band ; the lower ones have a broad brown border.

* Maura. Wings indented, dark brown, with irregular cinereous marks ; beneath a whitiſh border.

* Libatrix. Wings jagged, reddiſh-grey, with two white dots, and two whitiſh ſtreaks.

* Plecta. Wings brown, with a white thicker margin.

* Brassicæ. Wings clouded with cinereous, with a black hook at the firſt ſpot.

d. *Wings deflected ; thorax ſmooth.*

Ficus. Wings cinereous with white veins, the baſe ſpotted with fulvous white and black. It is found in India, on the Ficus racemoſa.

Arundinis. Wings cinereous, with black dots and marginal lunules, beneath it is marked with a central brown ſpot. It is found in the ſtalks of the common reed, and is ſaid to occaſion the ſtaggers in horſes.

Virescens. Wings greeniſh, with three darker ſtreaks. It is found in the pods of the Cytiſus caian.

* Batis. Upper wings brown, with five peach-coloured ſpots ; the lower ones are cinereous.

* Roboris. Wings cinereous, with two white waved ſtreaks, and a central ſnowy ſpot, in which is a black lunule.

* Trapezina. Wings whitiſh, with a very broad deeper band, in which is a black dot ; the margin is dotted with black. The larva is greeniſh, with cinereous, with white and ſulphur-coloured lines ; it preys on the larva of other moths, and even on its own ſpecies.

* Cerasi. Wings grey-ferruginous, with a yellowiſh ſpot, and ſtreak behind, the margin is dotted with black.

* Monilis. Wings cheſnut-brown, with four approximate white dots, the antennæ are pectinate.

Gracilis. Wings brown-cinereous, with a brown and waved ſtreak at the baſe, and a yellowiſh one at the tip, with a punctured one between them. The larva is naked, greeniſh, with yellowiſh ſides ; the inciſures are yellow, each ſegment with four duſky ſpots, and a black one before. It is an American inſect.

e. *Wings deflected, thorax creſted.*

* Fulvago. Upper wings yellow, with ferruginous ſtreaks, the hind one compoſed of dots ; the lower wings are white.

* Citrago. Wings yellow, with three oblique ferruginous ſtreaks.

* Chrysitis. The wings of this inſect are yellowiſh-brown, with two green-gold bands, and a yellowiſh marginal one.

* Festucæ. Upper wings varied with yellow and brown, with three ſilvery-gilt ſpots ; the lower ones pale brown.

* Jota. Upper wings reddiſh-grey, with a large brown ſpot in the middle, in which is an inverted gold *i*.

* Meticulosa. Wings indented, pale ; the upper pair is of a fleſh-colour at the baſe, with a brown triangle.

* Gothica. Upper wings browniſh, with a black curve and dot in the middle ; the curve is turned upwards.

* Dorasa. Upper wings varied with rufous brown and white, with two black ocellar dots in the middle.

* Satellitia. Wings indented, reddiſh-brown, with a yellow ſpot in the middle, between two ſmaller white ones.

* Diffinis. Wings ferruginous, with three white ſpots at the rib, and two black dots behind. The larva is green, with white lines, head and fore legs black.

* Marginata. Wings yellowiſh, with ferruginous ſtreaks and hind margin ; lower ones with a black central dot and marginal band.

* Absinthii. Wings hoary, with black bands, and dots diſpoſed in a quadrangle.

* Alori. Wings ſooty, with two grey patches, the firſt with a black marginal dot.

* Delphinii. Wings purpliſh, with two whitiſh bands ; lower ones duſky.

* Perspicillaris. Wings with brown ſtreaks, twice two-toothed behind, with a ſingle kidney-ſhaped common ſpot.

* Pisi. Wings purpliſh, with two darker ſpots, and a yellowiſh waved ſtreak at the tip.

* Oxyacanthæ. The colour of the wings is dark

brown, with two fleſh-coloured ſpots and tip, the inner margin greeniſh, with a white lunule.

* Chrysoceras. Upper wings olive-green, with ſulphur-coloured ſtreaks and hind margin; lower ones browniſh, with a ſulphur margin.

* Gemina. The upper wings are of a browniſh-grey, with two ſtreaked darker bands, and two intermediate ſnowy dots.

Pulla. Upper wings brown, ferruginous, ſlightly clouded, with a white undulate ſtreak.

* Chrysoglossa. Upper wings ſubfalcate, grey, with three ſtreaks, the two firſt are abbreviated.

* Atriplicis. Upper wings brown, with blue and yellow ſtreaks; in the middle is a white mark, and a bifid yellow one.

* Præcox. Wings cinereous, with two ſubocellar ſpots; the lower ones are of a reddiſh-brown, with an abbreviated rufous band. There is a variety which has its wings entirely greeniſh.

* Pyramidea. Wings brown, with three flexuous, waved, yellowiſh ſtreaks; the lower ones are ferruginous.

* Lucipara. Wings cinereous, with dark angular marks, and a broad brown band in the middle.

* Oleracea. Upper wings ferruginous, with a yellowiſh lunule and white ſtreak, two-toothed behind.

* Xantographa. Wings black; lower ones ſnowy at the baſe.

* Pinastri. Wings black, the thinner margin and angle of the tail dull cinereous.

* Aprilina. Upper wings greeniſh, with black ſpots, and triangular dot each ſide behind.

* Ludifica. Upper wings and abdomen yellow, the latter with three rows of black dots. It is found on the willow.

* Lichenes. Upper wings green, with various black marks; the lower ones and all beneath brown.

* Psi. Upper wings grey, with a black line at the baſe, and various marks reſembling the Greek ψ; the legs are immaculate.

* Comma. Wings indented, cinereous, with a black line at the baſe, and an adjacent thinner white one.

* Chi. Wings grey; upper pair marked with a black Greek χ.

* Aceris. Wings grey, with black waves; abdomen pale ferruginous at the baſe beneath.

* Litura. Wings grey, with a black patch in the middle, in which is a white dot.

* Persicariæ. Wings clouded with brown, with a white kidney-ſhaped ſpot, in which is a yellow lunar pupil.

* Tragopoginis. Upper wings brown, with three black approximate dots in the middle; the lower ones livid.

* Triplacia. Upper wings with a double curve, turning contrary ways, and three glaucous ſpots between them.

* Rumicis. Wings grey, with brown ſtreaks and clouds, and an ocellar ſpot in the middle.

* Exoleta. Wings lanceolate, convolute, clouded with brown and cinereous, with four white marginal dots.

* Verbasci. Wings ſcalloped, indented, pale yellow, with brown margins.

* Umbratica. Wings ſtriate, lanceolate, grey, with a ferruginous ſpot in the centre, in which are two black dots.

* Putris. Wings ſubpunctured, the outer margin is brown, with an adjoining ſubocellar ſpot.

* Myrtilli. Wings ferruginous, ſpotted with white; lower ones yellow, with a black border. The larva is naked, green, with five rows of blackiſh tubercles: the pupa is chocolate brown, with white ſtigmata.

* Arbuti. Wings brown; lower ones black, with a yellow band.

Hyblæa.

Lagopus. Wings deflected, cinereous at the baſe, and tipt with brown; the legs are very hairy. The inſects of this diviſion are all natives of the Eaſt Indies.

Rostrata. Wings deflected, brown, with a common cinereous ſpot in the middle, and one at the rib.

Deflorata. Wings incumbent, grey; lower ones yellow, with a black fillet and marginal band.

Saga. Wings incumbent, gloſſy brown; the lower ones are black, with two fulvous ſpots.

Hepialus.

* Humuli. Wings of the male ſnowy, ſtriate, of the female yellow, with fulvous marks.

* Hecta. Wings deflected, yellow, with two oblique whitiſh bands, conſiſting of interrupted dots.

Cossus.

* Cossus. Upper wings grey, with numerous ſhort curves, and black ſtreaks; the thorax with a black band.

* Æsculi. Wings white, with numerous dark blue ſpots; the thorax has ſix. The antennæ of the male are feathered at the baſe, and ſetaceous at the tip; of the female ſetaceous.

Pyralis.

* Bankiana. Wings brown, with two ſnowy bands; the hinder is one-toothed. It is found in the woods.

* Lecana. Wings pale, with a brown central ſpot.

* Prasinana. Upper wings green, with two oblique yellowiſh ſtreaks; the lower ones are white.

* Fagana. Upper wings green, with three oblique white ſtreaks; the lower ones are whitiſh-green.

* Viridana. Wings rhombic; upper pair green, immaculate; lower ones brown. The larva is naked and ſixteen-footed, green dotted with black, the head is red; and the hind legs are yellow.

* Chloræna. Wings rhombic; upper pair green, with a white margin. The larva is green, dotted with white; the ſides ſpotted with brown.

* Uncana. Wings brown, with a whitiſh outer margin ſending out a recurved branch in the middle.

* Rosana. Upper wings teſtaceous, with an oblique grey band.

* Christiernana. Wings yellow, with red bands, croſſing each other in the middle.

* Smeathmanniana. Wings whitiſh, with two oblique brown bands, the firſt abbreviated, the other interrupted.

* Fuscana. Upper wings brown, immaculate.

* Fosterana. Upper wings dull cinereous, with two brown marginal ſpots.

* Xylosteana. Upper wings teſtaceous, with an oblique brown band.

* Ministrana. Upper wings teſtaceous, with a rufous hind margin; in the middle is a ferruginous mark, with a white line.

* Crystalana. Upper wings yellow brown, with dark ſhades; there is a broad irregular white mark, and a tuft in the centre.

* Udmaniana. Wings dark grey, with an angular common cheſnut-brown mark. The larva is roſy, with

white lateral ſpots, and black head and collar; pupa reddiſh-brown.

* SOLANDRANA. Wings pale, ſubfaſciate with white, with a dorſal ferruginous ſpot.

* PUPILLANA. Wings pale, with two oblique brown bands; the angle of the tail is marked with a blackiſh ſpot, in which are three ſilvery dots.

* ZOEGANA. Wings yellow, with a brown central dot; the tip is brown, and marked with a yellow ſpot.

* HAMANA. The upper wings of this ſpecies are yellow, with a reddiſh-brown dot, and hooked mark behind.

* OBLIQUANA. Wings cinereous, with oblique fulvous bands edged with white.

* BRYNNICHANA. Wings brown, with a common brown rhombic dorſal ſpot.

* PRUNIELLA. Wings purpliſh-brown, with a white ſtripe down the middle, in which is a black dot.

* ARCUANA. Wings pale yellow, with three curved bands, and a black ſpot on the diſk, in which are three ſilvery dots.

* LECHEANA. Upper wings teſtaceous; the thorax is ſilvery.

* AVELLANA. Upper wings teſtaceous, with three ſhort brown bands.

* HASSIANA. The upper wings of the inſects of this ſpecies are brown, with an oblique white ſtreak.

* INTERROGATIONANA. Wings red-brown, with a white flexuous line and dot, reſembling a note of interrogation.

* MODEIERIANA. Upper wings yellowiſh, with a marginal brown ſpot behind.

* SCHREBERIANA. Upper wings grey, with a white triangular marginal ſpot.

* HELMIANA. Upper wings pale yellow ferruginous, with a white triangular marginal ſpot.

* FRANCILLANA. Wings pale yellow, with two cheſnut brown ſtreaks.

* GNOMANA. Upper wings yellow, with an oblique teſtaceous band, and ferruginous marginal ſpot behind.

* OPORANA. Upper wings ferruginous, ſpotted and reticulate with brown.

* ILICANA. Upper wings brown-aſh, with brown dots, and a ſingle black one in the middle.

* LOGIANA. The upper wings are grey, with irregular black ſpecks; the lower ones whitiſh.

* DESFONTAINANA. Wings brown-cinereous, with an abbreviated fulvous fillet in the middle, in the middle of which is a hairy dot.

* PROFANANA. Wings cinereous, with a brown tufted dot in the middle.

* SQUAMMANA. Upper wings green, with numerous raiſed dots.

* STICTICANA. Wings browniſh, with a common white dorſal ſpot, in which there is a black dot.

* EMARGANA. Wings falcate, emarginate at the rib; it is brown, with reticulate dark lines.

* CAUDANA. Wings falcate, emarginate, the ribs grey, with a fulvous ſtreak.

* SCABRANA. The upper wings are cut off on the rib behind; they are rough cinereous, and ſlightly barred with brown. Found chiefly in the oak.

* QUERCANA. The upper wings are roſy, with two ſulphur coſtal ſpots.

* OCELLANA. Wings cinereous, with a red patch in the middle, in which is a whitiſh dot.

* FORSKABLIANA. The upper wings are yellow, and reticulate with ferruginous, with a browniſh patch in the middle.

* LŒFLINGIANA. The upper wings are yellow, reticulate with teſtaceous, and marked with a double X.

* BERGMANNIANA. Upper wings yellow, varied with orange, and four ſilvery bands, the third bifid.

* YEATIANA. Upper wings grey, with a black ſpot, and two central dots.

* ALSTROEMIANA. Wings whitiſh; upper pair with a lateral ruſty-brown ſpot in the middle.

* NITIDIANA. Wings ſhining brown, with a broad ſilvery band in the middle, in which is a brown ſtreak.

* NIGRICANA. Wings blackiſh, the rib dotted with yellow, the tip with a black dot.

* PARIANA. Wings brown, with two black ſtreaks, and cheſnut-brown hind margin.

* CONWAYANA. Wings ruſty brown, with ſilvery dots, and a yellowiſh dorſal ſpot.

* AURANA. Wings brown, with two orange ſpots.

* POMANA. Wings clouded, with red-gold ſpot behind.

* UNGUICANA. Wings cinereous, ſub-faſciate, the tip recurved and pointed, the outer margin behind tranſverſely ſtriate with white.

* CYNOSBANA. Upper wings brown, tipt with white.

* SPARMANNIANA. Wings flat, pale, with two black dots on the diſk.

TINEA.

* COLONELLA. Wings oblong, cinereous, with two black dots before a curved undulate obſolete ſtreak.

* PANNERELLA. Wings oblong, brown, with a blackiſh line down the middle, and a few dots at the tip.

* PRUNIELLA. Wings purpliſh-brown, with a white line in the middle, in which is a blackiſh ſpot.

* GELATELLA. Wings brown-aſh, with a white fillet on the upper pair.

* EUONYMELLA. Upper wings ſilvery-white, with fifty black dots.

* PADELLA. Upper wings lead-colour, with twenty black dots.

* LAMDELLA. Upper wings yellow-brown, with a dark triangular ſpot, terminated by a detached ſmall dot.

* SEQUELLA. Upper wings white, with a common ſinuate flexuous black line and lateral ſpots.

* SEMIARGENTELLA. Upper wings ſilvery, with gold bands, croſſing each other in the middle.

* IRRORELLA. Wings yellow; upper pair with three rows of black dots; thorax fulvous before and behind.

* MESOMELLA. Upper wings pale, with a yellow margin and two brown dots.

* GUTTELLA. Wings black, with numerous white dots on the upper pair; the head is ferruginous.

* PINETELLA. Upper wings yellowiſh-brown, with two clear white ſpots, ſeparated by a blackiſh band.

* PRATELLA. The upper wings are cinereous, with a clear white line branched behind, the tip with oblique ſtriæ.

* PASCUELL. Wings cinereous, with a clear white line, hind margin dotted with black.

* CULMELLA. Wings cinereous, with a ſingle abbreviated clear white line.

* ARGENTELIA. Wings and body ſilvery; the antennæ are annulate and brown.

* CARNELLA. The upper wings are of a roſe colour, with yellowiſh anterior and poſterior margins.

* GRAMELLA. Wings cinereous, with two angular brown ſtreaks, and a marginal ſilvery one.

* SALICELLA. Wings blueiſh-grey, white in the middle, with black dots on the hind margin; the thorax is creſted.

* Pusiella. Wings blueiſh-grey, with a black dot, fillet in the middle, and contiguous rhombic dots.

* Foenella. Wings brown, with clear white ſpots, the anterior one falcate, the poſterior kidney-ſhaped.

* Cratægella. Upper wings whitiſh, with two blackiſh bands, and a third which is terminal.

* Tapezella. Wings black, white behind; head ſnowy. A variety has its wings and head brown. This inſect is found in ſkins, where it gnaws cylindrical cavities and ſecretes itſelf.

* Vestianella. Wings cinereous, with a white rib; the tips are aſcending and feathered. This attaches itſelf to clothes and woollen furniture, to which it is very deſtructive.

* Sarcitella. The wings of this are cinereous; the thorax has a white dot on each ſide. Found in ſkins, clothes, and woollen furniture.

* Stigmatella. Wings nearly linear, ferruginous, with a white coſtal ſpot.

* Mellonella. Wings grey, the hind part purpliſh, with a white ſtreak; the ſcutel is black, tipt with white.

* Curtisella. Upper wings and thorax white, ſpotted and ſpeckled with brown; the lower wings and body are pale brown.

* Maculella. This is ſnowy; the wings with a large marginal ſpot and tip.

* Arbutella. Wings rufous, with ſilvery ſtreaks, the middle ones bifid. It is found chiefly on the Arbutus.

* Marginella. Upper wings rufous, with broad white margins.

* Tessella. Wings black, with two very remote teſſellate bands.

* Clementella. Upper wings ſnowy, with a black line at the baſe, band in the middle and dot at the tip.

* Bicostella. Wings cinereous, with a brown fillet; feelers projecting; antennæ hairy.

* Parenthesella. Upper wings teſtaceous, with a longitudinal white line.

* Radiatella. Upper wings yellow, with dark purple ſtripes, and white one nearer the thinner margin.

* Elongella. Wings linear, teſtaceous; the antennæ are moderate.

* Cinctella. Wings black; the upper pair with a ſilvery ſtreak.

* Leucatella. Wings blackiſh, with two white bands; the poſterior one fainter; head white.

* Strobilella. Wings waved with brown and ſilvery; lower ones brown, edged with white.

* Dodecella. Grey, dotted with black; wings with pale bands, and three pair of brown dots.

* Viridella. Wings greeniſh, with white dots, and two interrupted cheſnut bands.

* Combrella. Wings brown, thickly ſpeckled with whitiſh.

* Fuscella. Wings grey-brown, with two black dorſal dots.

* Cinerella. Wings grey-brown, gloſſy, immaculate.

* Trigonella. Wings brown, with a common white dorſal double triangular ſpot.

* Rhomboidella. Wings brown, with a black rhombic ſpot.

* Capitella. Wings brown, with three yellowiſh ſpots; the head is ferruginous.

* Compositella. Wings brown, with a common ſilvery dorſal ſpot, compoſed of four ſtreaks.

* Minutella. Wings black, with two ferruginous ſpots, nearly oppoſite.

* Petiverella. Wings greyiſh, with a yellow dorſal patch and three black dots at the tip.

* Listerella. Wings grey-brown, with black dots at the tip; the antennæ are moderate, annulate.

* Alcella. Snowy; upper wings ſpotted with black.

* Mouffetella. Wings pointed, livid, with oblong brown ſpecks; antennæ ſhort, annulate with white.

* Albinella. Wings brown, with a ſingle gold curve turned upwards. It is found among the ſhrubs of Europe.

* Sepella. Wings gold, with two ſilvery ſtreaks. It inhabits England.

* Merianella. Wings black, with three tranſverſe, divaricate, ſilvery bands.

* Lyonetella. Wings yellow, with four ſilvery bands; the third bifid above.

* Bonnetella. Wings white, with two ſilvery bands, and waved behind. This is found in gardens, and among hedges.

* Schæfferella. Wings orange, with ſilvery dots and band in the middle; the tip is fringed with black.

* Scopolella. Wings black, with ſcattered white dots; the antennæ are annulate with white.

* Gleichella. Wings flat, black, with a ſilvery band in the middle, and two oppoſite ſpots at the tip.

* Rhediella. Wings black, the tip fulvous, with interrupted ſilver ſtreaks.

* Roesella. Wings black-gilt, with nine ſilvery convex ſub-marginal dots.

* Leuwenhoekalla. Wings gilt, with a ſilvery ſtreak at the baſe, and four oppoſite dots.

* Myllerella. Wings gilt, with two ſilvery ſtreaks at the baſe, and three lines near the tip.

* Linneella. Wings brown-gilt, with four raiſed ſilvery dots.

* Rayella. Wings gilt, with ſeven ſilvery ſpots, the ſecond and third united.

* Schreberella. Wings gilt, with two ſilvery bands at the baſe, and two ſpots at the tip.

* Harrisella. Wings ſilvery-gilt, the tip obtuſe, parched, and ſub-ocellate.

* Cramerella. Wings ſilvery, with oblique marginal brown lines, and a black dot at the tip.

* Blancardella. Wings gilt, with a ſilvery line at the tip, and ſeven marginal ſpots.

* Lichenella. Apterous, ſmooth, black. Found on various lichens.

Alucita.

* Marginella. Upper wings pale brown, with ſnowy margins.

* Granella. Wings varied with white and black; the head is ſnowy. This is found in corn lofts, where it devours the grain, and cauſes it to cling together: in winter it crawls up the walls.

* Nivella. Wings ſnowy, with a black band between two marginal ſpots; the head is white.

* Asperella. Upper wings emarginate at the tip, whitiſh, with two common blackiſh ſpots.

* Costella. Snowy; wings reddiſh-gold, with a white coſtal ſpot at the baſe, dotted with brown.

* Scabrella. Wings grey-brown, with black raiſed dots.

* Aristella. Whitiſh; wings with a ſilvery line.

* Swammerdammella. Wings pale, immaculate; the antennæ are very long.

* Robertella. Wings brown, angle of the tail white; antennæ very long.

* FRISCHELLA. Wings brown-gold ; the antennæ are moderately long, and tipt with white.

* CALTHELLA. Black ; upper wings gold, the head is ferruginous.

* DEGEERELLA. Wings black-gold, ſtriate with yellow in the middle a yellow band ; the lower wings are brown ; the antennæ are very long. The yellow lines on the upper wings are ſometimes wanting.

* PODELLA. Wings black-gold, ſtriate with yellow ; in the middle there is a pale band ; the lower ones are purple, and the antennæ are very long.

* SULZELLA. Wings black-gold, with a gold band ; the antennæ are very long. This is thought to be a variety of the laſt.

* REAUMERELLA. Wings black, bronzed outwardly ; the antennæ are very long.

* FASCIELLA. Wings gilt, with a brown band ; the antennæ are tipt with white.

* SULPHURELLA. Upper wings gilt, with two oppoſite ſulphur ſpots ; the lower ones are yellow.

* OPPOSITELLA. Wings brown, with two yellow oppoſite ſpots ; the lower ones are brown.

PTEROPHORUS.

* MONODACTYLA. Wings expanded, linear, undivided.

* DIDACTYLA. Wings cleft, red-brown, with white ſtreaks ; the upper pair bifid.

* TESSERADACTYLA. Wings expanded, cleft, clouded with cinereous ; the lower ones are clouded with brown.

* PTERODACTYLA. Wings extended, cleft, teſtaceous, with a brown dot.

* PENTADACTYLA. Body and wings ſnowy ; upper pair bifid, lower ones three-parted. The larva of this ſpecies is ſixteen-footed, hairy, green, with black dots, and a white dorſal line ; the pupa is hairy, green, dotted with black. It appears in Auguſt : its larva feeds on nettles.

* HEXADACTYLA. Wings cleft, cinereous, ſpotted with brown ; all of them are ſix-parted. This ſpecies is found on the Lonicera xyloſteum, or Honey-ſuckle ; it as a very elegant and beautiful inſect, and often flies into the houſe in the evening : it makes its appearance in the month of September. It has been frequently called, by Engliſh collectors, the twenty-plumed moth ; this, however, is an improper name, the plumes being, in reality, twenty-four.

PHALAIA, a word invented by Baſil Valentine, and uſed as the name of a panacea, or univerſal medicine ; but Rolſink has ſince uſed it to expreſs a tincture of jalap.

PHALAINA, φαλαινα of Ariſtotle, a ſpecies of *Balæna*. See MYSTICETUS.

PHALANGER. See DIDELPHIS *Orientalis*.

PHALANGIUM, in *Botany*, φαλαγγιον, a name adopted, by the earlier botaniſts among the moderns, from Dioſcorides. Their example was followed by Tournefort, Haller, and others ; but Linnæus always objected to this name, as properly belonging to an inſect, to which it had been appropriated from the moſt remote antiquity, and for which therefore he retained it in the Zoological part of his ſyſtem, preferring *Anthericum*, another ancient denomination, for the genus of plants in queſtion. Of late, however, Juſſieu and other French botaniſts, ſome of whom never heartily aſſented to the above deciſion of Linnæus, having divided his genus *Anthericum*, have reſtored *Phalangium*. Whether the genus to which they have applied it, characteriſed by its ſmooth filaments, be a good one, is a matter of opinion. It is adopted by Mr. Ker in Curtis's Magazine, but not by the late Mr. Dryander in Ait. Hort. Kew. nor by Willdenow. We are inclined to admit it, but certainly not under the above appellation, which is equally contrary to good ſenſe and to every ſyſtematic rule. *Phalangites* preſents itſelf as a ſynonym to the ſame plant in Dioſcorides, and is unexceptionable. The flowers of this genus are obſerved by Juſſieu to be white or purpliſh ; thoſe of his *Anthericum* yellow. *Anthericum græcum, ſerotinum*, Engl. Bot. t. 793, *Liliago, Liliaſtrum*, &c., are examples of the former ; *A. fruteſcens*, Curt. Mag. t. 816, *aloides*, t. 1317, *aſphodeloides*, and ſeveral others, of the latter, in which *Narthecium* of Fl. Brit. is, by ſome botaniſts, alſo retained. See ANTHERICUM and NARTHECIUM.

PHALANGIUM, in *Entomology*, a genus of inſects of the order Aptera ; the generic character is, mouth with horny mandibles, the ſecond joint with a very ſharp moveable cheliferous tooth ; feelers filiform ; no antennæ ; two eyes on the crown, and two at the ſides ; eight legs, the abdomen is generally rounded. There are nineteen ſpecies, divided into two ſections, which are ſubdivided. Of all the inſects of this order, few are more repulſive than thoſe of the Phalangium genus. Some of them are armed with weapons reſembling thoſe of the ſpider genus, but operating with much malignity. They differ very much in ſize, ſome being very minute, while others are equal in magnitude to the larger kind of ſpiders.

A. *Mouth with a conic tubular ſucker.*

a. *Four feelers, the upper ones chelate.*

Species.

* GROSSIPES. Body minute, cylindrical glabrous ; ſhoulders tuberculate ; legs very long. It inhabits European ſeas. The body is of a dirty red, very minute and ſlow ; it inſinuates itſelf into the ſhells of muſcles, and deſtroys the fiſh.

HIRTUM. Body filiform and hairy. It inhabits the Norway ocean, and is about the ſize of the laſt.

SPINIPES. Body cylindrical, ſlender ; legs very long and ſpinous. This alſo is found in the ſeas of Norway.

b. *Two feelers.*

* BALÆNARUM. Two feelers ; body ovate, red on the back. It inhabits European ſeas. Found under ſtones. The ſucker projects ſtraight, is obtuſe at the lip, with a round perforation ; the feelers as long as the ſucker, and placed at its baſe ; the legs are pointed.

B. *Mouth without ſucker.*

a. *Feelers projecting, incurved.*

BICOLOR. Body roundiſh and black above ; legs very long, with teſtaceous joints and tips. It is a large inſect, and is found in Switzerland.

MORIO. Abdomen ovate, black beneath, and baſe of the legs pale. It inhabits Norway, about rocks ; larger than the Opilio, which comes next.

* OPILIO. Abdomen ovate, grey, beneath whitiſh. It inhabits Europe and America, and wanders about by night. This is the moſt common inſect of the genus, and during autumn it may be obſerved in gardens, about walls, &c. ; it is remarkable for its plump, but at the ſame time flattiſh orbicular body, and its extremely long and ſlender legs, which are generally ſo carried that the body appears ſuſpended or elevated to a conſiderable height above the ſurface on which the animal reſts ; the eyes are ſituated on the top of the head, and reſemble two very minute glaſſy globules ; the colour of the whole animal is a pale greyiſh-brown. This ſpecies preys on the ſmaller kind of inſects.

* CORNUTUM. Abdomen depreſſed; mandible conic, aſcending; feelers reſembling eggs. It is found in this country and other parts of Europe, like the laſt, to which it bears a reſemblance.

BILINEATUM. Pale, with two black dotted dorſal lines. This and the next are found among the rocks of Norway.

DIADEMA. Thorax with an elevated ſpinous tubercle on the back. This tubercle is furniſhed with a large eye on each ſide.

CARINATUM. Brown; abdomen depreſſed, carinate; the fore legs are one-toothed before the tip. It is found chiefly at Dreſden, and is about the ſize of the Opilio.

* DUO-MACULATUM. Abdomen black, with two white ſpots. This is an Engliſh inſect, and is deſcribed and figured by Mr. Donovan. The body is very ſmall, ovate, and black, with two white ſpots; abdomen is ſurrounded with a very fine ſub-marginal white line; the legs are long and black.

ARANOIDES. The claws are toothed and villous; the body oblong. Inhabits the Cape of Good Hope, and ſouthern parts of Ruſſia. Its bite is ſaid to be extremely poiſonous, occaſioning livid tumours, and ſometimes death itſelf. The body of this inſect is ſoft, livid, woolly, with inflated claws.

* CANCROIDES. Abdomen obovate, depreſſed, ferruginous; the claws are oblong and hairy. A variety has ovate claws. It is found in divers parts of Europe, beſides this country, in cellars and damp places, and is the little inſect which gets into our legs and under the ſkin, cauſing a very painful itching.

ACAROIDES. Abdomen cylindrical, yellowiſh; claws ovate and ſmooth. It inhabits America. Is twice as large as the former, and its bite is reported to be extremely painful and dangerous.

b. Feelers thick, ſpinous, and furniſhed with a claw at the tip.

* HIRSUTUM. Feelers ſerrate; body ſub-oval, with ten angles. It is found in this country.

RENIFORM. Feelers ſerrate; fore-legs very long and filiform; thorax kidney-ſhaped. It inhabits South America, and its iſlands. It is one of the largeſt of the genus, and has the appearance of a very large ſpider.

CAUDATUM. The feelers of the inſects of this ſpecies are branched; the tail ends in a briſtle. The claws are large, and toothed on the inſide towards the tips. It is a native of the Eaſt Indies.

LUNATUM. Feelers very long, and ſpinous at the tip; thorax kidney-ſhaped. It inhabits America. The feelers are four times as long as the body, they are ſmooth, except at the tip, which is very ſpinous.

PHALANGIUM *Apulum*, the *Apulian phalangium*, a name given by authors to that large and poiſonous ſpecies of ſpider, called by the vulgar the tarantula, from the name of a city of Calabria, Tarantum; near which it is very common.

PHALANGOSIS, from φαλαγξ, *a row of ſoldiers*, in *Surgery*, a diſeaſe, in which the row of hairs, compoſing the eye-laſhes, turn inward, and irritate the eye. See TRICHIASIS.

PHALANX, in *Anatomy*, a name applied to the bones of the fingers and toes, which are diſtinguiſhed by the numerical terms, firſt, ſecond, and third, reckoning from the metacarpus and metatarſus. The two rows of carpal bones are alſo called phalanges; the firſt or radial, the ſecond or metacarpal.

PHALANX, φαλαγξ, in *Antiquity*, a huge, ſquare compact battalion, formed of infantry, ſet cloſe to one another, with their ſhields joined, and pikes turned croſs-ways; inſomuch that it was almoſt impoſſible to break them.

It conſiſted of eight thouſand men: Livy ſays, that this ſort of battalion was invented by the Macedonians, and that it was peculiar to them; whence, among writers, it is ſometimes called the *Macedonian phalanx*.

St. Evremont obſerves, that the Macedonian phalanx had the advantage in valour and ſtrength over the Roman legion.

PHALANX, in *Natural Hiſtory*, a term uſed by Dr. Woodward, and ſome other writers of foſſils, to expreſs an arrangement of the columns of that ſort of foſſil coralloid body found frequently in Wales, and called *lithoſtrotion*.

In the great variety of ſpecimens which are found of this, ſome have the whole phalanx of columns cracked through, and others only a few of the external ones; but theſe cracks never remain empty, but are found filled up with a white ſpar, as the ſmaller cracks of ſtone uſually are. This is not wonderful, as there is much ſpar in the compoſition of this foſſil; and it is eaſily waſhed out of the general maſs to fill up theſe cracks, and is then always found pure, and therefore of its natural colour, white. The lithoſtrotion, or general congeries of theſe phalanges of columns, is commonly found immerſed in a grey ſtone, and found on the tops of the rocky cliffs about Milford in Wales. It is uſually erect, though ſomewhat inclining in ſome ſpecimens, but never lies horizontal. It ſeems to have been all white at firſt, but to have been ſince gradually tinctured with the matter of the ſtone in which it lies. The ſingle columns which form each phalanx are uſually round or cylindric, though ſometimes flattened and bent; ſome of them are alſo naturally of an angular figure; theſe, however, are not regular in the number of their angles, ſome conſiſting of three ſides, ſome of five, and ſome of ſeven; ſome are hexangular alſo, but theſe are ſcarce. They are from five or ſix to ſixteen inches in length; and the largeſt are near half an inch over, the leaſt about a quarter of an inch; the greater number are very equal to one another in ſize; but the ſides of the columns being unequal, the ſame column meaſures of a different thickneſs when meaſured different ways; the phalanges or congeries of theſe are ſometimes of a foot or more in diameter.

The columns are often burſt, as if they had been affected by external injuries; and it is evident, that they were not formed before ſeveral other of the extraneous foſſils; for there are found ſometimes ſhells of ſea-fiſhes and entrochi immerſed and bedded in the bodies of the columns. It appears plainly from hence, that when theſe bodies were waſhed out of the ſea, and toſſed about in the waters which then covered the tops of theſe cliffs, this elegant foſſil, together with the ſtony bed in which it is contained, were ſo ſoft, that theſe other bodies found entrance into their very ſubſtance, and they were formed, as it were, upon them. This foſſil takes an elegant poliſh, and makes in that ſtate a very beautiful appearance, being of the hardneſs of the common white marble, and carrying the elegant ſtructure viſible in the ſmalleſt lineaments. Woodward's Coll. of Foſſ. p. 11.

PHALARIS, in *Biography*, tyrant of Agrigentum, in Sicily, who rendered himſelf famous by the cruelties which he committed, but of whoſe perſonal hiſtory very little is known. He is thought to have been born in Crete, and to have been baniſhed from that iſland on account of his political intrigues. He went to Sicily, and by his abilities was enabled to obtain the ſovereignty of Agrigentum about the year B. C. 571. He found it neceſſary to maintain by harſhneſs and ſeverity, the place to which he had riſen by force or fraud, and he became one of the moſt deteſted of tyrants. The moſt marked inſtance of his cruelty is his puniſhment by the brazen bull. (See AGRIGENTUM, and BULL *of Phalaris*.) There is extant a ſeries of letters under the names of Phalaris and Abaris, the genuineneſs of which has been the ſubject of much controverſy, eſpecially between the honourable Charles Boyle and the celebrated Dr. Bentley. Boyle, who gave an edition of thoſe epiſtles with a new Latin verſion, in 1695, made a reflection upon the conduct of Bentley in his preface, which induced the critic to undertake to prove that the letters were ſpurious, and conſequently the labour beſtowed upon them uſeleſs. He carried his point, and the ſpuriouſneſs of the epiſtles of Phalaris is now generally admitted: hence the circumſtances of his life deduced from them loſe their authority. An hiſtory of Phalaris was publiſhed in 1726, by a Frenchman, entitled "L'Utilité du Pouvoir Monarchique," &c. which is a mere romance. Perhaps the lateſt edition of the Epiſtles is that of Valkenaer, Groningen, 4to. 1777. Univerſal Hiſt. Moreri.

PHALARIS, in *Botany*, ſuppoſed to be the φαλαρις of Dioſcorides, with whoſe deſcription the firſt or principal ſpecies talies tolerably well, and anſwers ſtill better to the idea of the name, in the neat ſhining aſpect of its glumes and ſeeds.—Linn. Gen. 32. Schreb. 45. Willd. Sp. Pl. v. 1. 326. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 62. Prodr. Fl. Græc. Sibth. v. 1. 36. Ait. Hort. Kew. v. 1. 137. Juſſ. 29. Lamarck Illuſtr. t. 42. Gærtn. t. 80. Schrad. Germ. v. 1. 177.—Claſs and order, *Triandria Digynia*. Nat. Ord. *Gramina*.

Gen. Ch. reformed. *Cal.* Glume ſingle-flowered, of two compreſſed, nearly equal, keeled, acute valves, their ſtraight parallel margins brought cloſe together. *Cor.* but half the ſize of the calyx, and concealed within it, double; the outermoſt ſmalleſt, of one or two lanceolate, acute, keeled, nearly equal, more or leſs downy valves, cloſely applied to the back of the innermoſt, which conſiſts of two larger, oblong, concave, acute valves, finally permanent and cartilaginous, inveſting the ſeed, the inner one ſmalleſt. Nectary of two lanceolate, pointed, pellucid leaves, tumid at the baſe. *Stam.* Filaments three, capillary; anthers oblong, forked at each end. *Piſt.* Germen ovate; ſtyles two, capillary, combined at the baſe; ſtigmas villous. *Peric.* none, except the permanent hardened inner corolla, which does not ſeparate. *Seeds* ſolitary, ovate-oblong, acute, ſmooth.

Eſſ. Ch. Calyx ſingle-flowered, of two, nearly equal, keeled valves, encloſing the double corolla. Seed coated with the hardened inner corolla.

Many changes, and ſome miſtakes, have taken place with regard to the ſpecies of this elegant genus of graſſes, ſo that it is neceſſary to exhibit the whole in detail.

1. Ph. *canarienſis*. Common Canary-graſs. Linn. Sp. Pl. 79. Willd. n. 1. Ait. n. 1. Engl. Bot. t. 1310. Knapp. t. 3. Mart. Ruſt. t. 17. Schreb. Gram. t. 10. f. 2. Leers t. 7. f. 3 +. Sm. Fl. Græc. Sibth. v. 1. 40. t. 55. (Phalaris; Ger. Em. 86. Matth. Valgr. v. 2. 270.)—Panicle ovate, ſpike-ſhaped. Valves of the calyx boat-like. Outer corolla of two valves; inner one villous. Root fibrous.—Native of cultivated fields in the ſouth of Europe; naturalized occaſionally in England, flowering in July and Auguſt, and generally occurring about dunghills. It is ſown as a crop, chiefly in the county of Kent, according to profeſſor Martyn, being much uſed as the food of ſinging birds in cages. The *root* is annual, of ſeveral branched fibres. *Stems* ſeveral, eighteen inches or two feet high, bent at the lower joints, but otherwiſe erect, round, leafy, ſmooth. *Leaves* ſpreading, lanceolate, taper-pointed, rather glaucous, roughiſh beneath; their ſheaths long, ſtriated, inflated upwards, eſpecially the uppermoſt. *Stipula* blunt, moſtly torn. *Spikes* terminal, ſolitary, an inch or two long, thick, very handſome; the valves of the *calyx*, the only ones that are viſible, being prettily ſtriped with green and white; they are uſually ſmooth, ſometimes a little downy, the white dilated keel of each often furniſhed with a notch near the ſummit. The outer *corolla* is of two equal lanceolate ſmooth valves, clapped cloſe to the keels of the valves of the inner, which are downy and unequal. *Anthers* yellow, prominent. Linnæus and Schreber reckon the outer *corolla* an inner *calyx*, perhaps not incorrectly.

2. Ph. *nodoſa*. Knotty Canary-graſs. Linn. Syſt. Veg. ed. 14. 104. Willd. n. 5. Sm. Fl. Græc. Sibth. v. 1. 41. t. 56. (Ph. tuberoſa; Linn. Mant. 557. Ph. bulboſa; Cavan. Ic. v. 1. 46. t. 64. Ph. bulboſa, albo ſemine; Scheuch. Agr. 53. t. 2. f. 3 F.)—Panicle lanceolate, ſpike-ſhaped. Valves of the calyx boat-like. Outer corolla of one valve. Stems bulbous at the baſe.—Native of the ſouth of Europe. Barnadez found it in Spain; Sibthorp about the borders of fields in the Archipelago. The *root* is perennial, of many downy fibres. *Stems* numerous, twelve or eighteen inches high, aſcending, leafy; decumbent at the baſe, where two or three of the lower joints are tumid and ovate, aſſuming a bulbous aſpect, which ſhews that the plant is accommodated to a ſoil whoſe moiſture varies much. *Leaves* ſpreading, graſs-green, linear, longer and narrower than in the preceding, with cloſe *ſheaths*, and long *ſtipulas*. The *ſpike* is alſo much narrower and rather longer. Keel of the *calyx* entire, roughiſh. Outer *corolla* of only one lanceolate villous valve. Linnæus cultivated this ſpecies at Upſal, and from a more accurate obſervation of its *root*, was led to change the name he had given it in the *Mantiſſa*, to *nodoſa*. It has been much miſunderſtood, and is a ſtranger to our gardens.

3. Ph. *aquatica*. Water Canary-graſs. Linn. Sp. Pl. 79. Willd. n. 2. Ait. n. 2. Sm. Fl. Græc. Sibth. v. 1. 42. t. 57. Schrad. Germ. v. 1. 179. Hoſt. Gram. Auſtr. v. 2. 29. t. 39. (Ph. minor; Retz. Obſ. faſc. 3. 8. Ehrh. Exſicc. 61. Gramen typhinum phalaroides majus bulboſum aquaticum; Barrel. Ic. t. 700. f. 1.)—Panicle cylindrical, ſpike-ſhaped. Valves of the calyx boat-like, ſomewhat crenate. Outer corolla of one valve. Root knotty, creeping.—Native of Egypt and of the Tiber, according to Linnæus. Dr. Sibthorp found it in watery ſituations in Aſia Minor. The *root* is branched, knotty and jointed, creeping, with numerous downy fibres. All authors, even the accurate Schrader, aſſert it to be annual, which nobody could ſuppoſe from its appearance. *Stems* erect, ſtraight, ſmooth and rather glaucous, in our ſpecimens four or five feet high; Schrader ſays a foot and a half. *Leaves* very long and rather narrow, rough on both ſides; the ſheaths long and tight. *Panicle* from three to five inches long, cylindrical, bluntiſh, three quarters of an inch thick. Keel of the *calyx* thin, with ſeveral ſmall ſhallow irregular notches. Outer *corolla* of one minute, lanceolate, cloſe-preſſed, villous glume; both valves of the inner more or leſs ſilky. This ſpecies has long been cultivated at Paris, as appears by the Linnæan herbarium, and was ſent to Kew by M. Thouin in 1778. Ehrhart's ſpecimen agrees exactly with our's, except in being leſs luxuriant. We ſee no reaſon for rejecting Barrelier's ſynonym.

4. Ph. *cæruleſcens*. Blueiſh Canary-graſs. Desfont. Atlant. v. 1. 56. (Gramen phalaroides hirſutum, ſpicâ longiſſimâ; Buxb. Cent. 4. 30. t. 53.)—Panicle cylindrical, ſpike-ſhaped, rather lax. Valves of the calyx boat-like,

tapering, pointed. Corolla acute.—Gathered by Buxbaum, in meadows about the Boſphorus, in May; by Deſfontaines in fields at Algiers. This is compared by the latter to *Ph. bulboſa*, by which there is good reaſon to ſuppoſe he meant the graſs ſo called by Linnæus; ſee Phleum *tenue*. Buxbaum took his plant for that of Barrelier, cited under our laſt ſpecies, and therefore found fault with that figure; but he was miſtaken, as was Linnæus no leſs in citing him under *aquatica*, from which the plant of Buxbaum and Deſfontaines ſeems to differ in having ſmooth *leaves*, and a more lax *panicle;* but eſpecially in the *calyx*, which is blueiſh, with taper-pointed valves. We do not underſtand why Buxbaum terms his "a hairy graſs." We have ſeen no ſpecimen, and as Deſfontaines does not advert to the double *corolla*, even in *Ph. canarienſis*, it is impoſſible to aſcertain from him whether the preſent plant has one or two valves in the outer *corolla*. His expreſſion of "an inner *calyx*," in theſe and other graſſes, alludes only to the *corolla* altogether, after the French mode.

5. Ph. *paradoxa*. Briſtled-ſpiked Canary-graſs. Linn. Sp. Pl. 1665. Willd. n. 11. Ait. n. 6. Sm. Fl. Græc. Sibth. v. 1. 43. t. 58. Schrad. Germ. v. 1. 179. Linn. fil. Dec. 2. 35. t. 18. Schreb. Gram. 93. t. 12. Hoſt. Gram. Auſtr. v. 2. 30. t. 40.—Panicle cylindrical, obtuſe, ſpike-ſhaped. Valves of the calyx ſingle-toothed, awned. Lower flowers abrupt and abortive.—Native of Iſtria, Italy and Greece, in cultivated ground, flowering in May and June. *Root* annual, of many downy fibres. *Stems* numerous, aſcending, 12 or 18 inches high, bent at the joints, almoſt entirely clothed with the long, more or leſs inflated, ſheaths of the *leaves*, the uppermoſt of which embraces the lower part of the *panicle*, where a great many of the *flowers* aſſume a ſtrange appearance, being ſtarved, abortive, and of an abrupt wedge-like figure. The *flowers* above, in their natural ſtate, are prettily variegated with green and white. *Calyx-valves* lanceolate, each with a broad, but partial and acute, dilatation of the keel, like a tooth, and a terminal rough ſtraight awn, various in length. Schrader has obſerved a minute outer *corolla* of two valves; the inner conſiſts of two, rather unequal, ovate, acute, ſomewhat downy ones. *Seed* minute. Linnæus obſerved, that all the *flowers* became perfectly formed, in cultivated ſpecimens.

6. Ph. *arundinacea*. Reed Canary-graſs. Linn. Sp. Pl. 80. Fl. Dan. t. 259. Ehrh. Calam. 51. Schrad. Germ. v. 1. 180. t. 6. f. 5. Engl. Bot. t. 402. and t. 2160. f. 2. Hoſt. Gram. Auſtr. v. 2. 25. t. 33. Leers 18. t. 7. f. 3. (Arundo colorata; Soland. in Ait. H. Kew. ed. 1. v. 1. 116. Dryand. in ed. 2. v. 1. 174. Sm. Fl. Brit. 147. Prodr. Fl. Græc. Sibth. v. 1. 69. Knapp. t. 98.)—Panicle upright, with ſpreading branches. Flowers crowded, leaning one way.—Native of rivers, ditches and lakes, throughout Europe, flowering in July. A variety with variegated *leaves* is common in gardens. The *root* is perennial, creeping and tufted, ſpreading to a great extent. *Stems* from two to five feet high, erect, ſtrong, reedy, ſmooth and leafy, with ſeveral joints. *Leaves* alſo reed-like, lanceolate, ſtriated, pointed, ſmooth, rather glaucous, with tight, or ſcarcely ſwelling, ſheaths. *Stipula* ſhort, bluntiſh. *Panicle* very different from any of the preceding, conſiſting of numerous, compound, angular, rough *branches*, turned one way, and bearing numerous, crowded, often purpliſh, tufts of *flowers*. The *calyx-valves* are lanceolate, nearly equal, keeled, ribbed, awnleſs. Outer *corolla* of two very minute, linear, gibbous, hard valves, each bearing a tuft of hairs exceeding their own length. Theſe hairs miſled the ingenious Dr. Solander to refer the graſs in queſtion to *Arundo*, a miſtake in which we concurred in Fl. Brit. but which is now corrected in *Engl. Bot.* by the ſubſtitution of a new page 402, in conſequence of the very accurate remarks of Dr. Schrader, whoſe *Flora Germanica* excels every work, in this tribe of plants, that we have ſeen.

7. Ph. *capenſis*. Cape Canary-graſs. Thunb. Prodr. 19. Willd. n. 3.—"Panicle ovate, ſpike-ſhaped. Glumes entire. Stem bent and decumbent."—Native of the Cape of Good Hope. Having ſeen neither ſpecimen, nor any further deſcription of this ſpecies, we dare not remove it from *Phalaris*, though it may poſſibly be a *Phleum*.

To the latter genus we now refer the Linnæan *Phalaris bulboſa*, *dentata*, *phleoides*, as well as *arenaria* of Fl. Brit. and *aſpera* of Willdenow. The *utriculata* is ſhewn in Fl. Græc. t. 63 to be an *Alopecurus*, beyond all poſſible doubt; *oryzoides* will be found under *Leerſia; zizanoides* is *Andropogon muricatum*, Retz. Obſ. faſc. 3. 43. *Ph. hiſpida*, Thunb. Jap. 44, appears a very doubtful plant, but there is evidently no reaſon to retain it here. See Phleum.

Phalaris, in *Agriculture*, the title of a genus of graſſes, of which there are ſeveral ſpecies, but none that can be introduced into field culture with advantage. It is the canary graſs.

Phalaris, in *Ornithology*. See Fulica *Atra*.

Phalaris's *Bull*, in *Ancient Hiſtory*, was a brazen bull for tormenting criminals, conſtructed by Perillus the Athenian, in order to flatter the cruelty of Phalaris, tyrant of Agrigentum. The artiſt, demanding too great a reward for his contrivance, was the firſt who ſuffered in it. Some have treated this fragment of ancient hiſtory as a fable; but we learn from Diodorus Siculus, lib. xiii. cap. 13. that Scipio Africanus, when he razed Carthage, about 260 years after the deſtruction of Agrigentum, found among other things this bull, and reſtored it to the inhabitants of Agrigentum, where it was to be ſeen when Diodorus wrote his hiſtory, *viz.* in the reign of Auguſtus. See Bull *of Phalaris*.

PHALAROPE, in *Ornithology*, is a ſpecies of the *tringa* in the Linnæan ſyſtem. Mr. Pennant gives the following general character of this ſpecies: the bill is ſtraight and tender; the noſtrils minute; the body and legs like thoſe of the ſand-piper, and the toes furniſhed with ſcallopped membranes. He alſo more particularly deſcribes the grey phalarope, or *tringa lobata* of Linnæus, and the red or *tringa hyperborea* of the ſame author. See Tringa.

PHALEMPIN, in *Geography*, a town of France, in the department of the North; 9 miles S.W. of Lille.

PHALERA, the name of a bandage for the noſe, deſcribed by Galen in his Treatiſe on Bandages.

PHALERÆ, among the *Ancients*, horſe-trappings.

PHALERUM, in *Ancient Geography*, the moſt ancient port of Athens, which, being found narrow and inconvenient, was ſucceeded by the more capacious harbour of Piræus, conſtructed by Themiſtocles. (See Piræus.) Phalerum was diſtant from the city, according to Thucydides, 35 ſtadia, but, according to Pauſanias, only 20. It was from this port that Mneſtheus, an ancient king of Athens, took his departure with a ſquadron for the ſiege of Troy. Theſeus likewiſe went from hence to Crete, to combat the Minotaur. Near this port was a temple of Ceres, a temple of Minerva Scirada, ſo called after Sciras, one of the propheteſſes of Dodona, a temple of Jupiter, ſome altars to unknown gods, different altars to ſeveral heroes, ſuch as the children of Theſeus and thoſe of Phalerus, from whom this port derived its name, and who was ranked among the Argonauts, and an altar to Androgeus, with this brief inſcription, "To the Hero." Pauſan. in Attic. On the road which led from Phalerum to Athens there had ſubſiſted for a long time a temple of Juno, which was burnt by Mardonius, on occaſion of the invaſion of the Perſians. See Athens.

PHALEUCUS, or Phalæcius, in *Poetry*, a kind of verſe, in uſe among the Greeks and Latins; conſiſting, like the Sapphic, of five feet; the firſt a ſpondee, the ſecond a dactyl, and the three laſt trochees.

The phaleucus is very proper for epigrams. Catullus excelled in it. Its original author is not known; though ſome have ſaid it derives its name from its inventor.

PHALLICA, φαλλικα, in *Antiquity*, feaſts or ſacrifices celebrated at Athens, in honour of Bacchus.

The Phallica were inſtituted on the following occaſion: one Pegaſus, a citizen of Eleutheris, having carried ſome ſtatues of Bacchus to Athens, drew on himſelf the laughter and contempt of the Athenians. Soon after this, the people were ſeized with an epidemic diſeaſe; and, upon conſulting the oracle how to get free of it, were anſwered, that there was no way but to receive Bacchus in pomp: they did it, and thus inſtituted the Phallica; wherein, beſides the ſtatues and trophies of the god, they bore figures of the parts affected, tied to thyrſi.

PHALLOPHORI, φαλλοφοροι, a name given at Sicyon to certain mimes, who ran about the ſtreets ſmutted with black, and clothed in ſheep ſkins, bearing baſkets full of various herbs, as chervil, brancha urſina, violet, ivy, &c.

The word is formed from φαλλος, *a pole*, at the end of which was faſtened the figure of a human penis made of leather; and φερω, *I bear*.

They danced in cadence, and were crowned with ivy, in honour of Bacchus; carrying the phallus before them as the enſign of their office.

PHALLUS, in *Botany*, a genus of *Fungi*, whoſe whimſical conformation bears too ſtriking a reſemblance to the Greek φαλλος to be overlooked or diſſembled. Linn. Gen. 568. Schreb. 769. Mart. Mill. Dict. v. 3. Perſ. Syn. 242. Hudſ. 629. Juſſ. 4. Lamarck Illuſtr. t. 885. Venten. Mem. de l'Inſtit. v. 1. 503. Uſt. Annal. faſc. 21. 67.—Claſs and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Eſſ. Ch. Volva radical. Head ovate, ſtalked, entire, clothed with a fluid containing the ſeeds.

Obſ. The above characters, to which the genus in queſtion is very juſtly reſtricted by Perſoon, exclude from it the ſeveral kinds of Morel (ſee Morchella), which indeed have no natural affinity in texture, characters, or properties to *Phallus*, though confounded with it by Linnæus and his followers, as well as by Ventenat. The following are all the genuine ſpecies known.

Section 1. *Head reticulated and cellular.*

1. Ph. *fœtidus*. Common Stink-horn. Sowerb. Fung. t. 329. (Ph. impudicus; Linn. Sp. Pl. 1648. Curt. Lond. faſc. 3. t. 72. Bolt. Fung. t. 92. Bull. Fr. t. 182. Fl. Dan. t. 175. Schæff. Fung. t. 196—198. Ph. vulgaris, &c.; Mich. Gen. 201. t. 83.)—Stalk with numerous perforations, ſomewhat oblique. Head honeycomb-like, pervious.—This occurs not unfrequently in autumn, on a ſandy ſoil, in various parts of Europe, either on open heaths, or under trees; exciting attention by the odious ſcent, which it diffuſes widely around, while the liquor is flowing from the head, and which is, naturally enough, often miſtaken for that of carrion. The *root* is fibrous. *Volvas* ſeveral together, partly buried in the ground, white, each reſembling a hen's egg in ſize and ſhape. *Stalk* erect, the growth of a few hours, about ſix inches high, tubular, whitiſh, highly cellular and tender, an inch, or almoſt two, in diameter. *Head* ovate, unconnected, except at the top; externally much like a honeycomb, pale, but covered when at maturity with a viſcid, fœtid, greeniſh-black fluid, which ſoon runs off, carrying away the *ſeeds*. Flies are very fond of this fluid.

2. Ph. *cancellatus*. Latticed Stink-horn. Perſ. n. 2. Venten. n. 10. (Ph. volvatus, pileo apice clauſo; Rothm. Stockh. Tranſ. for 1742. 19. t. 2. Ph. alpinus, volvâ ſubrotundâ albâ, pileolo cellulato, umbilico pervio carente, pediculo dilutè fulveſcente; Mich. Gen. 202. Boletus phalloides; Petiv. Oper. v. 1. 6. t. 129. f. 10.)—Stalk cylindrical, even. Head reticulated, impervious.—Native of Sweden, in barren moſſy ground, as well as of mountains in Tuſcany, having been found by Tozzi, who ſent a figure of it to Petiver, in woods about the celebrated monaſtery of Valumbroſa. Its ſize, and general aſpect, are like the former, with which Linnæus confounds it, nor does even Perſoon aver it to be indubitably diſtinct. Yet the ſpecific character appears deciſive. Its ſcent is reported to be agreeable, and like ſome of the Orchis tribe.

3. Ph. *induſiatus*. Veiled Stink-horn. Venten. n. 13. Perſ. n. 3. (Ph. dæmonum; Rumph. Amboin. v. 6. book 11. 131. t. 56. f. 7.)—Stalk round, cellular, with a net-like veil. Head roundiſh, reticulated, pervious.—The plant which Ventenat deſcribes was found abundantly in the French ſettlements at Guiana, by Vaillant, father of the romantic African traveller, in the year 1755. Its *volva* was not obſerved. The *ſtalk* is ſix inches high, milk-white, tubular, its ſurface covered with bliſters, which at length burſt, and become cells. *Head* bell-ſhaped, connected only at the top, reticulated, or like a honey-comb, of a deep blue, the elevated reticulations white. From the lower margin of the *head* hangs down an ample, very tender, net-like *veil*, at firſt white, then reddiſh, gradually expanded, and finally reaching to the ground, which is the greateſt peculiarity of this ſpecies. Rumphius's Amboyna plant does not appear to us ſpecifically different. He attributes to it a very intolerable ſcent, which Vaillant did not obſerve, and ſpeaks of it as held in abhorrence by the Malays, who ingeniouſly imagine this fungus to ſpring from the urine of demons. Dr. Buchanan found in Upper Nepaul, in Auguſt, a ſingle ſpecimen which anſwers to the above deſcription, but which decayed before he could have it delineated. In this the *head* was livid, the *veil* of a pale ſtraw-colour; but probably theſe parts may undergo changes in this reſpect; during their rapid growth. After all, we do not mean to aſſert that there may not be ſeveral ſpecies furniſhed with a *veil*, but we have not materials to diſtinguiſh them.

Section 2. *Head tuberculated, combined with the Stalk.*

4. Ph. *inodorus*. Small Scentleſs Stink-horn. Sowerb. Fung. t. 330. (Ph. caninus; Schæff. Fung. t. 330. Curt. Lond. faſc. 4. t. 73. Perſ. n. 4. Venten. n. 7.)—Stalk cylindrical, with numerous perforations, yellowiſh. Head united with the ſtalk, red, plaited lengthwiſe, impervious. This very pretty ſpecies is not half the ſize of the firſt, and much more rare. It is found every autumn, in Caen wood near Hampſtead, and very frequently in the woods of Coſſey and Crown Point, near Norwich. Mr. Sowerby ſays the unopened *volva*, brought into the houſe in an evening, has before morning produced a full-grown plant, but he never obſerved it to grow in the day-time. We have, on the contrary, had theſe plants before us, while writing, during a whole morning, and have ſeen them ſhoot up in the courſe of three or four hours. They may be obſerved without inconvenience, being deſtitute of the fetor of our other Britiſh ſpecies. The *root* is much branched,

ſpreading horizontally to a great extent, and producing here and there ſolitary, ovate, whitiſh *volvas*. *Stalk* two or three inches high, and half an inch thick, yellowiſh. *Head* while covered with its viſcid liquor, not unlike a pickled olive in ſize and colour, but when that ſubſtance is removed, which happens more tardily than in the *fœtidus*, the *head* appears of a dull red, plaited or furrowed longitudinally, and without any terminal orifice: its lower edge moreover is cloſely united with the ſtalk.

5. Ph. *Mokuſin*. Chineſe Stink-horn. Cibot Act. Petropol. v. 19. 373. t. 5. Linn. Suppl. 452. Perſ. n. 5. Venten. n. 8.—Stalk with five angles. Head acute, in five deep cohering ſegments.—Grows on the old decaying roots of Mulberry trees in China. Father Cibot, one of the miſſionaries, obſerved it about Pekin, and ſent a full account, with excellent drawings of the plant, to the Academy of Peterſburg. Its growth is rapid, ſize rather inferior to the laſt, and ſcent very offenſive. The *volva* reſembles that of *Ph. inodorus*. *Stalk* rather curved, hollow, very tender and cellular, of a delicate fleſh-colour at the baſe, which becomes deeper afterwards. The greateſt peculiarity of this ſpecies is the *ſtalk* having five angles, and the red *head* being deeply divided into as many oblong portions, all cohering, and cemented, as it were, by the greeniſh viſcid fluid which envelopes the *ſeeds*. Inſects are ſaid to devour this fungus as ſoon as it comes in their way. It is reported to vary greatly in ſize in various parts of China, and in ſome to be eatable, though in others poiſonous. Perhaps ſeveral ſpecies are confounded under the above name. The aſhes of the burnt fungus are eſteemed ſerviceable, if ſprinkled over cancerous ulcers.

6. Ph. *Hadriani*. Smooth Dutch Stink-horn. Venten. n. 11. Perſ. n. 6. (Phallus n. 140; Sterb. Fung. 277—279. t. 30. f. A—G. Fungus marinus; Dod. Pempt. 483. Fungus; Ger. Em. 1583. f. 2.)—"Stalk cylindrical, ſpotted with grey. Head ſmooth and even, with a prominent dilated orifice."—This is ſaid by Dodonæus to grow on the ſand-hills which border the coaſt of Holland, amongſt *Carices*. It is repreſented with a double *volva*, an even, not cellular, *ſtalk* and *head*, the latter with a prominent wide mouth. Sterbceck's figures A—D ſeem intended for the ſame plant, in an earlier ſtate, as his E—G. The latter repreſentations are copied from Dodonæus, and repeated over and over again in various books; they are alſo copied in Barrelier's t. 1258. As no recent author ſeems to have obſerved this ſpecies, we cannot but ſuppoſe it a variety, or perhaps miſrepreſentation, of the *fœtidus*, which is found on our Norfolk coaſt, oppoſite to Holland, in the ſituations mentioned. The ſpecific name alludes to Hadrianus Junius, who has deſcribed the plant in a copy of Latin verſes, printed by Dodonæus.

Fungus phalloides gallus, Barrel. t. 1264, appears, as Perſoon well obſerves, a diſtinct ſpecies. Poſſibly it may be akin to the *cancellatus*, n. 2. Were it not for the *volva*, we ſhould ſuſpect it might be a bad repreſentation of Perſoon's *Morchella coſtata*; Boletus of Micheli, t. 85. f. 3.

Phallus *Marinus*, a name given by ſome authors to a ſpecies of *canalis* or *tubulus marinus*, found about Amboyna, and called by the French writers *priape* and *arroſoir*. It is an oblong ſhell, with a large head, which is pierced full of holes; ſo that it at once reſembles the glans penis, and the noſe of a watering-pot, uſed by gardeners.

PHALSBOURG, in *Geography*, a town of France, in the department of the Meurthe, and chief place of a canton, in the diſtrict of Sarrebourg, founded in 1570, and fortified by Vauban in 1680; 4 miles E.N.E. of Sarrebourg. The place contains 2032, and the canton 12,760 inhabitants, on a territory of 197½ kiliometres, in 27 communes.

PHANAGORA, a town of Ruſſia, in the government of Caucaſus, at the mouth of the Kuban, on the coaſt of the Black ſea; called by the Tartars "Taman," without a harbour; 60 miles E. of Theodoſia. N. lat. 45°. E. long. 36° 40'.

PHANATIC, Phanaticus, commonly written *fanatic*, a viſionary; one who fancies or thinks he ſees ſpectres, ſpirits, apparitions, or other imaginary objects, even when awake; and takes them to be real.

Such are phrenetics, necromancers, hypochondriac perſons, lycanthropi, &c. See Phrenzy, Hypochondriasis, Lycanthropy, &c.

Hence the word is alſo applied to enthuſiaſts, pretenders to revelation, new lights, prophecies, &c. See Fanatic.

PHANERA, in *Botany*, from φανερος, *conſpicuous*, a genus of Loureiro's, founded on the *Bauhinia ſcandens*, Linn. Sp. Pl. 535, the Folium linguæ, Rumph. Amboin. v. 6. 1. t. 1. This plant, it ſeems, has but three *ſtamens*, and a *calyx* of four leaves. Its habit however is altogether that of a genuine *Bauhinia*, a genus in which the ſtructure of both thoſe parts is variable. Rumphius ſays the *flowers* are white or yellowiſh; Loureiro deſcribes them ſcarlet. See Bauhinia.

PHANTASM, φαντασμα, *phantom*, a ſpecies of an object perceived by an external ſenſe, and thence retained in the phantaſy.

Ariſtotle taught, that all the objects of our thought enter at firſt by the ſenſes; and, ſince the ſenſe cannot receive external material objects themſelves, it receives their ſpecies, that is, their images or forms, without the matter; as wax receives the form of the ſeal, without any of the matter of it. Theſe images or forms, impreſſed upon the ſenſes, are called "ſenſible ſpecies," and are the objects only of the ſenſitive part of the mind; but by various internal powers, they are retained, refined, and ſpiritualized, ſo as to become objects of memory and imagination, and at laſt of pure intellection. When they are objects of memory and of imagination, they get the name of "phantaſms." When by farther experiment, and being ſtripped of their particularities, they become objects of ſcience, they are called "intelligible ſpecies:" ſo that every immediate object, whether of ſenſe, of memory, of imagination, or of reaſoning, muſt be ſome phantaſm or ſpecies in the mind itſelf. Such was the theory of the Peripatetics, with regard to the objects of our thought; and it has been ſaid that the doctrine of modern philoſophers concerning ideas is built upon it. Mr. Locke, who uſes this word frequently, tells us that he means the ſame thing by it, as is commonly meant by ſpecies or phantaſm. Gaſſendi, from whom Locke borrowed more than from any other author, ſays the ſame. The words ſpecies and phantaſm are terms of art in the Peripatetic ſyſtem, and from this we are to learn the meaning of them. We ſhall here add, that the theory of Democritus and Epicurus, on this ſubject, was not very unlike to that of the Peripatetics. They held, that all bodies continually ſend forth ſlender films or ſpectres from their ſurface, of ſuch extreme ſubtilty, that they eaſily penetrate our groſs bodies, or enter by the organs of ſenſe, and ſtamp their image upon the mind. The ſenſible ſpecies of Ariſtotle were mere forms without matter. The ſpectres of Epicurus were compoſed of a very ſubtile matter. See Idea, Perception, and *Mental* Philosophy.

PHANTASMAGORIA, a term which denotes the raiſing of ſpectres, is a ſpecies of magic lantern, exhibited on a large ſcale, and projecting an image on a ſemi-tranſparent ſcreen of taffetas, inſtead of a wall. For the principle of the conſtruction, ſee Magic *Lantern*.

PHANTASTIC, in *Muſic*. Phantaſtic ſtyle is a free, eaſy manner of compoſition; proper for inſtruments. See Style.

PHANTASTICAL Colours, is a denomination given by the Peripatetics to thoſe colours exhibited by the rainbow, or a priſm; they erroneouſly ſuppoſing them not to be real colours, but only phantoms, or deceptions of the ſight.

But many experiments of the moderns, and particularly thoſe of ſir Iſaac Newton, demonſtrate the contrary, and prove them as real as any other colours in nature. See Emphatical.

PHANTASY, or Fancy. See Imagination.

PHARÆ, or Phares, in *Ancient Geography*, a town in the eaſtern part of Achaia, on the river Melas, diſtinguiſhed by a variety of beautiful ornaments. It had a ſtatue of Mercury *Agoreus*, and alſo oppoſite to it another ſtatue, which repreſented the goddeſs Veſta; and it was famous for its oracles.—Alſo, a town of Meſſenia, on the Meſſenian gulf, N.W. of Cardamyla. Its foundation is aſcribed to Phares, the ſon of Mercury and Philodamæa, one of the daughters of Danaus. Among other divinities reverenced in this place were Nicomachus and Gorgazus, ſons of Machaon. They had both governed this city after the death of their father, to whom as well as themſelves was attributed the art of healing maladies. Hence aroſe the veneration paid in this place to demi-gods. Their temples were full of the richeſt preſents, and almoſt conſtantly emitted the incenſe of ſacrifices. Here was a beautiful temple of Fortune. Pharæ was ſituated at the diſtance of ſix ſtadia from the ſea, and near it was a ſacred grove dedicated to Apollo Carneus; and in this grove a fountain.—Alſo, a town of the iſland of Crete, in which was a colony of Meſſenians.—Alſo, a town of Greece, in Bœotia.

PHARAMBARA, in *Ancient Geography*, a town of Aſia, in the interior of Media, between Tigrana and Tachaſara. Ptolemy.

PHARAN, a deſert of Arabia Petræa, near Kadeſh-Barnea. It was in a place of this deſert, called "Rothma," that the Iſraelites had their 15th ſtation.

Pharan, in *Geography*, a town of Arabia Petræa, near the gulf of Suez, once the ſee of a biſhop, but now ſunk into decay; 40 miles N. of Tor.

PHARAOH, in *Biography*, a common name of the kings of Egypt. The etymology of this name is variouſly ſtated by different writers. Le Clerc, in Gen. xii. 15, derives it from the root *pharah*, to be exalted, or to be ſuperior. The abbé Renaudot ſays, that Pharaoh is the ſame as the Egyptian word *poura*, which ſignifies a king. Kircher deduces Pharaoh from the word *pharah*, which ſometimes ſignifies to deliver; and he would have Pharaoh to denote one who is exempted from the juriſdiction of the laws. Joſephus ſays (Antiq. l. viii. c. 2.), that all the kings of Egypt, from Minæus (or Menes), the founder of Memphis, who lived ſeveral ages before Abraham, had the name of Pharaoh, down to the time of Solomon, for more than 3300 years. He adds, that when theſe princes aſcended the throne, they aſſumed this name, laying aſide their former appellation; the word Pharaoh, in the Egyptian language, ſignifying a king. Accordingly Joſephus ſays, that Herodotus names none of the kings of Egypt after Minæus, the builder of Memphis, though he had 330 kings for his ſucceſſors, becauſe they had all the name of Pharaoh; but he names an Egyptian queen, Nicaule, (or Nitocris,) who ſucceeded them. Joſephus alſo ſays, that he finds from the ancient records of the Jewiſh nation, that after the age of Solomon, no king of Egypt had the name of Pharaoh. Joſephus ſeems to have miſunderſtood and miſrepreſented the account given by Herodotus: for this ancient hiſtorian expreſsly ſays, that in the books of the Egyptian prieſts were regiſtered the names of 330 kings, of whom 18 were Ethiopians, and a woman who was a foreigner, called Nitocris; and the others were Egyptians. Theſe princes had each his proper name in this catalogue. We ſee alſo in the fragments of Manetho, that each king of Egypt had a name peculiar to him; and we find the name of Pharaoh only in ſcripture. Joſephus is alſo miſtaken in aſſerting, that ſince the time of Solomon, the kings of Egypt had no longer the name of Pharaoh; ſince we find this name under Hezekiah (2 Kings, xviii. 20.), under Joſiah (ch. xxiii. 29, 30, &c.), under Jehoiakim (ch. xxiii. 35.), and in the prophets Iſaiah, Jeremiah, and Ezekiel; who are much later than Solomon. It is very probable, that the Egyptians gave the name of Pharaoh to their kings, as long as the Egyptian language was in common uſe, and as long as their kings were of their own nation. But, after the conqueſt of Egypt by the Perſians, and eſpecially by Alexander the Great, and the Grecians introduced their language, with their government, the name of Pharaoh ceaſed among them.

The *firſt* Pharaoh, known to us, is the perſon in whoſe time Abraham went down into Egypt (Gen. xii. 10, &c.), A.M. 2084, B.C. 1919. The *ſecond* Pharaoh, noticed in ſcripture, reigned in Egypt in the time of Joſeph. The *third* Pharaoh is he who perſecuted the Iſraelites. The *fourth* was probably the Pharaoh before whom Moſes appeared, and in whoſe ſight he ſmote Egypt with plagues. This Pharaoh was drowned in the Red ſea. The *fifth* Pharaoh, known to us, is he who gave protection to Hadad, the king of Edom (1 Kings, xi. 15—18.), about A.M. 2960. The *ſixth* is the Pharaoh, who gave his daughter in marriage to Solomon. (1 Kings, iii. 1. ix. 16.) The *ſeventh* Pharaoh is Shiſhak, who protected Jeroboam, and afforded him a refuge againſt king Solomon, his maſter, (1 Kings, xiv. 25. 2 Chron. xii. 2. 5, &c.) A.M. 3033. The *eighth* is the Pharaoh, with whom Hezekiah made a league againſt Sennacherib, king of Aſſyria, A.M. 3290. The *ninth* is Pharaoh-Necho, ſon of Pſammitichus, who ſubdued Joſiah. The *tenth* is Pharaoh-Ophrah, who entered into alliance with Zedekiah, king of Judah, and attempted to aſſiſt him againſt Nebuchadnezzar, king of Chaldæa. Againſt this Pharaoh Ezekiel pronounced ſeveral prophecies, Ezek. xxix, xxx, xxxi, xxxii. He is called Apries by Herodotus. He is alſo mentioned Habakkuk ii. 15, 16. Iſ. xix. xx. Jerem. xlvi. 17. Calmet on the Bible.

PHARAON, the denomination of a game of chance. The principal rules of this game are, that the banker holds a pack of fifty-two cards; that he draws all the cards one after the other, and lays them down at his right and left hand alternately; that the ponte may at his choice ſet one or more ſtakes upon one or more cards, either before the banker has begun to draw the cards, or after he has drawn any number of couples; that the banker wins the ſtake of the ponte, when the card of the ponte comes out in an odd place on his right hand, but loſes as much to the ponte when it comes out in an even place on his left hand; that the banker wins half the ponte's ſtake, when it happens to be twice in one couple; that when the card of the ponte being but once in the ſtock, happens to be the laſt, the ponte neither wins nor loſes; and that the card of the ponte being but twice in the ſtock, and the laſt couple containing his card twice, he then loſes his whole ſtake. M. De

Moivre has ſhewn how to find the gain of the banker in any circumſtance of cards remaining in the ſtock, and of the number of times that the ponte's cards is contained in it. Of this problem he enumerates four caſes; *i. e.* when the ponte's card is once, twice, three, or four times in the ſtock. In the firſt caſe, the gain of the banker is $\frac{1}{n}$, n being the number of cards in the ſtock. In the ſecond caſe, his gain is $\frac{\overline{n-2}\times y}{n \times n - 1} + \frac{2}{n \times n - 1}$, or $\frac{\frac{1}{2}n + 1}{n \times n - 1}$, ſuppoſing $y = \frac{1}{2}$. In the third caſe, his gain is $\frac{3y}{2 \times n - 1}$, or $\frac{3}{4 \times n - 1}$, ſuppoſing $y = \frac{1}{2}$. In the fourth caſe, the gain of the banker, or the loſs of the ponte, is $\frac{2n - 5}{n - 1 \times n - 3}y$, or $\frac{2n - 5}{2 \times n - 1 \times n - 3}$, ſuppoſing $y = \frac{1}{2}$. M. De Moivre has calculated a table, exhibiting this gain or loſs, for any particular circumſtance of the play; and he obſerves, that at this play, the leaſt diſadvantage of the ponte, under the ſame circumſtances of cards remaining in the ſtock, is when the card of the ponte is but twice in it, the next greater when three times, the next when once, and the greateſt when four times. He has alſo demonſtrated, that the whole gain *per cent.* of the banker, upon all the money that is adventured at this game, is 2*l.* 19*s.* 10*d.* De Moivre's Doctrine of Chances, p. 77, &c. p. 105, &c. See Bassette.

PHARASTIA, in *Ancient Geography*, a town of Aſia, in the interior of Media, between Phaſaba and Curia, according to Ptolemy.

PHARATHA, a town which was ſituated in the interior of Arabia Felix. Ptol.

PHARATHOU, or Pharatus, a town of Paleſtine, in the tribe of Ephraim.

PHARAZANA, a town placed by Ptolemy in Drangiana.

PHARBÆTHUS, a town of Egypt, and capital of the Pharbæithes nome. Ptol.

PHARGA, a town of Arabia Deſerta, near the Euphrates. Ptol.

PHARI, among the *Ancients*, a kind of candleſtick. See Branch.

PHARICUM, the name of a famous poiſon among the ancients: it was ſaid to be compoſed of many ingredients, but we know nothing of it at this time.

PHARIGIUM, in *Ancient Geography*, a promontory of Greece, in the Phocide, between Marathon and the foot of Mychus.

PHARINGOTOMUS, in *Surgery*, from φαϱιγξ, *the throat*, and τομη, *an inciſion*, an inſtrument for ſcarifying the tonſils, on opening abſceſſes about the fauces.

PHARIS, in *Ancient Geography*, a ſmall town of the Peloponneſus, in Laconia, according to Pauſanias, who ſays that it was ſituated near the river Phellia, on the route from Amyclæa to mount Taygetes. From his time its ruins only have been ſeen.

PHARISEES, a celebrated ſect among the ancient Jews: ſo called, as ſome ſay, becauſe ſeparated from the reſt by the auſterity of their life, and by their profeſſing a greater degree of holineſs, and a more religious obſervation of the law.

This is the import of the word פרם, in the Hebrew, or rather Chaldee tongue; whence is formed the Greek Φαρισαιος, and the Latin *Phariſæus*. St. Jerom, and ſeveral of the rabbins, maintain this etymology; which is very agreeable to the ſtate and character of the Phariſees; who were not only diſtinguiſhed from the reſt by their manner of life, but by their habit. However, others, with leſs probability, have derived the name from פרש, *expoſuit*, becauſe the Phariſees were in the higheſt reputation for expounding the law.

It is very difficult to fix the preciſe origin of the Phariſees. The Jeſuit Serrarius places their firſt riſe about the time of Eſdras, becauſe it was then that the Jews firſt began to have interpreters of their traditions. Maldonat, on the other hand, will not have this ſect to have ariſen among the Jews till a little before the time of Chriſt. Others, perhaps with more probability, refer the origin of the Phariſees to the time of the Maccabees.

Dr. Lightfoot thinks, that Phariſaiſm roſe up gradually, from a period which he does not aſſign, to the maturity of a ſect. It is certain, from the account given by Joſephus, that in the time of John Hyrcanus, the high-prieſt and prince of the Aſmonean line, about a hundred and eight years before Chriſt, the ſect was not only formed; but made a conſiderable figure; and that it had advanced to a high degree of popularity and power about eighty years before Chriſt. Calmet places their origin about A.M. 3820, B.C. 184. Joſ. Ant. lib. xiii. cap. 10. § 5, 6. cap. 15. § 5. and cap. 16. § 1. According to Baſnage, Hiſt. of the Jews, book ii. cap. 9. § 2, one Ariſtobulus, an Alexandrian Jew, and a Peripatetic philoſopher, who flouriſhed about a hundred and twenty-five years before Chriſt, and wrote ſome allegorical commentaries on the Scripture, was the author of thoſe traditions, by an adherence to which the Phariſees were principally diſtinguiſhed from other ſects.

Be this as it will, Phariſaiſm is ſtill the prevailing doctrine in the Jewiſh religion; that vaſt number of traditions in the Talmud, which bear ſo great a ſway among the Jews, coming all from the Phariſees, which they aſcribed to God, and received as of equal authority with the ſacred writings. See Mischna.

Joſephus, who deſcribes their dogmata, ſays, that they attributed all to deſtiny, and to God; ſo, however, as not to deprive man of his free agency, which Sixtus of Sienna thus explains: the Phariſees believed, that all things were done by deſtiny, *i. e.* with God's foreknowledge, and in conſequence of his immutable decree; the will of man ſtill remaining free and unaffected: "Fato, hoc eſt, Dei præſcientia, & immobili decreto, omnia geri; manente tamen libero humanæ libertatis aſſenſu."

They owned the immortality of the ſoul, a reſurrection, and a future ſtate; but they admitted, at the ſame time, as ſome have ſuppoſed, a kind of metempſychoſis, or tranſmigration of ſouls. They alſo held the doctrine of angels, and ſeparate human ſpirits. They were alſo much addicted to aſtrology.

The Phariſees were great ſticklers for the allegorical or myſtical ſenſe of the Scriptures; whence moſt of the converts made to Chriſtianity among the Jews were of the number of the Phariſees.

In effect, the Phariſees were in every thing directly oppoſite to the *Sadducees*; which ſee.

PHARIUM, in *Ancient Geography*, a town of Aſia, in Cilicia. Suidas and Xenophon.

PHARKOVA, in *Geography*, a town of Ruſſia, in the government of Tobolſk, on the Niznei Tungunſka. N. lat. 61° 35′. E. long. 106 54.

PHARMACEUTICA, Φαρμακευτικη, that part of phyſic which directs the preparation and application of medicines. See PHARMACY.

PHARMACI, Φαρμακοι, among the Greeks, an appellation uſed for two perſons who were employed in the luſtration or purification of cities.

Theſe were two men, according to ſome; but others ſuppoſe them to have been a man and woman, to repreſent the male and female ſex, for each of which they offered a ſacrifice. It was uſual for the man to carry about his neck figs, called ισχαδες, of a blackiſh colour; and the woman ſuch as were white. Pott. Archæol. Græc. tom. i. p. 400, ſeq.

PHARMACIA, φαρμακεια, in *Antiquity*, denotes the art of effecting ſtrange and wonderful things, by means of medicated and enchanted compoſitions of herbs, minerals, &c. Theſe things themſelves were called *pharmaca*, ſome of which, being taken inwardly, were ſaid to cauſe blindneſs, madneſs, love, &c. Such were the medicaments by which Circe transformed Ulyſſes' ſoldiers: others infected by touch; ſuch was the garment Medea ſent to Creuſa: others ſpread their venom afar off, and operated upon perſons at a great diſtance.

There were alſo *pharmaca ſoteria*, φαρμακα σωτηρια, which were amulets againſt the former: ſuch was the herb moly, which preſerved Ulyſſes from Circe's enchantments; the laurel, the ſallow-tree, the rhamnus or Chriſt-thorn, fleabane, the jaſper-ſtone, and many others mentioned by Albertus Magnus, and Orpheus, in his book De Lapillis. Pott. Archæol. Græc. lib. ii. cap. 18. tom. i. p. 353. See AMULET.

PHARMACITIS TERRA, in the *Materia Medica*, a name which ſome authors have given to the common ampelites, or cannel-coal.

PHARMACIUS SINUS, in *Ancient Geography*, a gulf of Thrace, on the Boſphorus of the ſame name, ſouth-weſt of the gulf Bætycolpas. A conſiderable river ran into this gulf.

PHARMACOCHEMIA, a term uſed to expreſs that part of the chemical art which treats of the preparation of medicines.

It is thus called by way of diſtinction from that chemiſtry which is wholly employed about the tranſmutation of metals by means of the philoſopher's ſtone; this being called *ſpagirico-chemia*.

PHARMACOLOGY, a treatiſe of medicines, or the art of preparing them, judging of them, &c.

PHARMACOPŒIA, formed from φαρμακον, *remedy*, and ποιειν, *to make*, a diſpenſatory, or a treatiſe deſcribing the preparations of the ſeveral kinds of medicines, with their uſes, manner of application, &c.

We have various pharmacopœias; as thoſe of Bauderon, Quercetan, Zwelfer, Charas, Bates, Salmon, Lemery, Quincy, &c. The lateſt, and moſt in eſteem, are the Edinburgh, London, and Dublin Diſpenſatories.

PHARMACOPOLA, or PHARMACOPOEIUS, an apothecary, or a perſon who prepares and ſells medicines. See APOTHECARY.

The word is ſeldom uſed but by way of ridicule. It is formed from φαρμακον, and πωλειν, *to ſell*. See Horace, Satire 2. lib. i. verſ. 1.

PHARMACUM, φαρμακον, a medicament, or medicine; whether of ſalutary, or poiſonous quality.

PHARMACUSA, in *Ancient Geography*, an iſland of the Ægean ſea.—Alſo, the name of two ſmall iſles, ſituated near that of Salamina; in the largeſt of which, according to Strabo, was ſeen the tomb of Circé.

PHARMACY, φαρμακεια, derived from φαρμακον, *remedy*, that branch of medicine, which teaches the choice, preparation, and mixture of medicines.

Moſt of the natural bodies being ſome way or other employed as ſubjects of pharmacy, the materia medica is extremely large, and its operations various. Its materials in the earlieſt ages, indeed, were very few, and the ways of managing them very ſimple: ſubjects afterwards multiplied, operations increaſed, and at preſent we ſeem abundantly ſtocked with both ſimple and compound medicines.

Diſeaſes muſt have been very early, if the firſt inhabitants of the earth experienced the ſame changes of ſeaſons, breathed the ſame kind of air, and uſed a like kind of diet and regimen of life with ourſelves: but ſoon after the diſeaſe afflicts, the patient ſeeks a remedy; and this appears to have been the foundation of pharmacy in different parts of the world.

Experiments being thus multiplied, and the preparations of ſimples better made, pharmacy became at length an art. Hippocrates, however, when he came to compile a kind of ſyſtem of phyſic from the obſervations of antiquity, deſcribed but few, and thoſe generally ſimple.

Succeeding phyſicians then enlarged the *materia medica;* which ſee. Galen conſiderably ſwelled the catalogue, and the Arabians much more; and when learning began to revive in Europe, the materia medica was again enlarged, and great changes wrought upon it by chemiſtry.

The art of pharmacy muſt be conſidered under the management of phyſicians, apothecaries, trading chemiſts, and druggiſts. To the phyſician it belongs to direct the medicines, and to give the rules of extracting and managing the ſimples. To the apothecary belongs the reduction of the materia medica into certain forms of medicines, according to the direction of the phyſician. And the deſign of trading chemiſts, and druggiſts, is to furniſh medicinal matters to the apothecary, who cannot always detect an artificial counterfeit, or a dexterous ſophiſtication; and perhaps many remedies, well deſigned by the phyſician, have failed, or had miſchievous effects on this account. Shaw's Lectures, p. 195.

Pharmacy has been divided (without any ſufficient reaſon) into Galenical and chemical.

PHARMACY, *Galenical*, called alſo ſimply pharmacy, is that derived to us from the ancients; conſiſting in the knowledge and management of the ſeveral parts of the materia medica, now in the hands of the apothecaries. See GALENIC.

PHARMACY, *Chemical*, called alſo *ſpagirical* and *hermetical*, is that introduced by Paracelſus, who calls it *ars diſtillatoria;* conſiſting in the reſolving of mixed bodies into their component parts, in order to ſeparate the uſeleſs and ill, and collect and exalt the good. See CHEMISTRY.

Under the direction of modern chemiſtry and medical ſkill, the ſtate of modern pharmacy has been much improved. The pharmaceutical apparatus conſiſts of furnaces, baths, and a variety of veſſels made of glaſs, &c. For the weights and meaſures, we refer to theſe articles. The operations of pharmacy are ſolution, extraction, depuration, cryſtallization, precipitation, diſtillation, ſublimation, expreſſion, exſiccation, fuſion, calcination, &c. For the preparation of different articles, we refer to the terms that denominate them.

PHARMACY, *Characters in*. See CHARACTER.

PHARMUTHI, in the *Egyptian Chronology*, one of the months of their year, which anſwered to the month of April among the Romans.

PHARNACEUM, in *Botany*, a name taken from Pliny, ſaid to have been given to ſome plant in honour of its diſcoverer Pharnaces, ſon of Mithridates, king of Pontus. But what the ancient *Pharnaceum* was, though its dried root is reported to have improved the flavour of wine, commentators have conjectured in vain. We may venture to aſſert it has nothing to do with the preſent Linnæan genus; nor can we gueſs at the motive for its application to a ſet of plants, almoſt deſtitute of any ſenſible qualities, and of too trivial an aſpect to have attracted notice, except from the curious enquirers of modern time. Linn. Gen. 150. Schreb. 202. Willd. Sp. Pl. v. 1. 1507. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 2. 173. Juſſ. 300. Lamarck Illuſtr. t. 214. Gærtn. t. 130.—Claſs and order, *Pentandria Trigynia*. Nat. Ord. *Caryophyllei*, Linn. Juſſ.

Gen. Ch. *Cal.* Perianth of five, nearly ovate, concave, ſpreading, equal, permanent leaves, coloured withinſide, thin-edged. *Cor.* none; hence the coloured thin-edged calyx. *Stam.* Filaments five, awl-ſhaped, the length of the calyx; anthers cloven at the baſe. *Piſt.* Germen ſuperior, ovate, triangular; ſtyles three, thread-ſhaped, the length of the ſtamens; ſtigmas obtuſe. *Peric.* Capſule ovate, ſlightly triangular, inveſted by the cloſed calyx, of three cells and three valves. *Seeds* numerous, poliſhed, orbicular, depreſſed, ſurrounded by an acute border.

Obſ. Reichard remarks that the parts of fructification in *Ph. Mollugo* differ ſomewhat from the above account. This remark is ſuggeſted by the deſcription in Linn. Mant. 561, which belongs to *Mollugo Spergula*, ſee Mollugo; but we find the flowers are variable on the ſame individuals. We have already indicated the cloſe affinity between theſe genera.

Eſſ. Ch. Calyx of five leaves, coloured internally. Corolla none. Capſule ſuperior, of three cells, with many ſeeds.

The four ſpecies defined in Sp. Pl. ed. 2, have ſubſequently been augmented, chiefly by diſcoveries at the Cape of Good Hope, to 14, as may be ſeen in Willdenow. Their habit is for the moſt part ſlender, like a *Spergula* or *Arenaria*; in ſome caſes herbaceous and annual, in others ſhrubby; but always of humble ſtature. *Leaves* ſimple, entire, ſmoothiſh, variouſly diſpoſed; their *ſtipulas* ſometimes very remarkable for a ſhining membranous aſpect, and curious ſubdiviſion. *Infloreſcence* moſtly forked, panicled. *Flowers* copious, variegated with green and white, or a reddiſh tint.

1. Ph. *Cerviana*. Umbellate Pharnaceum. Linn. Sp. Pl. 388. Willd. n. 1. Ait. n. 1. (Ph. umbellis ſimpliciſſimis; Gmel. Sib. v. 3. 102. t. 20. f. 2. Alſine; Pluk. Phyt. t. 332. f. 1.)—Flower-ſtalks lateral, ſomewhat umbellate, about as long as the linear whorled leaves.—Native of Ruſſia, Siberia, Spain, Guinea and the Eaſt Indies. The *root* is ſmall and annual. *Herb* ſmooth. *Stems* numerous, ſpreading in every direction, thread-ſhaped, yellowiſh, three or four inches long, ſimple or divided. *Leaves* about ten in each whorl, linear, glaucous, an inch long, more or leſs. *Umbels* of two or three greeniſh-white *flowers*, on capillary *ſtalks* bent toward one ſide. Minuart, a Spaniſh botaniſt, is cited by Linnæus as having written a monograph on this ſpecies, under the name of *Cerviana*, but we have never been able to diſcover any ſuch work.

2. Ph. *Mollugo*. Bedſtraw Pharnaceum. Linn. Sp. Pl. 389. Mant. 562, but not 561. (Ph. glomeratum; Linn. Suppl. 185. Thunb. Prodr. 53. Willd. n. 7. Alſine procumbens, gallii facie africana; Herm. Lugd-Bat. 19. t. 21. Rubia ſtellaris ſive Aſperula minor humiſparſa, floſculis albis æthiopica; Pluk. Mant. 163. Mollugo n. 1.; Linn. Hort. Cliff. 28.)—Flower-ſtalks axillary, ſingle-flowered, half the length of the linear whorled leaves.—Native of the Cape of Good Hope. The *root* is annual. *Stems* numerous, proſtrate, alternately branched, zigzag, round, jointed, whitiſh, very ſmooth and poliſhed. *Leaves* ſix or ſeven in a whorl at each joint, ſpreading, about half an inch long, linear, entire, ſmooth, light green, each tipped with a ſmall briſtly point. *Flowers* very minute, about the ſize of a *Herniaria*, green, with white edges, pentandrous, each on a ſhort ſimple ſtalk, ſeveral together at each whorl; but we find no proper umbel, as deſcribed in the *Supplementum*, though we perceive what cauſed that error.

Great confuſion has exiſted between this plant and the *Mollugo Spergula* of Linnæus, but the above ſynonyms will not fail to prevent any further miſtake. Since the article Mollugo was publiſhed, various ſpecimens from Dr. Rottler have enabled us better to underſtand the *M. Spergula*, a moſt variable plant, ſome of whoſe *flowers* anſwer, as far as we can judge of them dried, to the deſcription in Mant. 561; whilſt others, from the ſame root, are ſimply triandrous, without either *petals* or barren *filaments*, as they ought to be in a *Mollugo*. Linnæus cultivated it in the Upſal garden, and, no doubt, ſaw there what he has ſo minutely deſcribed, though one of his ſpecimens from thence has ſimply triandrous *flowers*. This ſpecimen, moreover, has ſo nearly loſt all the lateral pubeſcence from the *ſtem*, and has its *leaves* ſo much elongated, that no one could think it the ſame with the authentic wild ſpecimen of *M. Spergula*, which we have deſcribed in its proper place, did not the various parts of Dr. Rottler's moſt ſatisfactorily combine the two. We muſt obſerve that *M. Spergula* is the *Pharnaceum Mollugo* of moſt botaniſts, they being miſled by the wrongly printed ſpecific name in *Linn. Mant.* 561, which in the margin ought to have been *Spergula*. Willdenow, bewildered by this miſtake, has increaſed it by the mention of *Mollugo verticillata*.

3. Ph. *ſerpyllifolium*. Thyme-leaved Pharnaceum. Linn. Suppl. 186. Willd. n. 8. Thunb. Prodr. 54.—"Stalks ſingle-flowered. Leaves ovate, ſtalked."—From the Cape. A delicate annual herb, reſembling a ſmall plant of *Herniaria glabra*. *Stems* branched, forked, thread-ſhaped, jointed, ſmooth. *Leaves* two or more at each joint, ſtalked, ovate, many times ſhorter than the intermediate ſpaces. *Stalks* lateral, capillary, the length of the *leaves*. *Linn.*

4. Ph. *dichotomum*. Forked Pharnaceum. Linn. Suppl. 186. Willd. n. 12. Thunb. Prodr. 54. Ait. n. 5.—"Stalks axillary, elongated, forked. Leaves whorled, linear."—From the ſame country. Willdenow and Aiton mark it annual. We have ſeen no ſpecimen of this or the laſt.

5. Ph. *lineare*. Linear-leaved Tawny Pharnaceum. Linn. Suppl. 185. Willd. n. 2. Ait. n. 2. Andr. Repoſ. t. 326.—Umbels irregular, partly compound, on long terminal ſtalks. Leaves linear, whorled. Stem proſtrate, ſomewhat ſhrubby.—Sent from the Cape by Mr. Maſſon, in 1795, and occaſionally introduced ſince, though often loſt, being difficult of preſervation. The *ſtem* is ſomewhat ſhrubby and perennial, and is, according to Mr. Andrews, increaſed by cuttings. *Leaves*, and whole appearance, much like our Engliſh *Spergula arvenſis*, but the *flowers* have a tawny hue, and grow in ſpurious *umbels*, ſome of whoſe ſtalks are racemoſe. The ſtructure of the *fructification* anſwers well to the generic character.

6. Ph. *teretifolium*. Thread-leaved Pharnaceum. Thunb.

Prodr. 53. Willd. n. 3.—“ Umbels lateral. Leaves thread-ſhaped, pointed. Stem erect, ſhrubby.”—Gathered by Thunberg at the Cape.

7. Ph. *microphyllum.* Small-leaved Pharnaeeum. Linn. Suppl. 185. Willd. n. 4. Thunb. Prodr. 54.—Umbels moſtly terminal. Leaves ſpatulate, cluſtered, obtuſe. —Stipulas woolly.—Found by Thunberg in the ſame country. *Stem* woody, erect, determinately branched; *branches* very numerous, ſhort, aſcending. *Leaves* imperfectly oppoſite, ſhort, recurved, with denſe axillary tufts of ſmaller ones, all enveloped at the baſe with white, woolly. criſped *ſtipulas. Umbels* ſimple, on ſtout purpliſh *ſtalks,* which are crowned with a tuft of ſmall leaves and ſtipulas in a ſingular manner, and ſeem therefore an elongation of the ſtem. *Flowers* few, yellowiſh, drooping.

8. Ph. *marginatum.* Bordered Pharnaceum. Thunb. Prodr. 54. Willd. n. 5.—“ Leaves ovate, bordered, obtuſe. Flowers axillary, ſeſſile.”—From the Cape. *Thunb.* We know nothing more of this ſpecies, nor whether Willdenow has rightly placed it next to *microphyllum.*

9. Ph. *quadrangulare.* Quadrangular Pharnaceum. Linn. Suppl. 185. Willd. n. 9.—Panicles denſe, leafy, terminal. Leaves lanceolate, thick-edged, cloſely imbricated in four rows.—Gathered at the Cape of Good Hope by Bladh, who communicated it to Linnæus. This ſpecies is extremely rare, and altogether ſingular for the Heath-like aſpect of the innumerable, minute, imbricated *leaves* on the young *branches. Flowers* greeniſh, in denſe *panicles,* or *cluſters,* accompanied by ſhorter ovate *leaves.* The *ſtem* is ſtout and woody.

10. Ph. *incanum.* Hoary Pharnaceum. Linn. Sp. Pl. 389. Suppl. 186. Willd. n. 10. Ait. n. 4.—Figured in Pluk. Phyt. t. 304. f. 4.—Panicles umbelled, forked, leafy, on very long ſtalks. Leaves linear. Stipulas in long capillary ſegments.—Native of Southern Africa. The *ſtem* is ſhrubby, much branched. *Leaves* about an inch long, very narrow, flat, beſet with long, white, ſhining, capillary *ſtipulas,* which give the *branches* a hiſpid aſpect. *Infloreſcence* of the ſame ambiguous kind as we have mentioned under n. 7, but the common *ſtalks* are even ſix inches long; the partial ones repeatedly compound, and of conſiderable length alſo. *Flowers* green and white, far more abundant, but ſmaller than in our ſpecimen from a garden, or in Plukenet's figure.

11. Ph. *albens.* Silver-branched Pharnaceum. Linn. Suppl. 186. Willd. n. 11. Thunb. Prodr. 53.—Panicles ſomewhat umbelled, forked, on very long ſtalks. Leaves linear, recurved, pointed. Stipulas minute, fringed.—Gathered at the Cape by Thunberg. Linnæus had ſpecimens from his friend Bæck.—*Stem* ſhrubby, like the laſt, but the *branches* are of an elegant blueiſh ſilvery hue, not concealed by the *ſtipulas,* which are very ſmall, fringed, and united to the ſides of each leaf, at the baſe. *Leaves* rather above half an inch long, fleſhy, glaucous, obtuſe, with a ſmall terminal briſtle. *Infloreſcence* much like the laſt, but leſs umbellate, and ſcarcely leafy, the common *ſtalks* four or five inches long, blueiſh and ſhining. Willdenow miſapplies to this Plukenet's ſynonym, which belongs to the *incanum.*

12. Ph. *diſtichum.* Double-cluſtered Pharnaceum. Linn. Mant. 221. Willd. n. 13. (Alſine ſpergula indiæ orientalis, ſpicatis floribus ex alis emergentibus; Pluk. Mant. 9. Phyt. t. 332. f. 4. A. holoſtea villoſa, foliis caulem ambientibus; multiflora; Pluk. Phyt. t. 130. f. 6.) Cluſters axillary, zigzag, ſtalked, in pairs. Leaves linear-lanceolate, downy.—Native of the Eaſt Indies. The *ſtem* appears herbaceous. *Leaves* whorled, various in ſize, downy. Common *ſtalks* of the twin *cluſters* longer than the leaves. *Flowers* ſmall.

13. Ph. *cordifolium.* Heart-leaved Pharnaceum. Linn. Sp. Pl. 389. Am. Acad. v. 6. 85. Willd. n. 14. Thunb. Prodr. 54.—Panicles forked, on lateral ſtalks, much exceeding the inverſely heart-ſhaped, whorled, ſtalked leaves. Native of the Cape. *Stems* herbaceous, proſtrate, branched, a foot or more in length. *Leaves* thick, half an inch wide, ſmooth. *Stipulas* white, finely fringed. *Infloreſcence* and *flowers,* except the want of *petals,* much like *Spergula arvenſis.*

The reader will obſerve that *Ph. depreſſum,* Linn. Mant. 562, is LOEFFLINGIA *Indica*; ſee that article; and ſeems to be figured in Pluk. Phyt. t. 334. f. 3. S.

PHARNACIUM, in *Ancient Geography,* a town of Aſia Minor, in Phrygia.

PHAROS, or ISSA PHAROS, an iſland of the Adriatic ſea, on the coaſt of Illyria.—Alſo, a river of Aſia, in the environs of Cilicia and the Euphrates.—Alſo, an iſland on the coaſt of Italy, over-againſt Brunduſium, which is ſaid to have been ſo called from the Pharos, or light-houſe, erected there for the ſecurity of navigation.

PHAROS, *Phare,* a light-houſe, a pile raiſed near a port, where a fire is kept burning in the night, to guide and direct veſſels near at hand.

The pharos of Alexandria, built in a ſmall iſland at the mouth of the Nile, was anciently very famous, inſomuch as to communicate its name to all the reſt. It was ſo magnificent a ſtructure, being built by the famed architect Soſtrates, a native of Cnidos, or, as ſome ſay, by Deiphanes, the father of Soſtrates, that it coſt Ptolemy Philadelphus eight hundred talents. It had ſeveral ſtories raiſed one over another, adorned with columns, baluſtrades, galleries of the fineſt marble and workmanſhip, to which, ſome add, that the architect had contrived to faſten ſome looking-glaſſes ſo artificially againſt the higheſt galleries, that one could ſee in them all the ſhips that ſailed in the ſea for a great way; inſtead of which noble ſtructure, one ſees now only a kind of irregular caſtle, without ditches or outworks of any ſtrength, the whole being accommodated to the inequality of the ground on which it ſtands, and which it ſeems is no higher than that which it ſhould command. Out of the midſt of this clumſy building riſes a tower, which ſerves for a light-houſe, but which hath nothing of the beauty and grandeur of the old one. The coloſſus of Rhodes alſo ſerved as a pharos.

Ozanam ſays, pharos anciently ſignified a ſtreight; as the pharos or pharo of Meſſina. See LIGHT-*Houſe.*

PHARPAR, or PHARPHAR, in *Ancient Geography,* one of the rivers of Damaſcus, or rather an arm of the Barrady or Chryſorrhoas (which ſee), that waters the city of Damaſcus, and the adjacent country. 2 Kings, v. 12.

PHARRKIRCHEN, in *Geography,* a town of Bavaria; 24 miles W. of Paſſau.

PHARSALIA, in the hiſtory of *Poetry,* a poem of Lucan, which belongs to the epic claſs. The ſubject of this poem bears characters of epic grandeur and dignity, nor does it want unity of object; *viz.* the triumph of Cæſar over Roman liberty. As it is not brought to a proper cloſe, we have either been deprived by time of the laſt books, or the author left an incomplete work. Although the ſubject be abundantly heroic, Dr. Blair points out two defects: the one is, that civil wars, eſpecially when fierce and cruel, like thoſe of the Romans, preſent too many ſhocking objects to be fit for epic poetry, and give odious and diſguſting views of human nature. But Lucan's genius ſeems to delight in ſavage ſcenes, and he dwells on them too much. The other defect of Lucan's ſubject, is its being too near the times in which he lived; becauſe he is thus deprived of the aſſiſtance of fiction and machinery, and his work is thus rendered leſs ſplendid and amuſing. As to characters, Lucan has drawn them with ſpirit and with force. Although Pompey be his profeſſed hero, he has failed in intereſting us much in his favour; he is always eclipſed by the ſuperior abilities of Cæſar. But Cato is Lucan's favourite character; and wherever he introduces him, he appears to riſe above himſelf. His ſpeech, in particular, to Labienus, who urged him to enquire at the oracle of Jupiter Ammon concerning the iſſue of the war, deſerves to be remarked as equal, for moral ſublimity, to any that is to be found in all antiquity. In the conduct of the ſtory he has attached himſelf too much to chronological order, which breaks the thread of the narration; and he is often too digreſſive.

In the Pharſalia, the reader will perceive ſeveral very poetical and ſpirited deſcriptions: nevertheleſs, the author's chief ſtrength does not lie in narration or deſcription; his narration is often dry and harſh, and his deſcriptions are frequently overwrought, and employed alſo upon diſagreeable objects. His principal merit conſiſts in his ſentiments, which are generally noble and ſtriking, and expreſſed with that glow and ardour of manner, for which he is peculiarly diſtinguiſhed. Lucan is the moſt philoſophical, and the moſt public ſpirited poet of all antiquity (ſee Lucan); and he is the only ancient epic poet, who was really and deeply intereſted by the ſubject of his poem. Hence he abounds in exclamation and apoſtrophes, almoſt always well timed, and ſupported with a vivacity and fire highly honourable to him. But he is apt to exceed due bounds, carrying every thing to an extreme, and not knowing where to ſtop. Attempting to aggrandize his objects, he becomes tumid and unnatural; and when the ſecond line of his deſcriptions is ſublime, the third, in which he meant to riſe ſtill higher, is bombaſt. Upon the whole, his ſentiments are ſo high, and his fire occaſionally ſo great, as to atone for many of his defects: and paſſages may be produced from him which are inferior to none in any poet whatever. The characters which he draws, *e. g.* of Pompey and Cæſar, in the firſt book, are maſterly, and the compariſon of Pompey to the aged decaying oak, is highly poetical. But judging of the whole execution of his poem, Dr. Blair pronounces, that his poetical fire was not always under the government of either ſound judgment or correct taſte. In his ſtyle there is abundance of force, blended with harſhneſs and obſcurity, from a deſire of expreſſing himſelf in a pointed and unuſual manner. Compared with Virgil, he may be allowed to have more fire and higher ſentiments; but in every thing elſe, particularly in purity, elegance, and tenderneſs, he falls infinitely below him. Blair's Lectures, vol. iii.

PHARSALUS, in *Ancient Geography*, a town of Theſſaly, upon the Enipeus, S.W. of Lariſſa, famous on account of the battle fought on a plain near it, in which Pompey was completely defeated by Cæſar.

PHARSANG, or Parasang. See Parasang.

PHARUS, in *Botany*, ſuppoſed to be ſo called from φαρος, *a cloak*, or *outer covering;* but whether this idea applies to the large wrapping glume of the female flower, as we are inclined to believe; or, as a late French writer, de Theis, aſſerts, on the alleged authority of Browne, to the economical uſe which the negroes in Jamaica make of the broad leaves of this graſs, muſt remain doubtful. We find no ſuch account in our original edition of Browne; either in the proper page, or at p. 333, cited by de Theis. Linn. Gen. 492. Schreb. 639. Willd. Sp. Pl. v. 4. 396. Mart. Mill. Dict. v. 3. Browne Jam. 344. Ait. Hort. Kew. v. 5. 278. Juſſ. 33. Lamarck Illuſtr. t. 769.—Claſs and order, *Monoecia Hexandria*. Nat. Ord. *Gramina*.

Gen. Ch. Male flowers ſtalked, *Cal.* Glume ſingle-flowered, of two ovate, membranous, coloured valves; the outermoſt ſhort, rather acute; the inner twice as long, rounded at the end. *Cor.* Glume longer than the calyx, of two equal, oblong, membranous, coloured valves; the outer are ſharpiſh, keeled below the point; the inner emarginate. *Stam.* Filaments ſix, very ſhort, erect; anthers linear, cloven at each end, the length of the corolla.

Female flowers larger, ſeſſile in the ſame panicle, *Cal.* Glume ſingle-flowered, of two lanceolate, membranous, ſharpiſh, ribbed, nearly equal valves. *Cor.* Glume rather longer, of two valves; the outer nearly cylindrical, rigid, denſely downy, with an acute triangular point, keeled at the back, bent backwards, and ſhaved off at the baſe; the inner linear, very narrow, as long as the other, membranous, its margins folded together, both the prominent edges thickened and downy, the apex cloven. *Piſt.* Germen ſuperior, linear; ſtyle ſimple; ſtigmas three, capillary, downy, projecting from the outer glume of the corolla. *Peric.* none; the outer glume of the corolla enlarged inveſts the ſeed, being all over muricated with little ſoft adheſive hooks. *Seed* oblong, large, with a furrow along one ſide.

Obſ. The above is the improved deſcription of Schreber, who was not able to diſcover any nectary.

Eſſ. Ch. Male, Calyx a glume of two valves, ſingle-flowered. Corolla a glume of two valves.

Female, Calyx as in the male. Corolla a glume of two valves, long, involving the ſolitary ſeed. Style ſimple; ſtigmas three.

1. Ph. *latifolius*. Broad-leaved Pharus, or Wild Jamaica Oat. Linn. Sp. Pl. 1408. Willd. n. 1. Ait. n. 1. (Ph. n. 1; Browne Jam. t. 38. f. 3. Gramen avenaceum ſylvaticum, foliis latiſſimis, locuſtis longis non ariſtatis, glumis ſpadiceis; Sloane Jam. v. 1. 116. t. 73. f. 2.)—Panicle much branched. Calyx awnleſs, naked. Leaves obovate, ſtalked, reverſed.—Frequent on the woody hills of Jamaica, according to Browne and Sloane, who both mention it as a remarkably good and nouriſhing food for cattle. From an expreſſion of the latter, that it is as good for this purpoſe as oats, we preſume the ſeeds are the part uſed, though this is not intelligibly expreſſed. The broad *leaves* are harſh and coarſe, remarkable for being turned upſide down, their length about four inches, and the *footſtalk* as much. *Root* perennial, of many ſtrong fibres. *Stem* ſimple, a foot high, or more, leafy. *Panicle* erect, or rather ſpreading, purpliſh, of numerous upright *flowers*, alternately ſpiked. We had ſpecimens from the Hon. Mrs. Barrington's ſtove in 1791.

2. Ph. *ciliatus*. Fringed Pharus. Retz. Obſ. faſc. 5. 23. Willd. n. 2.—"Panicle ſlightly branched. Calyx awnleſs, fringed. Corolla wanting. Leaves linear."—Gathered about the margins of pools in the Eaſt Indies, by Koenig, who ſent it to Retzius. *Stems* two feet high; clothed with numerous, linear, narrow, rough *leaves*. *Panicle* ſhort, ſometimes a ſimple *cluſter*. *Calyx-valves* ovate, convolute, with two furrows at the back, no awns, and no *corolla*. *Retz.*

3. Ph. *ariſtatus*. Awned Floating Pharus. Retz. ibid. Willd. n. 3.—Panicle umbellate. Calyx awned. Corolla wanting. Leaves ovate.—Native of ponds in the Eaſt Indies, where this graſs was gathered by Koenig, from whom we have it. The long leafy *ſtems* float on the water, ſending down abundance of tufted finely branched *roots*. *Leaves* ſhort, broad, ovate-oblong, obtuſe, with long tumid *ſheaths*,

ſheaths. *Panicles* ſhort, forming a terminal umbel. The ribs of the *calyx* are all finely fringed in our ſpecimens, as Retzius deſcribes them; yet he calls the *calyx* naked in his ſpecific character.

We readily agree with Mr. Brown, Prodr. Nov. Holl. v. 1. 211, that theſe two laſt ſpecies do not properly belong to *Pharus*, but are more akin to *Zizania*, or rather, conſtitute perhaps a new genus. See Leptaspis for a more genuine *Pharus* or two.

PHARUSII, in *Ancient Geography*, a people of Africa, in the interior of Mauritania Cæſarienſis; N. of the Melanogetulians and of mount Sagapola.

PHARYCADUM, a town of Macedonia, in the Eſtiotide, at the confluence of the rivers Peneus and Curialus. Strabo.

PHARYNGÆUM Sal, a name given by authors to an artificial ſalt, of uſe in the quinſey, and caſes of the like kind, when the pharynx, or fauces, are incommoded by a diſcharge of ſerous or other humours.

It is prepared of cream of tartar and nitre, each an ounce, with half an ounce of burnt alum; all theſe are to be diſſolved in vinegar, and coagulated according to art. This ſalt mixed with honey, and diſſolved in plantain-water, makes an excellent gargle.

PHARYNGEA, Artery, in *Anatomy*, a branch of the external carotid. See Artery.

PHARYNGEUS, the name given by Douglas to the conſtrictor muſcle of the pharynx.

PHARYNGO-STAPHYLINUS, is Winſlow's name for the palato-pharyngæus.

PHARYNX, Φαρυγξ, Gr. the large membranous and muſcular cavity, placed at the back of the mouth and noſe, through which the food paſſes into the œſophagus, and the air goes to and from the lungs. See Deglutition.

PHASCHIN, in *Geography*, a ſmall iſland in the Frozen ocean, near the S. coaſt of Nova Zembla. N. lat. 70° 30'. E. long. 57 24'.

PHASCUM, in *Botany*, an ancient Greek name, Φασκον, for ſome kind of moſſy production, adopted by Linnæus for a moſt diſtinct and natural genus of *Muſci*, properly ſo called, whoſe ſpecies are in general the moſt diminutive of their whole natural order. Dillenius comprehended ſuch of them as he had met with, under his *Sphagnum.* Schreber firſt gave a ſcientific and critical account of the genus, in a learned diſſertation, publiſhed at Leipſic in 1770, with two plates, ſince which the ſpecies have been much inveſtigated, and many new ones deſcribed by Dickſon, Hedwig and others.—Linn. Gen. 562. Schreb. 758. Mart. Mill. Dict. v. 3. Hedw. Fund. v. 2. 85. Sp. Muſ. 19. Sm. Fl. Brit. 1149. Turn. Muſc. Hib. 1. Swartz. Muſc. Suec. 17. Juſſ. 11. Lamarck Illuſtr. t. 873. Claſs and order, *Cryptogamia Muſci.* Nat. Ord. *Muſci.*

Eſſ. Ch. Capſule ovate, without any ſeparate lid, deciduous. Veil minute, deciduous.

The minute moſſes which compoſe this genus are generally of the moſt ſimple form of growth, with an undivided, ſhort, and ſometimes ſcarcely diſcernible *ſtem*, though with ſeveral *leaves*, and the *capſule* is, in that caſe, ſolitary, either terminal or lateral, ſeſſile or ſtalked. The *lid* is ſcarcely diſcernible from the reſt of the *capſule*, even in colour, nor are its limits defined by any diſtinct ſeparation; the *ſeeds* therefore eſcape by an irregular, and ſeemingly accidental, laceration, at one ſide, where the lid uſually ſeparates in other moſſes. The laſt edition of *Syſt. Veg.* contains but five ſpecies of *Phaſcum*, and of that ſmall number no more than two are really ſuch. The *Species Muſcorum* of Hedwig deſcribes twelve genuine ones. The *Flora Britannica* however enumerates ſeventeen, all natives of Britain, in the diſcovery of the more minute and curious of which, Mr. Dickſon has had a principal ſhare. They occur chiefly on banks and heaths, ſometimes in bogs. The annual ones, which are moſt numerous, keep vegetating through the open weather of winter, often bearing their minute *flowers* in November and January, and ripening fruit in the early ſpring, at which ſeaſon ſeveral of them compoſe a fine green turf on expoſed gravelly banks, and as the power of the ſun prevails, are ſoon afterwards dried up. Their little *capſules*, innumerable in themſelves, and beyond all calculation as to the abundance of their *ſeeds*, lie hid and undiſtinguiſhable among the ſandy particles of the ſoil, till the moiſture of declining autumn calls forth a new progeny. Several ſpecies are furniſhed, beſides the fibres that draw nouriſhment from the ground, with very curiouſly branched and reticulated ſpreading filaments, extending themſelves like a ſort of *Conferva*, and throwing up ſeparate buds or plants here and there. Yet it is not certain that even ſuch are all of perennial duration, nor do theſe jointed filaments ſeem to take root. They are probably of the nature of roots notwithſtanding, deſtined to imbibe moiſture from the ſurface of the ſoil, or from the moiſture which it exhales, or retains. The latter appears to be more particularly the caſe with *Phaſcum ſtoloniferum.* This grows on naked clay, ſerving merely to fix the plants, which can probably obtain no nutriment but from theſe filaments, ſpreading widely, and collecting from its inhoſpitable ſurface, what ſome trivial decompoſition, aided by the moiſture of the atmoſphere, may afford. America affords a ſimilar ſpecies to the laſt-mentioned, *Ph. cohærens*, Hedw. Sp. Muſc. 25. t. 1. f. 1 - 6. We have however, from Mr. Menzies, a New Holland nondeſcript *Phaſcum*, with actually creeping roots. The following examples will give a ſufficiently accurate idea of the whole.

Ph. *ſubulatum.* Awl-leaved Earth-moſs. Linn. Sp. Pl. 1570. Hedw. Crypt. v. 1. 93. t. 35. Curt. Lond. faſc. 4. t. 67. Engl. Bot. t. 2177. (Sphagnum acaulon trichodes; Dill. Muſc. 251. t. 32. f. 10. Muſcus trichoides minor acaulos, capillaceis foliis; Vaill. Paris. 128. t. 29. f. 4.)—Stem ſimple. Capſule on a ſhort ſtalk. Leaves awl-ſhaped, ſpreading; dilated at the baſe; capillary at the point.—Frequent in ſhady hollows of ſandy banks, bearing fruit in March. *Roots* fibrous, annual. *Plants* rather diſperſed, forming looſe velvet-like patches, of a pleaſant green. Each is about a quarter of an inch high; its ſhort *ſtem* clothed with very ſhort, taper *leaves*, and crowned with a ſpreading tuft of much longer ones, whoſe point is very obſcurely ſerrated. At the top ſtands the little cheſnut-coloured oval *capſule*, ſlightly elevated on a ſcarcely diſcernible *ſtalk.* The *veil* is very ſhort, and at firſt ſlender, till it is ſplit open at one ſide, by the rapid growth of the *fruit*, and ſoon falls off.

Ph. *ſtrictum.* Upright Earth-moſs. Dickſ. Crypt. faſc. 4. 1. t. 10. Sm. Fl. Brit. n. 4. Engl. Bot. t. 2093.—Stem ſcarcely any. Capſule ovate. Leaves awl-ſhaped, upright, ſtraight, ſlightly ſerrated.—A very rare ſpecies, found as yet by Mr. Dickſon alone, on alpine bogs in Scotland. This is not half the ſize of the foregoing, and is diſtinguiſhed by its dark and blackiſh-green hue, the want of a leafy *ſtem*, and the ſtraight uprightneſs of its *foliage.* *Capſule* dark brown when ripe, on a ſhort fruit-ſtalk, and greatly overtopped by the *leaves.*

Ph. *multicapſulare.* Many-fruited Earth-moſs. Sm. Fl. Brit. n. 7. (Ph. ſphærocarpos; Abbot. 230. Ph. criſpum; Swartz Muſc. Suec. 17. Engl. Bot. t. 618, but not of Hedwig.)—Cauleſcent and branched. Stem-leaves alternate; floral ones linear-lanceolate, crowded, ſtraight. Capſules numerous.—Diſcovered by the Rev. Dr. Abbot in cart-ruts in woods about Bedford; but we have received it from no other perſon except profeſſor Swartz. It is annual, bearing capſules all winter long. The *ſtems* are more or leſs divided into ſpreading leafy *branches*, clothed with ſmall alternate *leaves*, and crowned with a large tuft of large ones, which never curl like thoſe of the real *criſpum* of Hedwig, Engl. Bot. t. 1680, for which this was miſtaken in *Fl. Brit.*

Ph. *bryoides*. Tall Earth-moſs. Dickſ. Crypt. faſc. 4. 3. t. 10. f. 3. Sm. Fl. Brit. n. 10. Engl. Bot. t. 1280.—Stem ſimple. Leaves ovate, hair-pointed, upright. Capſule elliptical, beaked. Fruit-ſtalk erect, ſtraight, taller than the leaves.—Found by Mr. Dickſon in heathy woody places, and by the Rev. Dr. Abbot at Clapham ſprings, Bedfordſhire. It is annual, arriving at perfection in the ſpring, and diſtinguiſhed from moſt of its genus, though eaſily confounded with ſeveral ſpecies of other genera, by its elongated *fruit-ſtalk*, reſembling thoſe of moſſes in general. The *capſule* too has a more elongated beak than moſt others, but no ſeparate lid.

Ph. *muticum*. Common Dwarf Earth-moſs. Schreb. Phaſc. 8. t. 1. f. 11—14. Sm. Fl. Brit. n. 14. Engl. Bot. t. 2027. (Ph. acaulon β; Linn. Sp. Pl. 1570. Sphagnum acaulon bulbiforme minus; Dill. Muſc. 252. t. 32. f. 12.)—Stem none. Leaves ovate, concave, cloſely imbricated, beardleſs; the upper ones ſerrated towards the point. Capſule globoſe, nearly ſeſſile. We ſelect this as one of the moſt common ſpecies, and yet one that, for a long time, was not well underſtood. It is indeed among the ſmalleſt, as well as the moſt ſimple in ſtructure. It covers expoſed banks, in the early ſpring, and is conſpicuous for a tawny though ſhining green hue, whoſe brilliancy is enhanced by the dew impriſoned in the concave pellucid *foliage*. The *roots* are fibrous, and ſo entangled, that they have a creeping appearance; ſee Engl. Bot.; but we ſuſpect each fructifying portion to be a diſtinct plant. The want of a terminal hair to the *leaves*, ſome of the larger of which have been obſerved by Mr. J. D. Sowerby to be ſerrated or toothed, the more diminutive ſize of the whole plant, and the abſolute want of a *ſtem*, diſtinguiſh the preſent ſpecies from the equally common *cuſpidatum* of Hedwig, Engl. Bot. t. 2025, with which it was confounded by Linnæus, Hudſon, and others, under the name of *acaulon*.

Ph. *ſerratum*. Serrated Phaſcum. Schreb. Phaſc. 9. t. 2. Sm. Fl. Brit. n. 15. Engl. Bot. t. 460. Dickſ. Crypt. faſc. 1. t. 1. f. 1.—Stem none. Shoots ſpreading, repeatedly branched, capillary, jointed, barren. Leaves lanceolate, acute, ſerrated.—Schreber, who diſcovered this extremely minute ſpecies, in rich moiſt meadows near Leipſic, could not fail to obſerve the fibrous jointed ſhoots that always accompany it, but he miſtook them for *Byſſus*, or rather *Conferva*, *velutina*, Engl. Bot. t. 1556. Mr. Dickſon firſt detected the true nature of theſe appendages, to which we have adverted above. The *root* is ſmall, annual, and fibrous, throwing out from its crown a number of ſuch branched filaments; ſo that ſeveral plants, growing near each other, appear ſeated on a bed of *Conferva*, compoſed in reality of their own intermingled ſhoots. Each has no true *ſtem*. Four or five lanceolate, ſtrongly ſerrated, pellucid *leaves* riſe from the crown of the root, and envelop a nearly ſeſſile, ovate, brown, pointed *capſule*, whoſe *veil* is, above all others, minute and evaneſcent.

Ph. *ſtoloniferum*. Branching-rooted Earth-moſs. Dickſ. Crypt. faſc. 3. 1. t. 7. f. 2. Sm. Fl. Brit. n. 16. Engl. Bot. t. 2106.—Stem creeping, jointed, branched. Shoots ſpreading, branched, capillary, jointed, barren. Leaves lanceolate, pointed, toothed.—Firſt diſcovered by Mr. Edward Forſter, near Walthamſtow. Mr. G. Don has found the ſame in Scotland, and Mr. Turner, who conſiders it as a variety of the laſt, in Ireland. It grows on naked clay, in damp places, and is diſtinguiſhed from *ſerratum* chiefly or entirely by the truly creeping *roots*, which do indeed appear to originate from the jointed filaments, above deſcribed, taking upon themſelves the nature of roots. How far this is poſſible, we are all too imperfectly acquainted with theſe minute, though highly curious, productions, to declare with any degree of certainty.

PHASELIS, or PHASAELIS, in *Ancient Geography*, a town of Paleſtine, in the tribe of Benjamin, ſituated N. of the plain of Jericho, upon the banks of the river Carith, three leagues from the Jordan; ſaid to have been built by Herod in honour of his brother Phaſelus.

PHASEOLUS, in *Botany*, φασηλος, or Φασηολος, of the Greeks; names ſuppoſed to allude to the ſhape of the ſeed-veſſel, which reſembles a kind of ſmall boat, known under the ſame denomination; the Kidney-bean. Linn. Gen. 372. Schreb. 494. Willd. Sp. Pl. v. 3. 1030. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 4. 288. Juſſ. 356. Lamarck Illuſtr. t. 610. Gærtn. t. 150. Claſs and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, two-lipped; the upper lip emarginate; the lower with three teeth. *Cor.* papilionaceous; ſtandard heart-ſhaped, obtuſe, emarginate; reclining, reflexed at the ſides; wings ovate, the length of the ſtandard, ſupported by long claws; keel narrow, ſpirally revolute, contrary to the courſe of the ſun. *Stam.* Filaments in two diſtinct ſets, one ſimple, the other in nine diviſions, ſpirally twiſted within the keel; anthers ten, ſimple. *Piſt.* Germen oblong, compreſſed, downy; ſtyle thread-ſhaped, ſpirally inflexed, downy in the upper part; ſtigma obtuſe, thickiſh, villous. *Peric.* Legume long, ſtraight, coriaceous, obtuſe, with an oblique point. *Seeds* kidney-ſhaped, oblong, compreſſed.

Obſ. The keel, and organs of impregnation within it, being both ſpiral, afford the eſſential mark of the genus; ſee DOLICHOS. The perianth in many ſpecies is accompanied by two roundiſh leaves, termed by Linnæus an external calyx; but ſurely rather to be deemed bracteas.

Eſſ. Ch. Keel twiſted ſpirally, along with the ſtamens and ſtyle. Stigma downy.

This genus is rather leſs numerous in ſpecies than its near relation *Dolichos*, but is, like that, divided into two ſections, the one compoſed of climbing, the other of upright plants. The 14th edition of Syſt. Veg. contains ſeventeen ſpecies in all; Willdenow has twenty-four, fifteen of which are enumerated in the ſecond edition of Hort. Kew. without the addition of any new ones. Fourteen of Willdenow's are climbers, ten grow erect. They are moſtly tropical productions, though ſome of the annual kinds prove ſufficiently hardy in our climate, and are valuable articles of the kitchen garden, as well as very ornamental. We ſhall particularize ſome of the principal.

Section 1. *Stem twining.*

Ph. *vulgaris*. Common Kidney-bean, or French bean; Haricot of the French. Linn. Sp. Pl. 1016. ed. 1. 723. Lob. Ic. v. 2. 59. (Ph. albus; Ger. Em. 1212. Phaſioli; Math. Valgr. v. 1. 388.)—Stem twining. Cluſters ſolitary, ſhorter than the leaves. Flower-ſtalks in pairs. Bracteas ſpreading, larger than the calyx. Legumes pendulous.—Native of the Eaſt Indies. Cultivated throughout Europe, either for the ſake of its young legumes, which are boiled for the table, and ſo much eſteemed as to be thought worth forcing; or eſpecially in France, and the ſouth of Europe, for the ripe beans, not plentifully perfected in more northern countries, but much eſteemed where they abound, as an ingredient in ſoups, and various made diſhes. For theſe uſes the variety whoſe ſkin is of a pure white is preferred. Others are brown, or variouſly ſpotted. There are varieties of this ſpecies in the height, or mode of growth, of its twining *ſtem*. The *root* in all of them is annual. *Leaves* ternate, as in the whole genus, on longiſh ſtalks: leaflets nearly ſmooth, broad-ovate, inclining to ſquare, more or leſs pointed, entire, veiny; the lateral ones oblique. *Stipulas* oblong; thoſe on the partial ſtalks narroweſt. *Flowers* four or ſix in each long-ſtalked axillary cluſter, their partial ſtalks oppoſite, ſhort. *Corolla* of a pale blueiſh white. *Legumes* linear, ſix inches long. Each *flower* is accompanied by a pair of large, rounded, many-ribbed, pale green, ſpreading *bracteas*, larger than the *calyx*, and not, as in Willdenow and Aiton, ſmaller. This error is copied from the ſecond edition of Linn. Sp. Pl., the firſt edition being in this reſpect more correct. See the following.

Ph. *multiflorus*. Scarlet Kidney-bean. Lamarck Dict. v. 3. 70. Willd. n. 2. Ait. n. 2. (Ph. coccineus; Linn. Sp. Pl. ed. 1. 724. Schkuhr Handb. v. 2. 343. t. 199, a. *Ait.* Ph. puniceo flore; Cornut. Canad. 184. t. 185. Ph. indicus, flore coccineo; Moriſ. ſect. 2. t. 5. f. 4.)—Stem twining. Cluſters ſolitary, about equal to the leaves, many-flowered. Flower-ſtalks in pairs. Bracteas cloſe-preſſed, ſmaller than the calyx. Legumes pendulous. The native country of this beautiful ſpecies is unknown. Miller, in his 8th edition, is remarkably confuſed in his account of this genus, and has miſled Lamarck to aſſert that he gives South America as the country of the Scarlet Bean; whereas that account applies to his *coccineus*, his 6th not 5th ſort, a totally different plant, though it is not eaſy to ſay what. Linnæus originally diſtinguiſhed our Scarlet Bean by the name of *coccineus*, which ought to have been retained, though for convenience we have adopted what ſeems likely to prevail, and which is not exceptionable in itſelf, the *flowers* of the preſent being much more numerous in each *cluſter* than in the Common Kidney-bean. Their beautiful brilliant ſcarlet colour cauſes them to be univerſally cultivated, nor are the *legumes* of leſs value for the table than the former; Miller prefers them. The plant however is rather more tender, and periſhes at the firſt froſt. Gerarde ſays, p. 1215, that Tradeſcant introduced this *Phaſeolus* into the Engliſh gardens. Now it adorns every cottage bower, blooming abundantly from July till late in autumn, but its crop is not abundant. There is a white or pink-flowered variety. As far as we have obſerved, the ſmall cloſe *bracteas* afford an invariable ſpecific diſtinction between this and the *vulgaris*; ſee our remark on that ſpecies.

Ph. *inamoenus*. Green-flowered Kidney-bean. Linn. Sp. Pl. 1016. Willd. n. 6. Ait. n. 4. Jacq. Hort. Vind. v. 1. 27. t. 66. (Ph. n. 2; Linn. Hort. Cliff. 359.)—Stem twining. Standard of the flower revolute, hairy, the colour of the calyx. Leaflets elongated. Linnæus ſays this was raiſed from African ſeeds in Mr. Cliffort's garden, where it flowered, we preſume in the ſtove, in Dec. 1736. At Kew it is ſaid to be a hardy annual, flowering in July and Auguſt. The oblong-pointed *leaflets* diſtinguiſh the plant, and the ſmall *flowers*, with their green revolute *ſtandard*, are peculiar, though by no means ornamental. The *legume* is ſhort and cimeter-ſhaped. *Seeds* beautifully ſpeckled with red.

Ph. *vexillatus*. Sweet-ſcented Kidney-bean. Linn. Sp. Pl. 1017. Willd. n. 8. Ait. n. 6. Jacq. Hort. Vind. v. 2. 46. t. 102. (Ph. flore odorato, vexillo amplo patulo; Dill. Elth. 313. t. 234.)—Stem twining. Flower-ſtalks thicker than the footſtalks. Flowers crowded. Wings rather falcate; one of them lobed at the baſe. Legumes linear, ſtraight. This ſpecies was raiſed in Sherard's garden at Eltham, from ſeeds collected near the Havannah. It is annual, flowering in the ſtove in July and Auguſt, but not often met with. The incumbrance of the large rambling plant is ſcarcely compenſated by the beauty, or even fragrance of the *flowers*. Their common *ſtalks* are a foot long, and remarkably ſtout. *Legumes* long, narrow, and hairy. The *keel* is obliquely curved, but ſcarcely ſpiral; ſo that, as Linnæus obſerves, its character is intermediate between *Phaſeolus* and *Dolichos*. We ſhould incline to remove the plant to the latter genus.

Ph. *Caracalla*. Snail Kidney-bean. Linn. Sp. Pl. 1017. Willd. n. 13. Ait. n. 10. Andr. Repoſ. t. 341. (Ph. indicus, cochleato flore; Triumf. Obſ. 93. t. 95.)—Stem twining. Standard and wings, as well as the keel, ſpiral. The native country of this magnificent ſpecies is not clearly determined. We ſuſpect it to be of African origin; at leaſt it is common in all the gardens at Algiers, from whence M. Desfontaines brought us the only flowers we have ever ſeen; ſo little was Mr. Andrews aware of the great rarity he was exhibiting to the public in his plate. The plant indeed may often be ſeen in ſtoves, but bloſſoms ſo rarely, that few perſons have patience to allow it the requiſite time and ſpace. It was firſt brought to Italy by the Portugueſe, and long moſt jealouſly preſerved in the Grand Duke's gardens at Florence. In that country it acquired the name of Caracol, which properly belongs to a large ſnail. The *root* is perennial, and *ſtem* woody. The *flowers* are produced plentifully, if at all; many together in long, axillary, denſe *cluſters*. The *buds* are of a pearly whiteneſs; the *flowers* variegated with purple and buff, large, and very fragrant, but ſhort-lived. Their greateſt peculiarity conſiſts in the *petals* being all rolled ſpirally together.

Section 2. *Stem erect, or nearly ſo; in one inſtance decumbent.*

Ph. *trilobus*. Three-lobed Kidney-bean. Ait. n. 12. Willd. n. 16. (Ph. maderaſpatanus, foliis glabris trilobatus, &c.; Pluk. Phyt. t. 214. f. 3. Dolichos trilobus; Linn. Sp. Pl. 1021. Burm. Ind. 160. t. 50. f. 1.)—Stem ſomewhat twining, ſmooth. Lateral leaflets two-lobed; terminal one three-lobed; lobes ovate. Stipulas ovate. Stalks three-flowered, much longer than the leaves.—Native of the Eaſt Indies, from whence it was procured by ſir J. Banks in 1777. It is annual, kept in the ſtove, and chiefly remarkable for the formal ſegments of the *leaves*, the *flowers* being ſmall and inconſpicuous. *Glycine triloba*, Willd. Sp. Pl. v. 3. 1056, is the ſame plant.

Ph. *Max*. Hairy-podded Kidney-bean. Linn. Sp. Pl. 1018. Willd. n. 21. Ait. n. 14. (Cadelium; Rumph. Amboin. v. 5. 388. t. 140. Mungo, ſive Phaſeolus orthocaulis; Hernand. Mexic. 887.)—Stem erect, angular, rough with deflexed hairs. Legumes drooping, hairy.—Native of the Eaſt. The *root* is annual. *Stem* upright, but a little zigzag, ſomewhat branched two or three feet high, leafy, angular, denſely clothed with rigid deflexed hairs. *Leaves* not much unlike the Common Kidney-bean, but rather hairy, on hairy *ſtalks*. *Cluſters* axillary, hairy, on ſhort *ſtalks*, each of three or four pale greeniſh-yellow *flowers*. *Legumes* an inch and a half long, drooping or even pendulous, very hairy, each containing from two to ten roundiſh-oblong black *ſeeds*, variegated with brown. Theſe ſerve for the food of men as well as horſes in Turkey, Perſia and Arabia, and are called *Max* or *Mex*, a word borrowed from the Arabians. Columna has given a complete account of this plant, with a very good wooden cut, in the work of Hernandez, as above quoted.

Ph. *Mungo.* Hairy-headed Kidney-bean. Linn. Mant. 101. Willd. n. 22. (Ph. hirſutus flexicaulis, Mungo affinis e maderaſpatan, caule tereti; Pluk. Almag. 290.) —“Stem zigzag, ſomewhat twining, hairy, round. Legumes capitate, hairy.”—Native of the Eaſt Indies. Linnæus having raiſed this in the Upſal garden, found it diſtinct from the preceding, with which it appears by his manuſcripts he had once confounded it. The round *ſtem*, more diſpoſed to climb, and the capitate *flowers*, ſeated on a ſmooth, ovate, long-ſtalked receptacle, are, by his deſcription, ſufficient marks of difference. We find no ſpecimen in his herbarium of this ſpecies, but it is mentioned in the late Mr. Donn's Cambridge catalogue.

Ph. *capenſis.* Trailing Cape Kidney-bean. Thunb. Prodr. 130. Willd. n. 18.—Stem thread-ſhaped, decumbent. Stalks ſingle-flowered. Leaflets lanceolate.—Gathered at the Cape of Good Hope by Thunberg. The *ſtem* is very ſlender, rough with minute briſtles or prickles. *Leaflets* an inch and a half long, linear-lanceolate, veiny, minutely hiſpid. *Stipulas* ſmall, ovate. *Flower-ſtalks* axillary, thrice as long as the leaves, and thrice as thick as the footſtalks, ſtraight, ſingle-flowered, very rough at the top with deflexed ruſty briſtles, as is the *calyx* with erect ones. The *corolla* is purple, large and handſome. Our ſpecimen ſhews nothing of the proper character of the genus, for which we muſt rely on Thunberg. In the Bankſian herbarium this plant is referred to *Dolichos.* There appears to us much of the character of *Glycine,* the *ſtyle* being actually curved backwards, with the *keel,* ſo as nearly to touch the upper lip of the *calyx,* and the habit of the whole plant accords with that genus better than with either *Dolichos* or *Phaſeolus.*

PHASEOLUS, in *Gardening,* contains plants of the climbing, eſculent, and flowering kinds, of which the ſpecies cultivated is the common kidney-bean (P. vulgaris.)

But other ſpecies may be cultivated, for the purpoſe of variety, as flower-plants.

Theſe were formerly called *Sperage beans, French beans,* &c.

And the principal ſub-varieties of the dwarf, or low-growing ſorts, are; the early white dwarf; the early ſpeckled dwarf; the early yellow; the early liver-coloured; the early dun-coloured dwarf; the larger white, or cream-coloured dwarf; the larger black and white ſpeckled dwarf; black-ſtreaked dwarf; the red-ſpeckled dwarf; the ſpeckled amber dwarf; the ſparrow-egg dwarf; the Canterbury white dwarf; the Batterſea white dwarf; the China ſpeckled dwarf, conſiſting of black and white ſpeckled, brown and white, red and white, &c. Theſe are of upright dwarf-buſhy growth, rarely exceeding fifteen or eighteen inches in height; and ſeldom throw out runners, except the Canterbury and Batterſea ſorts, which ſometimes ſend out a few ſtragglers, but which ſeldom extend to much diſtance.

But the firſt three or four ſorts are at preſent in moſt eſteem for their coming early into bearing; being of ſmaller growth than the other ſorts, they ſooner form themſelves for bloſſom and bearing, of courſe are proper for planting for the earlieſt crops, and for forcing in hot-beds, &c. As they, however, do not continue long in bearing, they are not ſo proper for the main crops as the larger dwarf ſorts; particularly the black and white ſpeckled, the Canterbury and Batterſea kinds, which are all excellent bearers; but the two latter moſt of all, and the pods are ſmaller, more numerous, and eſteemed the ſweeteſt eating of all the dwarf kinds whilſt young, though the pods of the large white dwarf, and the ſpeckled kind in particular, continue exceedingly good, even when of pretty large ſize, but ſuperior in the latter, both in a more plentiful longer production, and goodneſs for eating, being excellent for a principal crop in a family garden; as are alſo the Batterſea and Canterbury ſorts, which ſhould not be admitted on the ſame occaſion; and theſe two varieties are commonly in moſt eſteem for general culture by the market-gardeners for main crops, as being by them conſidered both the moſt profitable for bearing, and having a ſmaller pod, the moſt ſaleable in the markets: however, any of the other dwarf ſorts are alſo proper to cultivate occaſionally, for variety, both for private and public uſe.

There is a ſcarlet bean, which is by ſome conſidered as a diſtinct ſpecies, but probably a variety of this, the running or twining ſtalks of which, if properly ſupported, riſe to the height of twelve or fourteen feet: the leaves are ſmaller than thoſe of the common garden-bean: the flowers grow in large ſpikes, and much bigger, and of a deep ſcarlet colour: the pods are large and rough; and the ſeeds are purple marked with black, and ſometimes pure white.

The principal ſub-varieties of theſe are; the large ſcarlet climber, which riſes with many twining runners upon ſupport, eight or ten to twelve or fifteen feet high, having numerous large cluſters of ſcarlet flowers, ſucceeded by large, thick, rough, fleſhy ſeed-pods, containing large, thick, purpliſh beans.

The large white climber, having large cluſters of white flowers, large, thick, rough ſeed-pods, and white ſeed. Theſe ſorts are all alike in reſpect to their growth, differing only in the colour of their flowers and ſeed, which is pretty permanent: they are great bearers; and the plants of the ſame crop continue in bearing from July or Auguſt until October; the pods, even when large, boiling exceedingly green, being remarkably tender and well-flavoured.

The large Dutch climber, which riſes with twining runners, upon ſupports, ten or twelve feet high; has numerous cluſters of white flowers, ſucceeded by long, broad, compreſſed, flat, ſmooth pods, containing large, oblong, flat, white ſeed: this is alſo a very great bearer, but it does not continue near ſo long in production as the two former climbers; its pods, however, which are very long, ſmooth, and fleſhy, boil exceedingly green, tender, and good: and, of the runner kind, it is a very deſirable family bean, inferior to none for ſweetneſs of flavour.

But the following ſorts are of a more moderate growth. The Negro runner; the Batterſea white runner; and the Canterbury runner; which, though climbers, ramble leſs, but bear plentifully and continue ſome time. The pods are ſmaller, but very tender, and very delicate in eating, while in moderate young growth.

Method of Culture.—As theſe are all plants of the annual tender tribe, they require to be raiſed every year, in the latter ſpring and ſummer months, as from April till June, or later, by different ſowings, at the diſtance of a few weeks, when the danger of froſts is over.

Culture in the Dwarf kinds.—In cultivating theſe ſorts, proper kinds ſhould be choſen for the different crops, as for the forward ones, any of the early ſorts are proper, but the early white, early ſpeckled, dun, and yellow kinds, are rather the earlieſt bearers; and for the main crops, any of the larger dwarf kinds, though preference ſhould be given to the ſpeckled, the Batterſea, and the Canterbury dwarf kinds, as being all plentiful bearers, and continuing long in ſucceſſional bearing on the ſame plants.

Theſe ſorts of beans, from their tender nature, ſeldom freely and produce a plentiful crop, which is often in as great perfection as in the full ground.

As in the other crops, they ſhould be gathered often; as it is the way to continue the plants long in a bearing ſtate.

A regular ſucceſſion of early young crops of theſe beans may be obtained in this way two or three months, by repeated ſowings at the interval of about three weeks, ſo as to have young plants advancing in pots or boxes in two or three different degrees of growth ſucceeding each other.

Where there is not much ſtove-room, it may be proper to plant beans for ſucceſſion crops in ſmall pots (forty-eights), three beans in each; and as theſe take up but little room, they may be ſtowed any where cloſe together, or between the other larger pots: the plants will come up and be advancing in growth, ſo as that when thoſe of the preceding crops are going off, theſe may be readily turned out of the ſmall pots with the whole ball of earth about their roots, and replanted into large pots, &c. to remain for fruiting, giving water at planting, and frequently afterwards, as above, in the firſt crop: by this practice a month's growth in the plants may be gained, and a conſtant ſucceſſion of beans for the table had.

Culture in the Climbing Kinds. Theſe are raiſed from the ſeed, by ſowing it annually in the later ſpring and ſummer months, as in the dwarf ſorts. For this purpoſe, the ſcarlet runner, and the white ſub-variety of it, are the moſt proper for the general crops, as being not only very great bearers, and continuing in perfection two or three months, but from their pods, when even pretty large, remaining green, fleſhy, tender, and well-flavoured. Some of the Dutch runners, and any of the other climbers, may alſo be cultivated with advantage.

The moſt proper ſeaſon to begin planting the main crops of all thoſe ſorts is the firſt or ſecond week in May, if the weather be fine; as being of a delicate nature like the dwarfs, when planted earlier, both the ſeed and plants are ſubject to danger from the ſame cauſes: however, in a ſouth border, or ſome ſimilar warm ſituation and dry ſoil, a few may be planted in the middle, or towards the latter end of April, to take their chance; but for the general crops, the moſt ſucceſsful ſeaſon for planting is from the above period until the middle or latter end of June, but not later than the beginning of July; but where the ſcarlet kind and variety are planted principally, one planting in May or beginning of June will come into bearing in July or Auguſt, and when the pods are kept gathered clean, according as they are fit for uſe, the plants continue ſhooting, bloſſoming, and bearing abundantly until the end of September, and often until the end of October, or even till deſtroyed by the cold and froſts; but two plantings of any of the ſorts of runners, one in May and the other in June, or early in July, are amply ſufficient to furniſh a very abundant ſupply for the whole ſeaſon of this ſort of crop.

All theſe kinds proſper almoſt any where in the garden, both in cloſe and open ſituations; chooſing principally a lightiſh ſoil, eſpecially for the forward crops: and the richer the ground the better it is for the purpoſe.

As all the running kinds require ſupport of ſome kind or other to climb upon, they ſhould be planted either in wide rows for the convenience of placing tall ſticks or poles along each row for the runners of the plants to wind themſelves round for ſupport, or be planted againſt ſome ſort of fence or treillage work for the ſame purpoſe of training up and ſupporting the runners. When, however, it is deſigned to train them up ſticks or poles, drills ſhould be drawn four feet, or four and a half, aſunder, eſpecially for the larger kinds, and an inch deep, in which the beans ſhould be dropped three or four inches apart; covering them in evenly with earth, and raking the ſurface ſmooth. The beans will ſprout in a few days, and come up in leſs than a fortnight.

When the plants are three or four inches high, a little earth ſhould be drawn with a hoe up to their ſtems, to ſtrengthen them, and encourage them to ſend forth ſtrong runners. At this time alſo all weeds between the rows ſhould be cut up and be removed.

As ſoon as they begin to puſh forth their runners, ſome tall ſticks or poles ſhould be placed for them to aſcend upon; and as they are placed, conducting the runners towards them, in a direction according to their natural mode of climbing, which is generally to the right, or contrary to the ſun's motion: they will thus naturally encircle the ſticks or poles, and aſcend to their tops, even if ten or fifteen feet high, producing bloſſoms and fruit from bottom to top.

When it is intended to plant theſe ſorts againſt fences for ſupport, it ſhould be done in a row cloſe along to the fence; and if againſt a wall or paling, either placing tall poles, or drawing ſome ſtrong packthreads from top to bottom at ſix inches diſtance; the plants readily twining round them, and ſupporting themſelves to a great height.

In gathering the produce of all theſe kinds, the ſame circumſtances ſhould be attended to as in the dwarfs—to gather the pods whilſt young and tender; and to continue the plants long in full bearing, always gathering the pods clean as they become of a proper ſize: and they will continue fruiting more abundantly, and in better perfection.

When it is intended to cultivate any of theſe climbing beans as flowering plants, the ſcarlet kind and its variety are the beſt ſorts for the purpoſe. They ſhould be ſown as above in any of the compartments of the pleaſure-garden, in patches, alternately ſcarlet and white ſort, two or three beans in each patch, about an inch deep; and when the plants are up, and begin to puſh forth runners, tall poles or branchy ſticks ſhould be placed for them to climb upon: they will thus effect a very fine variety all ſummer, until the autumn.

Theſe kinds of beans are alſo often employed to run over arbours, and to twine round lines, from the top of tall ſtakes, and ſtems of ſmall trees; alſo to run up along the ſides of houſes, or againſt walls, either upon poles, or upon packthread ſtrings, ſuſpended from above, about which they will twine themſelves many feet high, bearing abundance of flowers and fruit: they are likewiſe ſometimes trained to form ſhady walks, by means of ſticks or poles arranged along each ſide, or by ſupport of a ſort of treillage-work, ranging ſome tall ſtakes five or ſix feet aſunder, railing them along the top with poles or pan-tile laths, or extending ſtrong packthread lines; and from either of which ſuſpending ſtrings to the ground, ſix or eight inches aſunder, faſtening them down with pegs: upon theſe ſtrings the plants will climb and form a cloſe hedge; or they might be occaſionally arched over the top in a ſimilar manner, for the runners to extend, and form a vaulted roof and complete ſhade. Thus, this fine climber may be trained in various ways according to fancy, both for uſe and ornament; from which thoſe not accommodated with gardens may plant them in pots or boxes, to be placed in court-yards, windows, balconies, &c.

Saving Seed.—In order to have perfectly good ſeed, it is neceſſary to ſow a ſufficient quantity in rows on purpoſe, ſuffering the whole crop of the plants to remain without gathering any for uſe: by this means the ſeed ripens early, and in the higheſt perfection; which is eſſentially neceſſary for thoſe who deſign the ſeed for public ſupply. In private gardens, and many others, they often, however, after having gathered the prime of the principal crops, leave the latter produce of them to grow for ſeed; which, although it may be tolerably good, is not always ſo large, plump, and fine, as in the former method.

When the ſeed is quite ripe, which is eaſily known by examining a ſeed pod, the plants ſhould be pulled up and ſpread looſely along in rows, or upon any low hedges, &c. turning them occaſionally that the beans may dry and harden well; which, when effected, either thraſh them out directly, or lay them up in ſome dry loft or other room till convenient; and when thraſhed out and cleared from the rubbiſh, ſpread them upon ſome clear airy floor, or ſome ſuch place in the dry, to harden perfectly; then they ſhould be put up in bags for next year's uſe: ſome think the change of ſeed of this kind to be of much conſequence.

PHASES, φασεις, formed from φαινω, *I appear*, in *Aſtronomy*, the ſeveral appearances, or quantities of illumination of the moon, Venus, Mercury, and the other planets; or the ſeveral manners wherein they appear illuminated by the ſun.

The variety of phaſes in the moon is very remarkable: ſometimes ſhe increaſes, ſometimes wanes, ſometimes is bent into horns, and again appears like a ſemicircle; at other times ſhe is gibbous, and preſently again reſumes a full circular face. For the theory of the lunar phaſes, ſee MOON.

As to the phaſes of Venus, the naked eye does not diſcover any diverſity in them; but the teleſcope does. Copernicus anciently propheſied, that after-ages would find that Venus underwent all the changes of the moon, which prophecy was firſt fulfilled by Galileo, who, directing his teleſcope to Venus, obſerved the phaſes to emulate thoſe of the moon; being ſometimes full, ſometimes horned, and ſometimes gibbous.

Mercury alſo does the ſame; all the difference between theſe and thoſe of the moon, is, that when theſe are full, the ſun is between them and us; whereas, when the moon is full, we are between her and the ſun.

Saturn puzzled the aſtronomers a long time with his ſtrange variety of phaſes. Hevelius and others found him, 1. Monoſpherical. 2. Triſpherical. 3. Spherico-anſated. 4. Elliptico-anſated. 5. Spherico-cuſpidated. But Huygens ſhews, that theſe monſtrous phaſes were principally owing to the imperfections of their teleſcopes. That great author, aſſiſted by the beſt teleſcopes, noted three principal phaſes; *viz.* Jan. 16, 1656, he was round; Oct. 13, brachiated; and Decem. 17, 1657, inſated. See SATURN.

PHASES *of Comets.* See COMET.

PHASES *of an Eclipſe for any given Time, To determine the.*— Find the moon's place in her viſible way for that moment; and thence, as a centre, with the interval of the moon's ſemidiameter, deſcribe a circle. Find, in like manner, the ſun's place in the ecliptic, and thence, with the ſemidiameter of the ſun, deſcribe another circle; the interſection of the two circles ſhews the phaſes of the eclipſe, the quantity of obſcuration, and the poſition of the cuſps or horns. See ECLIPSE.

PHASIANELLUS, in *Ornithology*, a ſpecies of *Tetrao*; which ſee.

PHASIANUS, *the Pheaſant*, a genus of birds of the order Gallinæ. The generic character is; bill ſhort and ſtrong; cheeks covered with a ſmooth, naked ſkin; legs generally with ſpurs. Of this genus the females produce many young ones at a brood, and take care of them for ſome time, leading them abroad, and pointing out food for them. The young are at firſt clad with a thick ſoft down. The neſts of the whole tribe are formed on the ground. There are fifteen ſpecies enumerated by Gmelin, beſides varieties.

Species.

GALLUS; Common, or Wild Cock. Comb on the crown and two wattles on the chin compreſſed; ears naked; tail compreſſed, erected; feathers of the neck linear, long, membranaceous at the tips. It inhabits, in a wild ſtate, India. The feet are three or four inches long: it is domeſticated every where, feeds on grains and worms, which it ſcratches out of the ground, and ſhews to the young chickens; it is very courageous, proud, watchful, and ſalacious (ſee COCK); it claps it wings before it crows; has a piercing ſight, and never fails to cry in a peculiar note at the ſight of a bird of prey. The hen, if ſhe have plenty of food, will lay nearly through the year. The body, when wild, is leſs than that of the common cock; the comb is large, indented, ſhining red; temples, and line from the creſt to the eyes, naked, and of a fleſh colour; behind the eyes a clay-colour ſpot, of the ſhape of a man's nail, and covered with ſhort feathers; the feathers of the reſt of the head and neck long, narrow, grey at the baſe, black in the middle, and tipt with white; the feathers of the upper part of the body greyiſh, with a white and black ſtreak; breaſt reddiſh; greater wing-coverts reddiſh-cheſnut, with tranſverſe black and white ſtreaks; tail-coverts gloſſy-violet; middle tail-feathers long, falcate; ſpur large, curved. The female has neither comb nor wattles; the head and neck grey, cheeks and chin whitiſh; body more duſky, and varied with brown, grey, and rufous. It has no ſpur.

Of the period when this bird was firſt introduced into Europe, all reſearches will not enable us even to preſume a conjecture; but it ſeems to be taken for granted, that the cock is one of the oldeſt companions of mankind, and that he was among the firſt who were drawn from the wilds of the foreſt, to become a partaker of the advantages of ſociety. Although it does not appear at what period this took place, yet it is almoſt certain that the firſt accounts we have of the cock is from the Perſian hiſtory, to which kingdom, according to Buffon, the weſtern parts of the world are certainly indebted for him. Ariſtophanes calls the cock the Perſian bird, and it was known ſo early in the moſt ſavage parts of Europe, that we find the cock was one of the forbidden articles of food among our early anceſtors the ancient Britons. The domeſtic fowl has almoſt every where baniſhed the wild one; it is ſtill, however, found wild in the Tinian iſlands, and in many others in the Indian ocean, and in the woods on the coaſt of Malabar, in his ancient ſtate of independence. In his wild ſtate, his plumage is black and yellow, and his comb and wattles yellow and purple. Among the ancients, at leaſt the Europeans, after this bird's firſt introduction among them, thoſe whoſe feathers were of a reddiſh caſt, were conſidered as invaluable; but thoſe whoſe plumage was white they conſidered as unfit for domeſtic purpoſes. Ariſtotle has treated of them as being the leaſt fruitful of the two; the firſt he calls generous and noble, being remarkable for their fecundity; the other ignoble and uſeleſs, on account of their ſterility. Theſe diſtinctions, as Buffon obſerves, differ widely from our modern experience, the generous *game-cock* (ſee COCK) being by no means ſo fruitful as the dung-hill cock. The varieties of this ſpecies are as follow.

1. Crown with a thick downy creſt. This is called the *creſted* cock.
2. Feet five-toed, two behind. This is the *Dorking* cock.
3. In the *frizzled* cock all the feathers are turned back.
4. The *Perſian* cock has neither rump nor tail-feathers.

5. The *dwarf* cock has its legs very ſhort.

6. The *Bantam-cock*, ſo called from having been firſt found at Bantam in India. This variety is not half the ſize of the common cock, which he ſomewhat reſembles in colour and ſpirit, for he will attack cats, dogs, or any other animal, totally indifferent as to their ſize; he has a reddiſh bill, red eyes, and a curious roſe comb on the top of his head; his ears are covered with a tuft of white feathers; his neck and back are clothed with long feathers, intermixed with orange, black, and yellow; his breaſt and lower part of the belly are black. The hens of this variety differ from the cocks, principally by varying in their colours, but which at all times are more brown and yellow, and leſs black, than his; they have alſo but a ſmall red comb on the tops of their heads; their legs, like thoſe of the cock, are feathered down to the toes, and this is one of the chief marks by which the true breed is diſtinguiſhed.

7. The *rough-legged* cock, another variety, has its legs feathered down to the toes.

8. The *Turkiſh* cock is variegated with beautiful colours.

9. The *Paduan* cock is chiefly diſtinguiſhed by its great ſize.

10. The *Negro* cock has a creſt, the wattles and chin are black.

11. The hen with a tuberous crown is called the *crowned* hen.

12. The *horned* cock has a crowned horn.

13. The *ſilk* cock has feathers reſembling hairs.

VARIUS, variegated Pheaſant, is black; front red; neck and back gloſſy-green; tail compreſſed, aſcending, the coverts hanging down on each ſide. It is leſs than the common cock, and is probably found in India.

IGNITUS; Fire-backed Pheaſant. Black, with a ſteel-blue gloſs; the ſides are rufous; lower part of the back fiery ferruginous; the two middle tail-feathers yellowiſh-brown. It inhabits Java, and is the ſize of a common fowl.

MOTMOT; Motmot Pheaſant. This ſpecies is brown, beneath reddiſh; the tail is wedged, the lateral feathers rufous. It inhabits Braſil and Guiana, and is eighteen inches long.

PARRAKA; Parraka Pheaſant. Brown, beneath and crown tawny; tail long, even. It inhabits the thick woods of South America, is twenty-three inches long; and at ſunriſe it makes a clamour like a cock.

MEXICANUS; Courier Pheaſant. It is tawny white; tail long, ſhining-green. It is about eighteen inches long, inhabits New Spain; is ſlow in flight, but ſo ſwift on foot as to outrun the ſwifteſt horſes.

IMPEJANUS; Impeyan Pheaſant. Creſted; purple gloſſy-green, beneath black; feathers of the neck with a changeable luſtre of gold, copper, and green; tail entire, rufous. It is larger than a common fowl. It inhabits India; it is not at all a common bird, being brought down from the hills in the northern parts of Hindooſtan to Calcutta as a curioſity. The lady of ſir Elijah Impey attempted, with a probability of ſucceſs, to bring over with her ſome of them to England, but after living on ſhip-board a few weeks, they caught a diſorder from the reſt of the poultry, very like the ſmall-pox, and died in conſequence. They will bear cold tolerably, but are impatient of heat. The cock was never obſerved to crow, but had a ſtrong hoarſe cackle, not unlike that of a pheaſant. It is deſcribed and figured by Latham.

CRISTATUS; Creſted Pheaſant. Brown above; beneath reddiſh-white; vent rufous; head creſted; orbits red, naked; tail wedge-ſhaped, and tipt with yellow; bill and unarmed legs black; feathers of the creſt whitiſh-brown; beneath black; feathers from the hind head to the lower part of the neck have a white ſtreak down the middle; coverts of the wings at the tip and edge white, quill-feathers rufous; the tail is ten inches long, and the length of the body about twenty-two inches. It is a native of New Spain, frequents trees, in the neighbourhood of water, feeds on worms, inſects, and ſerpents.

AFRICANUS; African Pheaſant. The body is of a blue-aſh colour, beneath it is white; the head is creſted; the two middle tail-feathers at the tip and lateral ones entirely black. It, as its name imports, inhabits Africa, and is about nineteen inches long.

COLCHICUS, or common Pheaſant. Rufous, head blue; tail wedged; cheeks papillous; bill pale; horn colour; irides yellow; cheeks red, ſpeckled with black; in the old birds wrinkled and pendulous; a greeniſh-black feathered line from the noſtrils to beneath the eyes; reſt of the head and neck green-gold, with a gloſs of violet and blue; lower part of the neck, breaſt, back, and rump, ſhining tawny; quill-feathers brown, with ochreous ſpots; belly and vent white; tail-feathers eighteen, with tranſverſe black bars; legs duſky, armed with ſpurs. Female leſs, varied with brown, grey, rufous, and blackiſh; cheeks feathered; and, after ſhe has done breeding, puts on the appearance of the male. There are ſeveral varieties. This beautiful bird is about nineteen inches long, and weighs from two pounds twelve ounces to three pounds four ounces. It is ſaid to have been brought from the iſland of Colchis by the Argonauts; is a native of Africa, and very common in almoſt all the ſouthern parts of the old continent, whence it was originally imported into Great Britain. Pheaſants are much attached to the ſhelter of thickets and woods, where the graſs is very long; but they alſo often breed in clover fields. They form their neſts on the ground, and the females lay from twelve to fifteen eggs, which are ſmaller than thoſe of the domeſtic hen. The neſt is uſually compoſed of a few dry vegetables put careleſsly together, and the young follow the mother like chickens, as ſoon as they break the ſhell. The parents and their brood remain in the ſtubble and hedge-rows, if undiſturbed, for ſome time after the corn is ripe. If diſturbed, they ſeek the woods, and only come forth in the mornings and evenings to feed in the ſtubbles. Though very fond of corn, they are often obliged to content themſelves with wild berries and acorns. In confinement, the female neither lays ſo many eggs, nor hatches and rears her brood with ſo much care and vigilance as in the fields. In a mew ſhe will very rarely diſpoſe her eggs in a neſt, or ſit on them at all; and the domeſtic hen is uſually entruſted with the charge of incubation and rearing the young. The wings of the pheaſant are very ſhort, and ill adapted for conſiderable flights. As the cold weather approaches, theſe birds begin to fly at ſunſet among the branches of oak trees for rooſting during the night; and this they do more frequently as the winter advances, and the trees loſe their foliage. The male birds at theſe times make a noiſe, which they repeat three or four times, and which the ſportſmen call cokcting. The hens on flying up utter one ſhrill whiſtle, and then are ſilent. Poachers avail themſelves of all theſe notes, and, unleſs the woods are ſtrictly watched, ſecure the birds with the greateſt certainty. The crowing of the males, which begins in the firſt week of March, may be heard at a conſiderable diſtance. During the breeding ſeaſon, the cocks will ſometimes intermix with the common hen, and produce a hybrid breed. The pheaſant does not appear to pair, for the female carefully hides her neſt from the male; and where they are in plenty, and food provided for them, the two ſexes are ſaid in general not to feed together. In a domeſtic ſtate they are ſometimes more or leſs mixed with white, and ſometimes wholly ſo. A variety with a white ring round the neck, and hence called the ring pheaſant, is not uncommon in ſome parts of England. This ſpecies rarely occurs in Scotland. See Pheasant.

The varieties are

1. The *ringed* pheaſant with a white collar.
2. The *variegated* pheaſant, which is white varied with rufous.
3. The *white* pheaſant, which is white, with a few ſmall black ſpots on the neck, and rufous ones on the ſhoulders.
4. The *pied* pheaſant; this is rufous above, varied with brown and whitiſh; the tail-feathers are black, edged with white.
5. The *Turkey* pheaſant, that has naked orbits which are red; the reſt of the head is feathered. This inhabits Africa and Aſia; is domeſticated every where; in breeding time, on each ſide, above the ears, is a golden feathered tuft like horns.

Argus Pheaſant. Pale yellow, ſpotted with black; face red; hind head creſted, blue; bill yellowiſh; orbits and whiſkers black; front, chin, and throat red; hind-head and nape blue; wings grey, with eye-like ſpots; tail wedged; the colour of the wings; two middle feathers three feet long, with large eye-ſpots at the ſhaft; feet armed; ſize of a turkey. Inhabits Chineſe Tartary and Sumatra. This is a moſt beautiful bird, though its colours are not brilliant. It is with great difficulty kept alive for any time after it has been caught in the woods. It ſeems to have an antipathy to the light, being quite inanimate in the open day; but when kept in a dark place, it appears to be perfectly at eaſe, and ſometimes makes its call, which is rather plaintive, and not harſh, like that of the peacock. The fleſh reſembles that of the common pheaſant.

Pictus; Painted Pheaſant. Creſt yellow; breaſt ſcarlet; ſecondary quill-feathers blue; tail wedged; bill, irides, and armed legs, yellow; feathers of the creſt ſilky, and hanging backwards; cheeks naked and fleſh-coloured; feathers of the hind-head tawny, with black lines, and beneath theſe green ones; back and rump yellow; upper tail-coverts long, narrow, and ſcarlet; wing-coverts varied with bay and brown; ſcapulars blue; quill-feathers brown, with yellowiſh ſpots; tail-feathers varied bay and black, and twenty-three inches long. Female reddiſh-brown; yellowiſh-brown beneath; legs unarmed; leſs than the common pheaſants; length two feet nine inches and a half. The native country of this beautiful ſpecies is China, where it is called Kin-ki. It bears confinement well, and will breed readily in that ſtate. The eggs are redder than thoſe of the common pheaſant, and ſomewhat reſemble thoſe of the Guinea fowl. An inſtance of their breeding with the common pheaſant is mentioned by Buffon. Edwards informs us, that ſome females of this ſpecies, kept by lady Eſſex, in the ſpace of ſix years gradually gained the male feathers; and we are told that it is not unuſual for the hen birds, when about four or five years old, to be neglected by the cocks, and gradually to gain the plumage of the males.

Nycthemerus; Pencilled Pheaſant. This ſpecies is white; the creſt and belly are black, and the tail wedged. It inhabits China, and is about thirty inches long. Bill and irides are yellow; temples naked, red; head and body beneath purpliſh-black, above white; the two middle tail-feathers are white; the reſt with oblique, black ſtreaks; the legs are red and armed. The female of this ſpecies is brown, beneath white, varied with brown, and with tranſverſe black bands; the legs are unarmed.

Superbus; Superb Pheaſant. Unarmed; rufous, varied with green and blue; caruncles of the front rounded; wattles ſubulate. It is found in divers parts of China. The bill and body are red. On each ſide the neck are long feathers turned back; the crown is green, the hind part with a folding blue creſt; ſhoulders green, ſpotted with white; primary quill-feathers blue; tail long, wedged, the feathers are varied with blue and red; coverts declined, of various mixed colours; legs are yellow.

Leucomelanos; Coloured Pheaſant. Creſted, black; feathers of the body edged with white. It inhabits India, and is nearly two feet long. For a method of catching pheaſants, ſee Pheasant.

PHASIS, Pache, in *Ancient Geography*, the name of the moſt celebrated of the towns which were ſituated on the river Phaſis, according to Strabo. Its poſition was on the left bank and near the mouth of the river. Mela ſays, that it was built by Themiſtagorus, the Mileſian. It had a temple of Phryxus, and a grove memorable on account of the fable of the golden fleece.

Phasis, *Nehr Pache*, a river of Aſia, which had its ſource in the mountains of Armenia, and after a long courſe, in which it was augmented by ſeveral ſtreams, and in paſſing through the Colchide, and dividing it into two almoſt equal parts, diſcharged itſelf into the Euxine ſea. Strabo, Pliny, Ptolemy, &c. mention this river. Procopius ſays, that it was called "Bous," from its ſource to the extremities of Iberia, where it aſſumed the name of Phaſis, and began to become navigable by large veſſels to its mouth. Strabo reports, that Caſtor and Pollux built upon the banks of the Phaſis the town of Tindaris, and according to Euſtathius, Jaſon aſcended this river as far as the neighbouring mountains of Armenia.—Alſo, a river of the iſland of Taprobana. Ptol.

PHASMATA, in *Phyſiology*, certain appearances ariſing from the various tinctures of the clouds, by the rays of the heavenly luminaries, eſpecially the ſun and moon.

Theſe are infinitely diverſified by the different figures and ſituations of the clouds, and the appulſes of the rays of light; and, together with the occaſional flaſhings and ſhootings of different meteors, they have, no doubt, occaſioned thoſe prodigies of armies fighting in the air, &c. of which we have ſuch frequent accounts in moſt ſorts of writers. Vide 2 Maccab. xi. 8. Melancth. Metcor. 2 Shel. de Comet. ann. 1618.

Kircher, and his imitator Schottus, have erroneouſly endeavoured to explain the phenomenon from the reflection of terreſtrial objects made on opaque and congealed clouds in the middle region of the air, which, according to them, have the effect of a mirror. So that, according to theſe authors, the armies pretended by ſeveral hiſtorians to have been ſeen in the ſkies, were no other than the reflection of the like armies placed on ſome part of the earth. Vide Hiſt. Acad. Roy. Scienc. ann 1726, p. 405, & ſeq.

PHASSACATES, in the *Natural Hiſtory of the Ancients*, the name of a ſpecies of agate, which, in its different appearances, they ſometimes called alſo *leucachates* and *perileucos*. It is found in the Eaſt Indies, in Bohemia, and ſome other parts of Europe.

PHATCZ, in *Geography*, a town of Ruſſia, in the government of Kurſk, on the Uſoza; 40 miles N. of Kurſk.

PHAUSINGES, a name given by the ancients to red circles on the legs, occaſioned by fire: it is by ſome alſo extended to ſeveral other ſpots and blemiſhes on the ſkin.

PHAYLOPSIS, in *Botany*, ſo named by Willdenow, apparently from φαυλος, *vile* or *contemptible*, and ωψις, *aſpect.* Willd. Sp. Pl. v. 3. 342. (Micranthus; Wendl. Obſ. 38.)

Claſs and order, *Didynamia Angioſpermia.* Nat Ord. *Perſonatæ*, Linn. *Scrophulariæ*, Juſſ.

Eſſ. Ch. Calyx five-cleft; upper ſegment largeſt. Corolla ringent; upper lip very ſmall, cloven. Capſule pod-ſhaped, of one cell, with four ſeeds.

1. Ph. *parviflora.* Willd. (Micranthus oppoſitifolius; Wendl. Obſ. 39.)—Suppoſed to be a native of India. *Root* annual. *Stem* erect, ſquare, clothed in the upper part with long white hairs, furniſhed at its ſummit with ſmall reddiſh granulations. *Branches* oppoſite. *Leaves* oppoſite, on long ſtalks, ovate, pointed, ſlightly toothed, veiny, hairy, running down into the footſtalks. *Stalks* axillary, three-flowered. *Calyx* covered with glandular hairs, its upper ſegment oblong-lanceolate, veiny, the four others ſetaceous. *Corolla* narrow; the lower lip in three deep ſegments, twice as long as the upper. *Capſule* ſmaller than the calyx. *Willd.*

We have ſeen no authenticated ſpecimen, but we doubt not that this plant is to be found among the numerous unſettled ſpecies of this natural order, of which drawings have been brought from India by colonel Hardwicke and others, and which from their inconſpicuous appearance and annual duration, have not as yet been thought worthy of introduction to the European ſtoves. They indeed conſtitute a tribe not a little puzzling to the ſcientific botaniſt. The fruit of the preſent genus indeed appears, by the deſcription, very peculiar. We preſume it conſiſts of two valves, with the ſeeds inſerted, one above another, along one or both edges.

PHAZEMONITIS, in *Ancient Geography*, a country of Aſia, in Pontus, which, according to Strabo, extended from the river Amyſus to the Halys.

PHEA, a town of the Peloponneſus, in the Elide.—Alſo, a conſiderable river of the Peloponneſus.

PHEANTIDES, in *Natural Hiſtory*, a name given by ſome to the ſtone called *encymonites;* it was of the nature of our ſparry incruſtrations on the roofs of ſubterraneous caverns. It was ſuppoſed to have great virtues in promoting delivery, and was given to women when they fell in labour.

PHEASANT, in *Ornithology.* See PHASIANUS.

Pheaſants were firſt brought into Europe from the banks of the Phaſis, a river of Colchis. Martial, lib. xiii. ep. 72.

The pheaſant is ſo nearly allied to our common poultry, that it would naturally appear a very eaſy thing to breed them up from young; but the proper food of them is not ſufficiently inquired into. Though they eat corn when full grown and in health, yet they have recourſe, in their younger ſtate, and when ſick, to another ſort of food, preying on ſeveral inſects, and that in a very voracious manner.

The young pheaſant and partridges prey upon ants; and they will never ſucceed with us, if they have not a proper quantity of ants to have recourſe to, as ſoon as they leave their rooſt in a morning. When muſty corn, or want of due care in cleaning their houſes, has made them ſick, a repaſt of ants will often recover them. When that fails, they may be offered millepedes or ear-wigs, or both together, which will always do much better than either ſingly. To this medicine muſt be added a proper care that their common food of corn be very ſweet, their habitation be kept nicely clean, and their water ſhifted twice a day. They muſt not be let out of the houſe in a morning, till the dew is off the ground; and after ſunſet, they muſt be immediately taken in again: in the heat of the day, they muſt be allowed to baſk in the ſun in a dry ſandy place. With theſe regulations, the birds of this kind will ſucceed much better than they uſually do.

The pheaſant is a bird of a ſullen diſpoſition; and when the coupling time is over, there are ſeldom found more than one in a place. Phil. Tranſ. N° 23.

The way of taking pheaſants is, firſt, to be acquainted with their haunts and breeding-places; which are uſually young, thick, and well-grown coppices, free from the diſturbances of cattle, and having no path-way through them; for the pheaſant is an extremely timorous bird. When the haunts are diſcovered, the next thing to be attempted is, to find where the eye or brood is. In order to this, it is to be conſidered, that the pheaſant comes out of the wood three times a day to feed in green corn, freſh paſtures, or the like places. The times of coming out are in the morning ſoon after ſun-riſe, at noon, and at ſun-ſet. The ſide of the wood, where they are ſuppoſed to come out, is to be carefully watched on this occaſion; and the young ones will be ſeen following the female, juſt as a flock of chickens follow the hen. The wood may be alſo well watched in the evenings, and the noiſe of the cock and hen, calling the young ones together, will ſoon be heard; and the ſportſman is on this occaſion to get as near as he can to the place, and being very ſtill and ſilent, he may obſerve their numbers and diſpoſition, and learn how to ſpread his nets ſo as to take the whole brood with great eaſe; but if his leaſt motion, when near them, diſcover him, they will all take to their legs, and run to a great diſtance: they ſeldom riſe on the wing, except very cloſe frighted indeed. Practice will make ſome people ſo expert at imitating the voice of the old pheaſant, that they will be able to call the young ones together to any place that they pleaſe, when the haunts are once found out, and by this means they are eaſily led into the nets.

The beſt time for uſing the call is in the morning or evening; and the note imitated ſhould be that by which the old ones call them out to feed; but by learning to imitate the other notes, they will be brought together at any time of the day. The ſportſman who can make this call, muſt ſhelter himſelf in ſome cloſe place, and begin by very ſoftly making the note; then, if none are near enough to be within hearing, he is to raiſe it to more and more loudneſs, and at length he will be anſwered as loud, if any are within hearing, though at a conſiderable diſtance; whereas, if he ſhould ſet up the call too loud at firſt, and any of the birds ſhould happen to be very near, they will be frighted away.

As ſoon as a pheaſant anſwers, the ſportſman is to creep nearer and nearer, ſtill calling, though not ſo loud; he will ſtill be anſwered, till at length he will be led by the bird's voice within ſight of it. As ſoon as this is the caſe, he is to ſpread his net, and then begin to call again, keeping in ſome cloſe and well-ſheltered place behind the net: in this place he is to call till the bird approaches; and when he has drawn it under the net, he is to appear ſuddenly, and the bird, riſing up, will be caught in the net.

Another method of taking pheaſants, much quicker than by this means, is, the having a live cock pheaſant to uſe as a ſtale: this bird is to be fixed under the net, and by his crowing he will ſoon entice others in. The ſportſman muſt lie concealed; and as ſoon as another pheaſant comes in, he is to draw the net over him. Many people have a method of taking pheaſants in ſpringes or horſe-hair ſnares: the ſucceeding in this depends on the carefully ſearching out their haunts, and the places by which they go out of the woods into the fields. When theſe are found, a peg is to be fixed in the ground at each, and at each peg two ſpringes are to be laid open; the one to take in the legs, the other the head. As ſoon as the ſpringes are ſet, the ſportſman is to go into the woods, and getting behind the birds, he is to fright them with ſome little noiſe, ſuch as ſhall not be enough to raiſe them to the wing, but only to ſet them a-running. They will naturally make their way out of the wood, through their accuſtomed paſſes, and be then caught in the ſpringes.

There is another method of taking theſe birds in the winter, provided that there is no ſnow. This is to be done with a net made like a caſting net, but with the meſhes much wider; they may be five inches wide. Some peaſe or wheat are to be taken out; and the path of the pheaſant being diſcovered, which may eaſily be done by their dung, a pint or thereabout of corn is to be thrown down in the path in a place marked, ſo that the ſportſman can come to it again. This is to be done for ſeveral days, till at length the pheaſants are expecting it every day regularly; and all the birds of this kind that frequent the place, are brought together to feed there, and then the net is to be fixed over the place; its top being tied up to ſome bough of a tree, and its bottom fixed down all around, except in one place, where the walk of the pheaſants lies. In this place it is to be raiſed in form of an arch, and the entrance is to be lined with ſeveral rods of hazel; the thick ends of which are to be tied to the net, and the thin ones let into the ſpace covered by it; and thus the pheaſants will eaſily get in by parting the ſmall ends of the ſticks, as fiſh into a wheel, but they will not eaſily get out again. The nets are to be dyed of a ruſſet-colour, by laying them in a tan-pit; and they muſt, when planted for this purpoſe, be covered with boughs, ſo that the birds do not diſcover them, and then they will eaſily run into them, and be all taken at once.

Pheaſants frequently inhabit and infeſt the grain-fields of the farmer. But, where practicable, they are generally confined in preſerved places, as in incloſed woods of the coppice or other kinds; but none, or very few, attempts have hitherto been made to rear this ſort of birds in a domeſtic manner, for their uſes in that way: yet it would appear to be a very eaſy matter, from the great reſemblance which they have to poultry in their habits, modes of feeding, and ſeveral other particulars, though unqueſtionably they are much leſs hardy in their nature. When pheaſants become full grown, they are found to be great devourers of moſt ſorts of grains, to the great injury of the farmers who are near their habitations.

They would be a very good bird for the table, if they could be raiſed with facility in the farm-yard.

PHEASANT'S *Eye*, in *Botany*. See *Flos* ADONIS.

PHEASANT'S *Eye-pink*. See DIANTHUS.

PHEASANT'S *Iſland*, or *Iſland of Conference*, in *Geography*, an iſland ſituated in the river Bidaſſao, between France and Spain.

PHEASANT *Sea*, or *Pin-tail Duck*. See DUCK (*Acuta*).

PHEASANTRY, in *Ornamental Gardening*, a building or place conſtructed for the purpoſe of breeding, rearing, and keeping theſe ſorts of birds; and which ſhould conſtantly be raiſed near to, and be well covered with plenty of wood, in different ſtates of growth; the whole being incloſed with a high fence, in order that the young may be allowed, as ſoon as poſſible, to run freely through it, and pick up their food, as well as other matters.

The buildings of this nature ſhould be formed in a very neat, ornamental manner; ſometimes in a ſquare, at other times in an oval or oblong ſhape, as may be the moſt ſuitable to the particular ſpots on which they are to be erected.

PHEBALIUM, in *Botany*, a name adopted by Ventenat from John Bauhin, who, in his Hiſt. Plant. v. 1. 509, mentions it as applied by ſome Greek comic poets to the Myrtle, to which Ventenat thought his plant allied. But Bauhin writes the word *Phibaleon*, and nothing can be more unlucky than its application here, the genus of Ventenat, if we miſtake not, being one of the *Rutaceæ*, not *Myrti*, and having as little reſemblance to a Myrtle as may be. Notwithſtanding the elaborate deſcription and figure of this excellent botaniſt, in his Jardin de la Malmaiſon, we cannot but think he has erred in deſcribing the calyx without any teeth, and that he has totally miſunderſtood the fruit, which indeed he did not ſee ripe. We have not however met with his identical ſpecies, but we preſume on its evident and cloſe affinity to one before us; and on theſe grounds we venture to attempt a hiſtory of the genus; tolerating the name, for its ſound at leaſt, which conſidering ſome others, that we are forced to endure, is no ſmall recommendation. Vent. Malmaiſ. 102.—Claſs and order, *Decandria Monogynia*. Nat. Ord. *Rutaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, with five ſhallow teeth, permanent. *Cor.* Petals five, equal, elliptic-oblong, concave, entire, nearly ſeſſile. Nectary glandular beneath the germen. *Stam.* Filaments ten, capillary, ſimple, ſmooth; anthers terminal, incumbent, of two round lobes. *Piſt.* Germens five, erect, pointed; ſtyle central, from the baſe of the germens, erect, thread-ſhaped; ſtigma obtuſe. *Peric.* Capſules five, combined at the baſe, ſpreading, ovate, compreſſed, of one cell and two valves. *Seeds* ſolitary, ſmooth, in an elaſtic tunic of two valves.

Eſſ. Ch. Calyx five-toothed. Petals five. Stamens capillary, ſimple. Anthers terminal, ſimple. Style from the baſe of the germens. Capſules five, combined, ſeated on a glandular nectary. Seeds ſolitary, in an elaſtic tunic.

1. Ph. *ſquamuloſum*. Scaly Phebalium. Vent. Malmaiſ. t. 102.—Leaves lanceolate, ſcaly beneath. Umbels terminal, ſolitary.—Native of the mountains of New South Wales. A greenhouſe plant at Paris, flowering in the beginning of ſummer. *Stem* ſhrubby, erect, much branched, a yard high. *Leaves* alternate, about an inch long, lanceolate, acute, entire, on ſhort ſtalks; their upper ſurface dark green, ſmooth, dotted; under clothed with minute, whitiſh ſcales. *Umbels* at the ends of the branches, ſolitary, of ſix or eight ſmall yellowiſh *flowers*, whoſe *ſtamens* are capillary to the very baſe, and twice as long as the *petals*. The *ſtyle* is rather ſhorter than the *ſtamens*. Ventenat did not perceive any teeth or diviſions to the *calyx*. The *leaves* when bruiſed are aromatic. We have ſeen no ſpecimen.

2. Ph. *dentatum*. Toothed Phebalium.—Leaves linear, toothed, revolute; hoary beneath. Umbels axillary.—Brought by Gen. Groſe from ſome part of New Holland, and communicated to us by A. B. Lambert Eſq. A larger ſhrub, apparently, than the preceding; the *branches* round, hoary with extremely minute ſtarry ſcales. *Leaves* ſcattered, about two inches long, on ſhort ſtalks, linear, bluntiſh, revolute, rather diſtantly toothed; upper ſide dark ſhining green, beſprinkled with glandular dots; under white or hoary, with a ſort of mealy pubeſcence, not diſcernibly ſcaly. *Umbels* about the upper part of the branches, axillary, on dark coloured ſtalks, much ſhorter than the leaves, ſlightly hoary like the branches, each of eight or ten pale yellowiſh *flowers*. Theſe in every part anſwer to Ventenat's deſcription and repreſentation of the laſt, except that the *calyx* is very manifeſtly five-cleft. Each *anther* conſiſts of two round, almoſt ſeparate, lobes, without any appendage. The *ſtamens* and *ſtyle* are twice the length of the *petals*, which are full of large glandular dots, or cells of eſſential oil, moſt apparent at the back; but we ſee nothing like the

peltate ſcales which are deſcribed by Ventenat as covering the backs of the *petals* in his ſpecies.

3. Ph. *argenteum*. Silvery-ſcaled Phebalium. (Erioſtemon ſquamea; Labill. Nov. Holl. v. 1. 111. t. 141.)—Leaves lanceolate, entire, naked on both ſides. Cluſters axillary, compound, ſcaly.—Our ſpecimen was gathered by Mr. Menzies, near King George's ſound, on the weſt coaſt of New Holland. Labillardiere found his at the cape of Van Diemen. He ſpeaks of it as a *tree*, from five to ſeven fathoms high, with ſpreading *branches*, angular and ſcaly when young. Theſe ſcales in our's are ſcattered, and finely ſtellated, very like thoſe of a turbot in miniature. *Leaves* two or three inches long, bright green, ſomewhat coriaceous, lanceolate, flat, entire, about half an inch wide, naked on both ſides, except in a very young ſtate, when the back is ſcaly like the branches. *Footſtalks* ſhort. *Flower-ſtalks* axillary, much ſhorter than the leaves, racemoſe, compound, many-flowered, angular, entirely covered, as well as the *calyx*, under ſide of the *petals*, and the *germens*, with the moſt beautiful, crowded, convex, ſnow-white, ſilvery ſcales. The upper ſurface of the *petals* is ſmooth, naked, and ſeems to be white. *Stamens* but half the length of the corolla, very ſlightly dilated at their baſe, ſmooth in every part. *Style* ſhorter than the ſtamens. *Capſules*, according to Labillardiere, five, ovate, ſlightly compreſſed, pointed, gibbous at the upper edge where they burſt, lined with an elaſtic cartilaginous tunic to the *ſeed*, of the ſame form, and burſting in the ſame manner. *Seed* ſolitary, nearly kidney-ſhaped, black and ſmooth. This excellent author, fearing leſt the genera of the *Rutaceous* family ſhould be too much multiplied, refers this plant to our Erioſtemon, (ſee that article); but the ſtamens are too different to admit of ſuch a meaſure. A moſt valuable remark is ſubjoined, that except in number of the parts of fructification, the plant in queſtion agrees with *Melicope* of Forſter. We are happy to meet with this confirmation of our conjecture reſpecting the natural order of that genus, (ſee Melicope,) which we had not till now ſeen in Labillardiere. As to the difference of number, we ſhould not think it of importance in this caſe. But the ternate *leaves*, general ſmoothneſs, deeply divided *calyx*, and oblong arrow-ſhaped *anthers* of *Melicope*, excite conſiderable doubts; and if Gærtner be correct, the want of an elaſtic tunic to its *ſeeds*, affords a moſt eſſential diſtinction.

PHECOS, a name uſed by ſome authors for the ſagittaria, or water-arrow-head.

PHEDOROVKA, in *Geography*, a town of Ruſſia, in the government of Ekaterinoſlav, on the Bug; 60 miles N.W. of Cherſon.

PHEDOSIEVKA, a town of Ruſſia, in the country of the Coſſacks, on the Choper; 44 miles W. of Archedinſkaia.

PHEER-FARRID, a town of Hindooſtan, in Berar; 25 miles E.N.E. of Notchengong.

PHEGEA, in *Ancient Geography*, a town of the Peloponneſus, in Arcadia.

PHEGOS, a town of Greece, in Theſſaly, ſituated near the place where was an oracle of Jupiter, which was afterwards transferred to Epirus.

PHEIA, a town of Triphylia, north-weſt of Letrini, at the bottom of a ſmall gulf, which had a port and a ſmall iſland.

PHELDAHANATZ, in *Geography*, a town of Ruſſia, in the government of Caucaſus; 20 miles S.E. of Kizliar.

PHELIN, a town of Ruſſia, in the government of Riga, on the river Phelin; 96 miles N. of Riga. N. lat. 58° 10′. E. long. 25° 14′. The river of this name runs from lake Vertz into the Baltic, which it enters at Pernov.

PHELLANDRIUM, in *Botany*, the Water Hemlock, is uſually derived from φηλλος, *cork*, and ανηρ, ανδρος, *a man*; but as ſuch an etymology throws no light on the ſignification of the word, and is actually without any meaning, may we preſume to ſuggeſt that the firſt ſyllable ought perhaps to be *Phel*, from φηλεω, *to deceive*, in alluſion to the dangerous qualities of the herb, and its reſemblance to ſome that are wholeſome? This meaning is ſtrengthened by Pliny's comparing the leaves to *Apium*, for which, if the *Phellandrium* were miſtaken, the error would be very dangerous. Linn. Gen. 140. Schreb. 190. Willd. Sp. Pl. v. 1. 1444. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 321. Ait. Hort. Kew. v. 2. 149. Juſſ. 221. Tourn. t. 161.—Claſs and order, *Pentandria Digynia*. Nat. Ord. *Umbelliferæ*.

Gen. Ch. *General umbel* of numerous rays; *partial* ſimilar to it. *General Involucrum* none; *partial* of ſeven acute leaves, the length of the partial umbel. *Perianth* of five teeth, permanent. *Cor. Univerſal* nearly uniform; flowers all fertile; thoſe of the diſk ſmalleſt; *partial* of five unequal, pointed, inflexed, and ſo becoming heart-ſhaped, petals. *Stam.* Filaments five, capillary, longer than the corolla; anthers roundiſh. *Piſt.* Germen inferior, oblong; ſtyles two, awl-ſhaped, erect, permanent; ſtigmas obtuſe. *Peric.* Fruit ovate, ſmooth, crowned with the perianth and piſtils, ſeparable into two parts. *Seeds* two, ovate, ſmooth.

Eſſ. Ch. Flowers all fertile; thoſe of the diſk ſmalleſt. Fruit ovate, ſmooth, crowned with the calyx and ſtyles. General involucrum wanting.

Obſ. This genus is certainly nearly allied to Oenanthe, (ſee that article,) to which Lamarck has united it; but the flowers being all fertile, the general involucrum wanting, and the coat of the ſeeds, though ſmooth and even, not tumid or corky, may keep it diſtinct. In habit and economy, as well as in qualities, the firſt ſpecies, at leaſt, agrees with *Oenanthe*. Crantz refers *Phellandrium* to *Liguſticum*.

1. Ph. *aquaticum*. Common Water Hemlock. Linn. Sp. Pl. 366. Engl. Bot. t. 684. Woodv. Med. Bot. ſuppl. t. 266. (Phellandrium; Rivin. Pentap. Irr. t. 65. Dod. Pempt. 591. Cicutaria paluſtris; Ger. Em. 1063. Lob. Ic. v. 1. 735.)—Subdiviſions of the leaflets divaricated, bluntiſh. Stem leafy.—Native of ditches, rivulets, and the margins of pools, in moſt parts of Europe, flowering copiouſly in June and July. The *root* is biennial, ſpindle-ſhaped, thick, with whorled fibres. *Stem* two or three feet high, thick, cylindrical, hollow, furrowed, buſhy, with many wide-ſpreading branches; its ſtrong fibres, when bleached and diſſected by the water, forming an elegant, reticulated tube, often found about marſhland ditches. *Leaves* ſpreading, dark ſhining green, ſmooth, thrice pinnate, cut, all the ſegments divaricated. *Umbels* on ſhort ſtalks, oppoſite to the leaves, denſe, with thick rays. *Flowers* purpliſh-white. *Fruit* ſomewhat angular, but not furrowed. The *leaves* are lengthened out in running ſtreams, and the *flowers* rarely produced. When the plant happens to grow out of the water, the *leaves* are rounder and leſs divided, ſo as to aſſume a very different aſpect.

2. Ph. *Mutellina*. Mountain Water Hemlock. Linn. Sp. Pl. 366. Jacq. Auſtr. t. 56. (Mutellina; Bauh. Hiſt. v. 3. 66. Camer. Epiſt. 8.)—Subdiviſions of the leaves cloſe, acute. Stem nearly naked.—Native of the alps of Auſtria, Carniola, Switzerland, and Siberia, flowering from June to September. The *root* is perennial, long,

and tapering, crowned with the rigid fibres of old leaf-ſtalks. Its flavour, and that of the whole herb, is compared by Cluſius to the Carrot. *Stem* ſcarcely a foot high, erect, ſlightly branched, round, ſmooth, almoſt naked. *Leaves* ſubdivided as in the former, but their ſegments are narrower, more lanceolate, crowded, and very ſharp. They are moſtly radical, ſupported by long ſtalks. *Umbels* terminal, reddiſh. *Fruit* ſomewhat angular. *Mutellina*, or rather *Muttellina*, is the vulgar name of this plant upon the alps, according to John Bauhin, who ſays the paſtures where it grows are eſteemed good for milch cows.

PHELLOE, in *Ancient Geography*, a pretty conſiderable town of the Peloponneſus, in Achaia, near Egira, according to Pauſanias. In this place were temples of Diana and Bacchus, ornamented with ſtatues.

PHELLOS, in *Botany*, a name uſed by ſome authors for the cork-tree.

Phellos, φελλος, in *Antiquity*, a feſtival in honour of Bacchus, being a preparative to the Dionyſia.

PHELLUS, in *Ancient Geography*, a town of Aſia Minor, in Lycia, ſituated on low ground, oppoſite to Antiphellus.

Phellus, or *Phello*, a town of the Peloponneſus, in the Elide, in the vicinity of Olympia. Strabo.

PHELLUSA, an iſland ſituated near that of Leſbos. Pliny.

PHELYPÆA, in *Botany*, a genus of Tournefort's, reſtored by Desfontaines, after it had been all along confounded, by Linnæus and his followers, as well as by Juſſieu, either under Lathræa or Orobanche. (See thoſe articles.) The name was given in honour of the family of Phelipcaux, two of whom Tournefort mentions as the Mœcenates of his time; but we know nothing of their botanical claims, and feel little partiality for the name, except on account of its author. Thunberg and Schreber, ſuppoſing the Tournefortian genus aboliſhed, have transferred it to an entirely new plant from the Cape; ſee Thunb. Nov. Gen. 91; and Schreb. Gen. 672. n. 1489 (not 489). The latter therefore will now require a new appellation. Tourn. Cor. 47. t. 479. Desfont. Atlant. v. 2. 60.—Claſs and order, *Didynamia Angioſpermia*. Nat. Ord. *Perſonatæ*, Linn. *Pediculares*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, bell-ſhaped, in five, rather deep, ovate, obtuſe, erect, ſlightly unequal ſegments, permanent. *Cor.* of one petal, ringent; tube ſlightly curved, ample, dilated upwards; limb in five ſhort, broad, rounded, imbricated ſegments, the lower one moſt diſtant, with an elevated two-lobed palate, and intermediate longitudinal furrow. Nectary ..... *Stam.* Filaments four, awl-ſhaped, about as long as the tube, two of them longeſt; anthers thick, oblong, hairy, approaching each other, and cohering by their pubeſcence, with two acute lobes. *Piſt.* Germen ſuperior, ovate; ſtyle cylindrical, the length of the ſtamens; ſtigma drooping, thick, of two obtuſe lobes. *Peric.* Capſule ovate, compreſſed, of two cells and two valves, the partitions from the centre of each valve. *Seeds* numerous, minute, roundiſh.

Eſſ. Ch. Calyx deeply five-cleft, inferior. Corolla ringent; limb in five ſhort rounded ſegments; the lowermoſt with an elevated palate. Anthers cohering. Capſule of two cells and two valves. Seeds numerous.

Obſ. The calyx ſufficiently diſtinguiſhes this genus from *Orobanche*, and indeed, as to number and form of the ſegments, from *Lathræa*. The *corolla* is very different from both. Not having examined the capſule ourſelves, we cannot be certain that the ſuppoſed partitions are different from what are termed receptacles in the character of *Lathræa*. Nothing is ſaid, except by Forſkall, of any thing like a nectariferous gland in *Phelypæa;* yet it can hardly be ſuppoſed wanting. Three ſpecies are recorded by authors.

1. Ph. *coccinea*. Scarlet Phelypæa. (Ph. orientalis, flore coccineo; Tourn. Cor. 47. t. 479. Orobanche coccinea; Willd. Sp. Pl. v. 3. 354. O. Phelypæa; Marſchall von Bieberſtein in Sims & Kon. Ann. of Bot. v. 2. 447. Lathræa Phelypæa β; Linn. Sp. Pl. 844.)—Stem ſingle-flowered. Three upper ſegments of the calyx cohering.—Gathered by Tournefort in the Levant: by von Bieberſtein on graſſy hills, in the diſtrict of mount Caucaſus bordering on Circaſſia, and ſome other places, flowering in May or June. *Root* paraſitical, perennial. *Stem* one or more, quite ſimple, a ſpan high, brown, ſcaly, very like thoſe of *Orobanche major*. *Flower* terminal, ſolitary, ſeſſile, inclining toward one ſide, thrice the ſize of *O. major*, very handſome. *Calyx* the colour of the ſtem; its three upper ſegments erect, cohering, oblong, channelled; the two lower longer and more acute, directed forward, and applied to the tube of the corolla under the lower lip. *Corolla* beautiful; externally yellowiſh, and clothed with rather viſcid pubeſcence, as in *Orobanche;* internally like velvet, and of the richeſt ſcarlet; with two large deep-black ſpots in the throat. *Stigma* entire, hemiſpherical. *Bieberſt.*

2. Ph. *lutea*. Yellow Phelypæa. Desfont. Atlant. v. 2. 61. t. 146. (Ph. luſitanica flore luteo; Tourn. Cor. 47. Orobanche tinctoria; Forſk. Ægypt-Arab. 112. Vahl. Symb. v. 2. 70. Willd. Sp. Pl. v. 3. 353. O. elegantiſſima verna, flore luteo; Griſl. Luſit. 66. Moriſ. v. 3. 502. Lathræa Phelypæa α; Linn. Sp. Pl. 844.)—Stem many-flowered. Tube of the corolla contracted below; inflated above.—Native of Portugal, Barbary, and Arabia. Gathered at Algiers, by Brouſſonet and Durand; on the moiſt ſandy banks of the river El hammah, near Maſcar, by Desfontaines. Forſkall ſays it grows paraſitically on old roots. The *ſtem* of this very noble plant is erect, quite ſimple, ſmooth, ſucculent, ſcaly, from one to two feet high; its upper half conſiſting of a cloſe cylindrical *ſpike* of numerous large yellow *flowers*, ſpreading every way. *Bracteas* large, ovate, crenate, with a pair of internal ſmaller ones. *Calyx* five-cleft about half way down. Tube of the *corolla* above an inch long, cylindrical beyond the calyx, then bent forward, and ſuddenly inflated; ſegments of the limb ſpreading, rounded, nearly uniform, of a rich ſhining yellow within. *Anthers* very hairy. The whole plant dries brown.

Forſkall ſays the baſe of the *germen* is ſurrounded by a yellow ring. That our plant is what Griſley and Tournefort deſcribed, we know by an examination of original ſpecimens. If Linnæus had compared Moriſon with Tournefort, he could never have ſuppoſed this and the foregoing to be only varieties. *Ph. lutea* has often thirty *flowers* in a ſpike.

3. Ph. *violacea*. Violet Phelypæa. Desfont. Atlant. v. 2. 60. t. 145. (Orobanche Phelypæa; Willd. Sp. Pl. v. 3. 352.)—Stem many-flowered. Tube of the corolla funnel-ſhaped.—Gathered by Desfontaines, in the ſandy deſert of Africa, near Tozzer.—Much reſembling the laſt, except that the *flowers* are violet-coloured, with two yellow prominences on the palate, which appear leſs conſpicuous, though they do exiſt, in the *flava*. The regular ſwelling of the *tube* from the bottom upwards is a mark of this ſpecies. It is juſtly termed by its diſcoverer "a very beautiful plant," flowering in winter. The *bracteas* and *calyx* are coloured, partaking, in ſome degree, of the hue of the *corolla*.

We have great pleaſure in reſtoring the original and characteriſtic names of theſe three ſpecies, ſo perverſely changed and confuſed by various hands.

PHENEOS, in *Ancient Geography*, a town of Arcadia, N.W. of Orchomené. It was originally built on the ſummit of a mountain, the ruins of which were ſeen by Pauſanias. The new town was erected at the bottom of the ſame mountain; but the citadel was ſituated on a very elevated rock. At Pheneos are the ruins of a temple of Minerva Tritonia; on the declivity of the mountain was a ſtadium, and upon a ridge of it was the tomb of Iphicles, brother of Hercules, and another of Iolas, the brave companion of his travels. A religious ceremony was annually celebrated in honour of him. Mercury was the principal divinity of the country; who had a fine temple, with a marble ſtatue, executed by a very ingenious ſtatuary. Annual games, called "Hermæan," were celebrated in honour of him. The Pheneates had alſo a temple of Ceres; and the myſteries of this goddeſs were celebrated by them with great ſolemnity, and in the ſame manner as they were obſerved at Eleuſis; and the people of the country claimed this original invention. Near Pheneos was a temple of Apollo Pythius, which was in ruins at the time of Pauſanias. The inhabitants, however, continued to offer ſacrifices to him, though they had only an altar of marble, inſtead of a temple. Evander is ſaid to have been a native of Pheneos, according to the verſe in Virgil, Æn. l. viii. v. 165:

> "Acceſſi et cupidus Phenei ſub mœnia duxi."

PHENEUS, a lake or marſh of the Peloponneſus, in Arcadia. According to Pauſanias, it was the ſource of the river Ladon.

PHENGITES, in the *Natural Hiſtory of the Ancients*, the name of a very beautiful ſpecies of alabaſter. It is a very rude and irregular maſs, very ſhattery and friable, yet of a brightneſs ſuperior to that of moſt of the other marbles, and excelling them all in tranſparence; it is in colour of an agreeable pale, yellowiſh, white, or honey colour; the yellowiſh is more intenſe in ſome places than in others, and ſometimes makes an obſcure reſemblance of veins. It is very weak and brittle in the maſs; and when reduced to ſmall pieces, eaſily crumbled between the fingers into looſe but conſiderably large angular pieces, ſome perfect, others complex, irregular, or mutilated, and all approaching to a flat ſhape.

The ancients were very fond of this ſpecies in their public buildings; and the Temple of Fortune, built wholly of it, has long been famous. Its great beauty is its tranſparence, from which alone this temple was perfectly light when the doors were ſhut, though it was built without a window, and had no other light but what was tranſmitted through the ſtone its walls were built with. It was anciently found in Cappadocia, and is ſtill plentiful there: we have it alſo in Germany and France, and in our own kingdom in Derbyſhire, and ſome other counties. It takes an excellent poliſh, and is very fit for ornamental works, where there is no great ſtrength required. Hill's Hiſt. of Foſſ. p. 490. See Glass.

PHEONS, in *Heraldry*, the barbed head of darts, arrows, or other weapons.

PHEOS, in *Botany*, a name given by Theophraſtus, Dioſcorides, and others, to a plant uſed by the fullers in dreſſing their cloths, and of which there were two kinds, a ſmaller, called ſimply *pheos*, and a larger, called *hippopheos*.

The name of this plant is ſometimes written *phleos*; and it is by that confounded with a kind of marſh-cudweed, or gnaphalium, called alſo by that name; but it may be always found which of the two plants an author means, by obſerving the ſenſe in which the word is uſed, and the uſe to which the plant was put. The phleos, properly ſo called, that is, the cudweed, was uſed to ſtuff beds and other ſuch things, and to pack up with earthen veſſels to prevent their breaking; but the pheos, improperly called *phleos*, only about cloths; this was, however, alſo called *ſtæbe* and *cnaphon*.

PHERÆ, in *Ancient Geography*, a river of the Peloponneſus, below the river Pamiſus, in the gulf of Meſſenia. Ptolemy. Strabo.—Alſo, a town of Macedonia, in the Pelaſgia, according to Ptolemy and Livy. But Cicero and Pauſanias place it in Theſſaly.—Alſo, a town of Aſia, in the Serica. Ammian. Marcell.—Alſo, a town of Theſſaly, on the confines of the Pelaſgiotide, towards Magneſia and the Phtiotide. It was ſituated on the left bank of a ſmall river, called Naurus, towards the S.E. of the lake Bœbeis. According to Strabo, it had a port on the Pelaſgic gulf, called Pagaſes. This town, in the time of Philip, the father of Alexander, occupied a conſiderable rank in Theſſaly, as Alexander, who was its king, and whom the Greek authors denominate a *tyrant*, had ſubjected to his dominion ſeveral towns of Theſſaly. The Theſſalians implored ſuccour of Philip, who defeated him, and ſoon after he was put to death by his own wife: Philip obtained from Lycophron, whom he twice vanquiſhed, this town. On this occaſion Philip reſtored liberty to the whole of Theſſaly; but this town ſuffered by the ravages of war, when the Romans carried their arms into Theſſaly and Macedonia.

PHERECRATES, in *Biography*, a Greek comic poet, the contemporary with Eupolis and Ariſtophanes, flouriſhed about the year 420 B.C. He obtained a high reputation, writing in the utmoſt purity of ſtyle, and was the inventor of a meaſure called the Pherecratian, conſiſting of the three laſt feet of an hexameter, the firſt being invariably a ſpondee; of this, Horace's line "Quamvis Pontica pinus" is an example. The titles of ſeveral of his comedies have been preſerved, with ſome fragments, particularly in Athenæus. In the Obſerver there are tranſlations of three paſſages, one of which gives a ſtriking idea of the comic extravagance of the author. A fragment relative to ancient muſic, cited by Plutarch, has been particularly examined by M. Burette in the Memoir of the Academy of Inſcriptions. Gen. Biog.

PHERECYDES, a Grecian philoſopher, the contemporary with Terpander and Thales, who flouriſhed about the year 600 B.C., was a native of the iſland of Scyros, one of the Cyclades, near Delos. Some writers ſuppoſe that he derived his principles of philoſophy from the ſacred books of the Phœnicians, but others, who have carefully examined into the matter, think that he had them from the Grecian philoſophers. Joſephus advances the opinion that he ſtudied in Egypt, which is not improbable, ſince that country, in his time, was univerſally reſorted to as the ſeat of learning. It was pretended that he had the power of predicting future events; that he foretold the deſtruction of a veſſel at ſea, and the approach of an earthquake; and that the event, in both caſes, juſtified the prophecy. Admitting, however, the truth of theſe ſtories, it is eaſy to imagine that his knowledge was the reſult of a careful obſervation of thoſe phenomena which commonly precede ſtorms and earthquakes, in a country where they frequently happen; and it is not improbable that Pherecydes, like many other ancient philoſophers, availed himſelf of his ſuperior knowledge of nature to impoſe upon the ignorant multitude, by pretending to powers that he did not poſſeſs. He is ſaid to have been the firſt among the

Grecians who wrote concerning the nature of the gods; that is, who wrote upon that ſubject in proſe, ſince, before his time, Orphæus, Muſæus, and others, had written theogonies in verſe. Pherecydes was much eſteemed at Lacedæmon, on account of his poetry inculcating the maxims of Lycurgus. He died at the age of eighty-five. It is not eaſy to aſcertain the nature of the doctrines which he taught: he probably believed in an eternal firſt cauſe of all things; and in the immortality of the ſoul. According to Cicero, he was the firſt philoſopher in whoſe writings this doctrine appeared. He is ſaid to have taught the belief of the tranſmigration of the ſoul: this is probably true, it being a tenet commonly received among the Egyptians, and afterwards taught by Pythagoras, who was a pupil of Pherecydes. Enfield's Hiſt. Phil.

PHERENDIS, in *Ancient Geography*, a town of Aſia, in Greater Armenia, E. of the Tigris, between Siæ and Tigranocerta. Ptolemy.

PHEREPHATTIA, Φερεφαττια, in *Antiquity*, a feſtival at Cyzicum, wherein a black heifer was ſacrificed to Pherephatta or Proſerpine.

PHERME, or Ferme, in *Ancient Geography*, a mountain of Egypt, in the Thebaid, which is ſaid to have been the abode of Paul the Hermit.

PHERONIA, a town on the E. ſide of the iſland of Sardinia, between the mouth of the river Cœdrus and the town of Olbia. Ptolemy.

PHERRACIA, a town of Aſia, in the Colchide. Strabo.

PHERVINTASKOI, in *Geography*, a cape of Ruſſia, on the E. coaſt of Nova Zembla. N. lat. 77° 30′. E. long. 77° 14′.

PHESTE, in *Ancient Geography*, a town of the iſland of Cyprus, ſituated on the ſea-coaſt, in the ſouthern part, according to Diodorus Siculus. But Dionyſius Periegetes places it in the interior of the iſland, near Gortyna.

PHESTI, a place of Italy, in Latium, at the extremity of the territory, belonging to the city of Rome, where, according to Strabo, the prieſts offered the ſacrifices called "Ambarvalia."

PHEUGARUM, a town of Germany, between Tuliſurgium and Canduum. Ptolemy.

PHIAL, Phiala, formed of φιαλη, which ſignifies the ſame, a ſmall thin glaſs bottle, popularly called a *vial*.

Phial, *Leyden*. See Leyden.

PHIALA, in *Ancient Geography*, a fountain or lake at the foot of mount Hermon, which, according to Joſephus, was one of the two ſources of the Jordan: he ſays, that it ran by ſubterraneous canals, and then guſhing out of the earth, joined the other at the town of Dan.

PHIALIA, a town of the Peloponneſus, in Arcadia, between Heræa and Tegea. Ptolemy. It was alſo called Phigalea. Steph. Byz. Pauſanias.

PHIDALIA, a ſmall port of Thrace, upon the Thracian Boſphorus, towards the S.E. of the gulf Leoſtenius. A ſmall river runs into this port.

PHIDIAS, in *Biography*, an Athenian, the moſt celebrated ſculptor of antiquity. His diſtinguiſhing character was grandeur and ſublimity; and he particularly ſtudied optical effects. To this purpoſe it is related, that having, in competition with Alcamenes, made a ſtatue of Minerva to be placed on a column; the work of the latter appeared ſo finiſhed when viewed on the ground, that it was univerſally admired, whilſt that of Phidias ſeemed to be a mere rough ſketch; but when both were ſeen from their deſtined ſituations, the beauties of the firſt were loſt, while the ſecond produced the moſt ſtriking effect. After the battle of Marathon he converted a block of marble, which the Perſians had brought for a trophy of their expected victory, into a fine ſtatue of Nemeſis, the goddeſs of Vengeance. His reputation was ſo high at Athens, that Pericles regarded him as his particular friend, and appointed him ſuperintendant of all the public edifices with which that city was decorated. One of his greateſt performances was a coloſſal ſtatue of Minerva, in the temple called Parthenon. In this work he diſplayed his ſkill in minute ſculpture, no leſs than his grandeur of conception in the main figure. On the convexity of the goddeſs's ſhield was repreſented the battle of the Amazons, and on its concave ſurface the combat of the gods with the giants; whilſt her ſlippers were adorned with the fight of the Centaurs and Lapithæ. On her breaſt-plate was a Meduſa's head. The baſe contained the birth of Pandora, with twenty figures of the gods. He is ſaid to have been the firſt who brought the bas-relief to perfection. His fame and fortune excited envy, and ſeveral accuſations were brought againſt him, which he was enabled to repel. At length he was charged with having introduced the portraits of himſelf and Pericles in the battle of the Amazons, and this being regarded as a kind of profanation, he was thrown into priſon, where, according to Plutarch, he died. Others, however, affirm, that he eſcaped to Elis, where he afterwards executed his Olympian Jupiter, the moſt famous piece of ſculpture in all antiquity. It was a coloſſal ſtatue, ſixty feet high, of incomparable majeſty and dignity in its attitude and expreſſion. The name of the artiſt was engraved on the baſe. The Eleans, in gratitude for this extraordinary work, ſettled upon his deſcendants a perpetual office, the ſole duty of which was to preſerve the luſtre of the ſtatue. Plutarch.

PHIDITIA, or Philitia, in *Antiquity*, feaſts inſtituted by Lycurgus, and celebrated with great frugality at Lacedæmon.

The Phiditia were held in the public places, and in the open air: rich and poor aſſiſted at them alike, and on the ſame footing; their deſign being to keep up peace, friendſhip, and good underſtanding and equality among all the citizens, great and ſmall. Bernegger ſays, they who attended at this feaſt, brought each a buſhel of flour, eight meaſures of wine, called chorus, and five minæ of cheeſe, and as much figs.

The Phiditia of the Greeks were much the ſame with the Chariſtia at Rome.

PHIGALIA, or Phialia, in *Ancient Geography*, a town of Arcadia, upon a high and craggy rock, near the river Lymax, and S.W. of Megalopolis. This town, being the key of Arcadia, appeared ſo deſirable a poſſeſſion to the Lacedæmonians, that they laid ſiege to it, and took it in the year 659 B.C. The Phigalians, deſirous of regaining it, conſulted the oracle of Delphos, who directed them to procure 100 choſen men from Oreſtaſium to accompany them in their expedition. Nevertheleſs, theſe brave men periſhed in the attempt. The Oreſtaſians, however, in concert with the Phigalians, attacked their enemies, and made a great ſlaughter of the Lacedæmonians, who all periſhed, except ſome few, who ſaved themſelves by flight.

In this town were two remarkable monuments; one a ſtatue of the famous athleta, Arrachion; and the other, the place of burial of the 100 Oreſtaſians, who generouſly devoted themſelves to death in order to ſecure the conqueſt of the town. Upon the ſummit of the rock, which was the ſcite of Phigalia, there was a temple of

Diana Conſervatrix, in which was her ſtatue. There were ſome other ſtatues in a place of exerciſe not far diſtant.

PHIGIA, a town in the interior of Arabia Felix, between Saphtha and Badais. Ptolemy.

PHI-HAHIROTH, or Pi-hahiroth, a town ſituated on the banks of the Red ſea: it denotes the defile or the mouth of Hahiroth. Calmet ſuppoſes that it was the town of Heroopolis.

PHILA, an iſland of Africa, in the courſe of the river Triton, in Libya. Diod. Sic.

Phila, in *Mythology*, one of the attributes of Venus, which diſtinguiſhes her as the mother of love, from φιλειν, *to love.*

PHILACTES, in *Ancient Geography*, a river of Aſia Minor, which ran into the gulf "Hermonius," in the Thracian Boſphorus.

PHILADELPHIA, in *Antiquity*, were games inſtituted at Sardis, to celebrate the union of Caracalla and Geta, the ſons of Septimius Severus.

Philadelphia, in *Ancient Geography*, a town of Aſia Minor, at the foot of mount Tmolus, at ſome diſtance E. of Sardis. It derived its name from Attalus Philadelphus, the brother of Eumenes: and was much celebrated for its feaſts and public games. It became epiſcopal, and was very conſiderable when the Turks took poſſeſſion of it.—Alſo, a town of Aſia, in the interior of Cilicia, between Domitiopolis and Seleucia Aſpera, according to Ptolemy: it was ſeated on the Calycadnus, at a ſmall diſtance W. from Olba. This alſo became epiſcopal.—Alſo, a capital of the Ammonites, ſituated on the mountains of Gilead, towards the ſources of the river Arnon. Its eaſtern name was Rabbath-Ammon. According to Steph. Byz. it was the third town of Syria, which aſſumed ſucceſſively the name of Ammana (or Ammon), Aſtarte, and then Philadelphia, after the name of Ptolemy Philadelphus. It was one of the Decapolis of Paleſtine. See Ammonites.—Alſo, a town of Egypt. Steph. Byz.

Philadelphia, in *Geography*, a populous and highly cultivated county of Pennſylvania, bounded W. by Delaware county, N.W. by Montgomery, N.E. by Poquaſin creek, which ſeparates it from Burk's county, and S. and S.E. by the river Delaware, which divides it from the ſtate of New Jerſey. It contains about 89,600 acres, and is divided into 18 townſhips, and contains 81,009 inhabitants. On the banks of Schuylkill in this county is an excellent quarry of marble, which ſupplies the ſtone-cutters of Philadelphia.

Philadelphia, the metropolis of Pennſylvania, is ſituated in the county to which it gives name, on the weſtern bank of the river Delaware, which is here a mile broad. This city is diſtant 110 miles from the Atlantic ocean by the courſe of the bay or river, and about 55 or 60 in a S.E. direction. The river is navigable for a 74-gun ſhip as far as the city; for ſloops 35 miles farther to Trenton, and for boats loaded with eight or nine tons to a greater diſtance of 100 miles. Philadelphia was laid out by the famous William Penn (ſee his article) in the year 1683, and ſettled by the influx of adventurers from England to ſuch a degree, that in leſs than a century it was eſtimated to contain 6000 houſes, and 40,000 inhabitants, including thoſe of the ſuburbs as well as the city. The form of the ground plot of the city is an oblong ſquare, about one mile N. and S. and two E. and W. lying in the narroweſt part of the iſthmus between the Delaware and Schuylkill rivers, about five miles in a right line above their confluence. In the progreſs of building, it was found that the Delaware front was of itſelf ſufficient for quays and landing places. The buildings now occupy a ſpace not exceeding three miles in length from N. to S., and in the moſt extended part do not reach a mile from the Delaware. All the houſes built beyond the boundary line of the oblong ſquare are ſaid to be in the "Liberties," as the juriſdiction of the corporation does not extend to that part of the town. Here the ſtreets are very irregularly built. But the city is interſected by a great number of ſtreets, which croſs each other at right angles. Of theſe there were originally nine, which extended from the Delaware to the Schuylkill, and theſe were croſſed by 23, running N. and S. The number of ſquares in the original plan was 184; but as ſeveral of theſe have been interſected by new ſtreets, their number now amounts to 304; and ſeveral of theſe are again interſected by lanes and alleys. Broad-ſtreet is 113 feet wide; High-ſtreet 100; Mulberry-ſtreet 60; and the other ſtreets in the original plan 30 feet wide. The greateſt part of the city is tolerably well paved with pebble ſtones in the middle, and with neat foot paths of brick, furniſhed with common ſewers and gutters, ſo that the ſtreets are, in general, kept very clean. The ſpace occupied by Water-ſtreet was intended, in the original plan, for a cart way, in order to accommodate the wharfs and ſtores; but it is now occupied, a few vacancies excepted, by lofty houſes, reaching through the whole front, and commodious wharfs of a rectangular form, and conſtructed of wood, are extended into the river, and here the largeſt ſhips that are in the port may lie in ſafety, both to receive and diſcharge their cargoes; and they are defended from the ice, in winter, by piers firmly fixed. Another ſtreet, called Dock-ſtreet, was formerly a ſwamp, but is now by a plantation of a row of Lombardy poplars on each ſide rendered one of the pleaſanteſt ſtreets in the city. Lamps, to the amount in number of 662, diſpoſed at convenient diſtances, give light to all parts of the city in the night.

The houſes in the city and ſuburbs are generally conſtructed of brick, three ſtories high, plain and neat, without much ornament. The general height of the ground, on which the city ſtands, is nearly 40 feet above the Delaware; but ſome of the ſtreets are conſiderably lower, and have on this account been ſubject to damage from the overflow of the river, by flood tides, and a ſtrong ſouth-eaſt wind.

The city contains 27 places for public worſhip, *viz.* five for Friends or Quakers, ſix for Preſbyterians and Seceders, three for Epiſcopalians, three for Roman Catholics, two for German Lutherans, two for Methodiſts, one for German Calviniſts, one for Swediſh Lutherans, one for the Moravians, one for Baptiſts, one for Africans, and a Jewiſh ſynagogue. The other public buildings are a ſtate-houſe and offices, two city court-houſes, a county court-houſe, an univerſity, the philoſophical ſociety's hall, a public library, an hoſpital, diſpenſary, an alms-houſe, a gaol, three incorporated banks, two dramatic theatres, a medical theatre, a laboratory, an amphitheatre, four brick market-houſes, a fiſh-market, a houſe of correction, and a powder magazine. Two ſteam-engine houſes have not long ago been erected, for ſupplying the city with wholeſome water from the Schuylkill. The roof of the firſt Preſbyterian church is ſupported in front by ſix pillars of the Corinthian order, and the whole building would do honour, by the elegance of its ſtructure, to any part of Europe. The German Lutheran church, erected to ſupply the place of that which was burnt in 1795, is one of the handſomeſt churches in the United States. Each of the Epiſcopal churches is furniſhed with an organ; ſo are the German, and two of the

Roman Catholic churches. The ſtate-houſe was erected about the year 1753, and its architecture is admired. Adjoining to it is a garden, which occupies a whole ſquare, and is ornamented with ſeveral rows of trees and gravel walks: that which was formerly a burying-place, is now converted into a public walk, and planted with rows of trees, ſo as to form a pleaſant promenade. The Philadelphia library originated with Dr. Franklin, and was incorporated in 1742, and has been gradually gaining an increaſe in books, &c. At preſent it contains upwards of 12,000 volumes, beſides a muſeum, and a valuable philoſophical apparatus. It is open every day in the week, except Sunday, to any perſon who has an inclination for reading. Books may alſo be borrowed out of the library, by leaving a depoſit to inſure their ſafe return, and paying a ſmall ſum for the uſe of them. The ſubſcribers amount to ſeveral hundred, and each ſubſcriber pays ten ſhillings annually. The building belonging to the library company is an elegant ſtructure; and in front of the edifice is a ſtatue of Dr. Franklin of white marble, executed in Italy at the expence, as it is ſaid, of 500*l.*, and given to the company by William Bingham, eſq. The apartments of the public gaol are arched with ſtone, as a ſecurity againſt fire; and the whole building is the largeſt, ſtrongeſt, and neateſt of the kind in the United States. Adjoining to it is a work-houſe, in which the ſexes are kept apart, and the criminals are ſeparated from the debtors, which undoubtedly is a circumſtance of great importance. Here are alſo apartments for the ſolitary confinement of criminals. The market-houſe is amply ſupplied with various proviſions, which are expoſed for ſale every Wedneſday and Saturday. This is an extenſive building, and is ſupported by 300 pillars. The new bank of Pennſylvania, lately erected under the ſuperintendance of Mr. Latrobe, is a large and remarkably elegant edifice of marble, of the Ionic order, conſtructed after the model of the ancient temple of Minerva in Greece. The eaſtern and weſtern fronts are adorned with two lofty colonnades of ſolid marble. The new theatre near the ſtate-houſe, finiſhed in 1793, is ſpacious and convenient. The large building, intended for the accommodation of the preſident of the United States, has been purchaſed by the univerſity of Pennſylvania, which conſiſts of two literary inſtitutions, that had for ſome time been eſtabliſhed in Philadelphia; one deſignated by the above name, the other by that of the college, academy, and charitable ſchools of Philadelphia. They now conſtitute a reſpectable ſeminary, incorporated in 1791. The philoſophical apparatus has lately been very much enlarged at a conſiderable expence, and is very complete of its kind. The funds of the univerſity produce annually a revenue of about 2365*l.* The aggregate number of ſtudents in the ſeveral ſchools is, on an average, about 510; and thoſe uſually admitted to degrees every year are about 25. The chief literary and humane ſocieties are the American philoſophical ſociety, formed in 1769; the college of phyſicians, inſtituted in 1737, and incorporated in 1739; the ſociety for promoting political inquiries, inſtituted in 1787; the Pennſylvania hoſpital, eſtabliſhed in 1751; the Philadelphia diſpenſary, in 1786; the Pennſylvania ſociety for the abolition of ſlavery, begun in 1774, and enlarged in 1787; the ſociety for alleviating the miſeries of priſons; the Pennſylvania ſociety for the encouragement of manufactures and uſeful arts, inſtituted in 1787; the Philadelphia ſociety for the information and aſſiſtance of immigrants, inſtituted in 1794; and two other ſocieties of the ſame kind; and an humane ſociety, inſtituted in 1790, an agricultural, marine, and various charitable ſocieties. Here are alſo a grand lodge of free and accepted maſons, and eight ſubordinate lodges. Few cities in the world, of the ſame population and wealth as Philadelphia, are more liberally provided with uſeful inſtitutions, both public and private. Here are alſo numerous academies for the inſtruction of both ſexes. Almoſt every religious ſociety has one or more ſchools under its immediate direction, in which children belonging to the ſociety are taught to read and write, and are furniſhed with books and ſtationary articles.

In the city and ſuburbs are ten rope-walks, which manufacture about 800 tons of hemp annually; 13 breweries, which are ſaid to conſume 50,000 buſhels of barley yearly; ſix ſugar-houſes; ſeven hair-powder manufactories in and about town; two rum diſtilleries and one rectifying diſtillery; and three card manufactories. The other manufactories are 15 for earthen-ware, ſix for chocolate, four for muſtard, three for cut nails and one for patent nails, one for ſteel, one for aquafortis, one for ſal ammoniac and Glauber ſalts, one for oil colours, twelve for bruſhes, two for buttons, one for Morocco leather, and one for parchment; beſides gun-makers, copper-ſmiths, hatters, tin-plate workers, coach-makers, cabinet-makers, and a variety of others. In this city is the public mint, in which the national money is coined. The great number of paper-mills in the ſtate enable the printers to carry on their buſineſs more extenſively than is done in any other place in America. There are 31 printing-offices in this city; five of which publiſh each a daily gazette; two others publiſh gazettes twice a-week, one of which is in the French language; beſides four weekly papers, one being in the German language. The other offices are employed in printing books, pamphlets, &c. The catalogue of books for ſale in this city contains upwards of 300 ſets of Philadelphia editions, together with a great variety of maps and charts. The pleaſure-carriages are, according to enumeration, 553 two-wheeled carriages, 80 light waggons, 137 coaches, 22 phaetons, 35 chariots, and 33 coachees. The coachee is a carriage thought to be peculiar to America: the body of it is rather longer than that of a coach, but of the ſame ſhape; in the front it is left quite open down to the bottom, and the driver ſits on a bench under the roof of the carriage. There are two ſeats in it for the paſſengers, who ſit with their faces towards the horſes. The roof is ſupported by ſmall props, which are placed at the corners: on each ſide of the doors, above the pannels, it is quite open; and to guard againſt bad weather, there are curtains, which are made to let down from the roof, and faſtened to buttons placed for the purpoſe on the outſide. There is alſo a leathern curtain to hang occaſionally between the driver and the paſſengers. The light waggons are on the ſame conſtruction, and are calculated to accommodate from four to twelve people. The roads from this city are in a ſtate of progreſſive improvement; ſtage-coaches perform the journey to Lancaſter, the diſtance being 58 miles, on the new turnpike-road, in 11 hours.

This city is governed by a mayor, recorder, eight aldermen, and ſixteen common-council men, who make a quorum to tranſact buſineſs: they have full power to conſtitute and appoint laws and ordinances for the government of the city. The mayor, recorder, and aldermen, are juſtices of the peace, and juſtices of oyer and terminer. They hold a court four times a-year, to take cognizance of all crimes and miſdemeanors committed within the city; and two aldermen, appointed by the mayor and recorder, hold a court on Mondays and Thurſdays in every week, to determine matters cognizable before a juſtice of the peace. The trade of Pennſylvania is chiefly carried on from this city, and there are few commercial ports in the world where ſhips from Philadelphia may not be found in ſome ſeaſon of the year; but the amount of the exports and imports has varied at different periods, and under different circumſtances.

Accordingly the trade ſuffered an interruption in 1793, which laſted nearly five months, in conſequence of the yellow fever, of three months' duration, to which nearly 5000 inhabitants were victims. In the year 1794, there were 9000 houſes in the city, beſides 400 which were then building. In 1800, the number of inhabitants within the city was 41,220. The ſuburbs and county contained 39,783, and of theſe only 85 were ſlaves. In 1810, the number of inhabitants was 92,247; and in Pennſylvania the number was 810,091.

Philadelphia is the grand reſidence of Quakers or Friends in America; but their number does not bear the ſame proportion now to that of other citizens, which it did formerly. At preſent, it is ſaid, they form about one-fourth only of the inhabitants. This is not owing to any diminution of the number of Friends, becauſe, on the contrary, they have conſiderably increaſed, but to the great influx into the city of perſons of a different perſuaſion. According to a liſt publiſhed of the births and deaths in the ſeveral religious ſocieties of Philadelphia, it appears that from Auguſt 1, 1792, to Auguſt 1, 1793, the births amounted to 2511, and the deaths to 1497. The inhabitants conſiſt of Engliſh, Iriſh, Scots, Germans, French, and America-born citizens, deſcended from people of theſe different nations, who are of courſe by far the moſt numerous claſs. They are all, for the moſt part, engaged in ſome ſort of buſineſs; few living, without any oſtenſible occupation or profeſſion, on the fortunes which they themſelves have raiſed. The purchaſe and ſale of lands conſtitute objects of peculiar attention in Philadelphia, as well as in other parts of America. It may naturally be expected, that amongſt a people aſſembled from ſo many different quarters, there ſhould be a great diverſity of manners. It is a remark, however, ſays Mr. Weld, very generally made, not only by foreigners, but by perſons from other parts of the United States, that the Philadelphians are extremely deficient in hoſpitality and politeneſs towards ſtrangers. This author obſerves, that in the uppermoſt circles of Philadelphia, pride, haughtineſs, and oſtentation are conſpicuous; ſo that it ſhould ſeem they would be rendered happy if an order of nobility were eſtabliſhed, which would ſerve to exalt them in rank as much above their fellow-citizens as they are in their own imagination. It is obſerved further, that in the manners of the people in general there is a coldneſs and reſerve, as if they were ſuſpicious of ſome deſign againſt them, which chill to the heart thoſe who come to viſit them. It is added, that in their private ſocieties a *triſteſſe* is apparent, near which mirth and gaiety can never approach.

The women, it is ſaid, when young, are generally very pretty; but when they become mothers, in advancing age, they loſe their beauty. Their complexions fade, their teeth begin to decay, and they manifeſt a wonderful change. In a few inſtances only, ſays Mr. Weld, it would be poſſible to find a fine woman at the age of 40, who has had a large family. The ſudden decay of the teeth is a circumſtance that has attracted attention, and that has been made the ſubject of inveſtigation. It has been aſcribed to various cauſes, and particularly to the immoderate uſe of confectionary; but it is more probably owing to the very general uſe that is made of ſalted proviſions.

The greater number of ſervants in Philadelphia conſiſts of emigrant Europeans, who only remain in that condition till they can ſave a little money, and gain that kind of independence which every perſon, who is induſtrious, may enjoy in America. The wages of thoſe who are retained in ſervice are exorbitant. The Americans themſelves conſider ſervitude as ſuitable only to negroes. Amongſt the generality of the common ſort of people in the United States, and particularly amongſt thoſe of Philadelphia, there is, ſays Mr. Weld, a want of good manners, which excites the ſurpriſe of almoſt all foreigners. He adds, "civility cannot be purchaſed from the lower claſſes of people on any terms: they ſeem to think, that it is incompatible with freedom, and that there is no other way of convincing a ſtranger that he is really in a land of liberty but by being ſurly and ill-mannered in his preſence."

The environs of Philadelphia are pleaſant and well cultivated. Towards the north are Kenſington, near the ſuburbs on Delaware, noted for ſhip-building; Germantown, a populous neat village, with two German churches; and Frankfort, another village, both within ſeven miles; beſides many country ſeats. Towards the ſouth is Darby, a ſmall, pleaſant borough, above ſeven miles diſtant, and on Schuylkill, four miles from the city, the botanical garden of Meſſrs. Bartrams. In the weſt, on the ſame river, 18 acres of ground have been deſtined for a public botanical garden.

As you approach Philadelphia by the river, it cannot be ſeen farther off than three miles; a point of land covered with trees concealing it from the view. On weathering this point it ſuddenly opens upon you, and at that diſtance looks extremely well; but, on a nearer approach, the city makes a poor appearance, as nothing is viſible from the water but confuſed heaps of wooden ſtore-houſes, crowded upon each other, the chief of which are built upon platforms of artificial ground, and wharfs which project a conſiderable way into the river. Behind theſe wharfs, and parallel to the river, runs Water-ſtreet, which does not give a ſtranger a very favourable opinion of Philadelphia. The ſtreet is about 30 feet wide; and behind the houſes is a high bank, ſuppoſed to be the old bank of the river, which renders the air very confined. But modern improvements will remedy this inconvenience. Philadelphia is diſtant 728 miles S.W. of Paſſamaquoddy, the moſt eaſterly part of the ſea-coaſt of the United States; 347 S.W. of Boſton; 958 W. of New York; 102 N.E. of Baltimore; 144 N.E. of Waſhington; and 925 N.E. by N. of Savannah in Georgia. N. lat. 39° 56′ 54″. W. long. 75° 13′ 45″. Morſe's Geog. vol. i. Weld's Travels, &c. vol. i. See PENNSYLVANIA.

PHILADELPHIA *Stones*, a name given by ſome authors to what are called by others *Chriſtians' bones*, found in the walls of that city. It is a common error, that theſe walls are built of bones, and the tradition of the country is, that when the Turks took the place, they fortified it for themſelves, and built their walls of the bones of the Chriſtians whom they killed there. Dr. Smyth, in one of his epiſtles, mentions this wall as an inſtance of the Turkiſh barbarity; but this is an idle opinion, what paſſes for bone being only a looſe and porous ſtone, of the ſparry kind, found in an old aqueduct, which is ſtill in the wall. Sir Paul Rycaut brought home pieces of theſe ſtones, which he alſo ſuppoſed to have been bones, but on examination they proved to be no other than various bodies, chiefly vegetable, incruſted over and preſerved in a ſpar of the nature of that which forms incruſtations in Knareſborough ſpring, and other places with us. Theſe bodies are often cemented together in great numbers by this matter, and their true ſhape loſt in the congeries, till a diligent and judicious eye traces them regularly.

PHILADELPHIAN SOCIETY, in *Eccleſiaſtical Hiſtory*, an obſcure and inconſiderable ſociety of myſtics, formed, towards the cloſe of the 17th century, by an Engliſh female fanatic, named Jane Leadley, who ſeduced by her viſions, predictions, and doctrines, ſeveral diſciples, among whom were ſome perſons of learning. This woman apprehended, that all diſſenſions among Chriſtians would ceaſe, and the kingdom of the Redeemer become a ſcene of charity, concord, and felicity, if Chriſtians, without regarding the forms of doctrine or diſcipline that diſtinguiſh particular communions, would all join in committing their ſouls to the care of the internal guide, to be inſtructed, governed, and formed by his divine impulſe and ſuggeſtions. Nay, ſhe pretended a divine commiſſion to proclaim the approach of this glorious communion of ſaints; and imagined that the ſociety eſtabliſhed by herſelf was the true kingdom of Chriſt. One of her leading doctrines was, that of the final reſtoration of all intelligent beings to perfection and happineſs.

PHILADELPHUS, Φιλαδελφος, in *Antiquity*, a title or ſurname, borne by ſeveral ancient kings; formed from the Greek φιλος, *friend*, *lover*, and αδελφος, *brother*; *q. d.* one who loves his brother, or brethren.

Ptolemy Philadelphus erected a library at Alexandria, and furniſhed it with four hundred thouſand, others ſay with ſeven hundred thouſand volumes, by the advice, and with the aſſiſtance, of Demetrius Phalereus. See ALEXANDRIAN *Library*.

It was the ſame Philadelphus that procured the Greek verſion of the books of Moſes, called the *Septuagint*.

Father Chamillart has a medal of the queen of Comagene, which bears the title of Philadelpha, without any other name. M. Vaillant tells us, that Philip, king of Syria, had alſo the title Philadelphus.

PHILADELPHUS, in *Botany*, φιλαδελφος, the name of a ſhrub mentioned by Athenæus, which it is impoſſible for us to aſcertain. Caſpar Bauhin firſt applied this ſynonym to our Syringa, or Mock Orange, with which it remains, as the generic appellation. Linnæus ſuppoſes it was deſigned to commemorate Ptolemy Philadelphus, king of Egypt; but a much more probable opinion ſeems to be, that the plant of Athenæus was of the twining or claſping kind, ſomething like *Periploca græca;* and that the word, by a poetical fancy, was intended to expreſs its brotherly love for thoſe near it. The name *Syringa*, which Tournefort retained for this ſhrub, and by which it is now univerſally called in Engliſh, originated in a confuſion of ideas. That name equally belongs to the Lilac; and though really, as Bauhin ſays, of Mooriſh origin, has been ſuppoſed to be derived from συριγξ, *a pipe*, becauſe the young branches of Lilac are uſed in Africa and the Levant for tobacco-pipes. Thoſe of our *Philadelphus* alſo are reported to ſerve the ſame purpoſe. Hence one ſhrub has been termed *Syringa cærulea*, or Blue Pipe; the other *S. alba*, or White Pipe. But their wide generic difference, requiring an alteration of this unſcientific nomenclature, and *Lilac* being barbarous, Linnæus was perhaps led, by the pipe-like flower, to prefer *Syringa* for that genus; eſpecially as *Philadelphus* was already applied to the other. Juſſieu however, following Tournefort, retains *Lilac*, though againſt his own general rule.—Linn. Gen. 247. Schreb. 332. Willd. Sp. Pl. v. 2. 947. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 3. 180. Juſſ. 325. Lamarck Illuſtr. t. 420. Gærtn. t. 35. (Syringa; Tourn. t. 389.)—Claſs and order, *Icoſandria Monogynia.* Nat. Ord. *Heſperideæ*, Linn. *Myrti*, Juſſ.

Gen. Ch. *Cal.* Perianth ſuperior, of four oblong, acute, equal, ſpreading leaves. *Cor.* Petals four, roundiſh-ovate, ſeſſile, flat, large, ſpreading. *Stam.* Filaments 20, awl-ſhaped, the length of the calyx; anthers erect, with four furrows. *Piſt.* Germen inferior, pointed; ſtyle thread-ſhaped, in four deep ſegments; ſtigmas ſimple. *Peric.* Capſule ovate, pointed at each end; coated below; naked, and riſing rather above the inſertion of the calyx, at the top, of four cells, and four valves, with partitions from their centres. *Seeds* numerous, minute, oblong, decumbent, inſerted into the thickened edges of the partitions, each inveſted with a tapering tunic, fringed at the baſe.

Eſſ. Ch. Calyx of four leaves, ſuperior. Petals four. Style four-cleft. Capſule of four cells. Seeds numerous, each in an oblong tapering tunic.

Obſ. The number, in the parts of fructification, occaſionally varies from four to five. For the differences between this genus and LEPTOSPERMUM, ſee that article.

1. Ph. *coronarius*. Common Syringa, or Mock-Orange. Linn. Sp. Pl. 671. Willd. n. 1. Curt. Mag. t. 391. (Syringa alba; Ger. Em. 1399.)—Leaves with ſhallow teeth. Native of the ſouth of Europe, and north of Africa, if we miſtake not, though ſo generally cultivated, that we know not where it can be ſeen truly wild. Dr. Sims in Curt. Mag. p. 1478, ſuſpects it may come from Japan. In our gardens and ſhrubberies it is a hardy deciduous tall ſhrub, flowering in May and June. The *leaves* are elliptical, recurved, oppoſite, on ſhort ſtalks, darkiſh green, ſmooth, with broad ſhallow teeth; their taſte remarkably like cucumber, but diſagreeable if too copiouſly taken. *Flowers* in denſe terminal upright cluſters, large, white, looking ſomewhat like thoſe of the Orange, powerfully ſcented, ſo as to be intolerable to moſt people in a cloſe room, though pleaſant in the open air. Gerarde, having laid ſome in his chamber window, ſays they awaked him out of his ſleep, and he was forced to throw them away. There is a dwarf variety.

2. Ph. *inodorus*. Carolina Scentleſs Mock-Orange. Linn. Sp. Pl. 672. Willd. n. 2. Curt. Mag. t. 1478. (Ph. flore albo majore inodoro; Cateſb. Carol. v. 2. 84. tab. 84.)—Leaves entire. Native of Carolina. Rather more tender than the former, and not often met with in gardens, though it is preſerved in the open ground at Kew. This is a humbler, more ſlender and ſpreading *ſhrub* than the common kind, bearing fewer, rather later, and much larger, as well as more elegant, ſnow-white *flowers*, which are deſtitute of ſcent; a quality that might render this ſpecies, to ſome perſons, the moſt deſirable of the two.

PHILADELPHUS, in *Gardening*, contains plants of the hardy, deciduous, flowering, ſhrubby kind, of which the ſpecies cultivated, is the common ſyringa, or mock orange (P. coronarius).

There are two ſpecies; the dwarf ſyringa, which ſeldom riſes above three feet high; the leaves are ſhorter, more ovate, and little indented on their edges; the flowers come out ſingly from the ſide of the branches, and have a double or treble row of petals of the ſame ſize and form as the other, and the flowers have the ſame ſcent; but flowering very rarely, it is not ſo much in eſtimation.

And the Carolina ſyringa, which riſes with a ſhrubby ſtalk about ſixteen feet high, ſending out ſlender branches from the ſides, oppoſite to each other; the leaves ſmooth, ſhaped like thoſe of the pear-tree, entire, oppoſite, on pretty long footſtalks; the flowers are produced at the ends of the branches; they are large, but without ſcent; each has four white oval petals ſpreading open, and a large calyx, compoſed of four acute-pointed leaflets.

Method of Culture.—Theſe plants may be increaſed by ſuckers, layers, and cuttings. The ſuckers are ſent from the roots in great plenty; theſe ſhould be taken from the old plants in autumn, and be planted in a nurſery, to grow one or two years, till they have obtained ſufficient ſtrength, when they may be removed to the places where they are to remain.

The layers may be laid down in the autumn, being made from the young twigs. Theſe may be taken off in the following autumn, when well rooted, being planted out where they are to remain.

The cuttings of the young ſhoots may be planted in the autumn, in a ſhady ſituation, where they ſoon form plants.

The plants are extremely hardy, and thrive in almoſt any ſoil or ſituation, but grow taller in light good ground than in that which is ſtiff.

Theſe plants are commonly diſpoſed in plantations of flowering ſhrubs, among others of the ſame growth; mixing very well with lilacs, gelder roſes, and laburnums; and particularly valuable from their thriving under the ſhade of trees, and forming a blockade againſt low buildings, where perſons have no objection to their ſtrong ſmell.

PHILÆNI, in *Mythology*, two brothers reckoned by the Carthaginians among their gods. Theſe brothers, having been ſent, by their countrymen, to accommodate ſome differences with the Cyreneans, and, in conjunction with the commiſſaries appointed by theſe people, to ſettle the limits of their reſpective dominions, by fraud extended their own frontiers to the prejudice of the others. The Cyreneans, incenſed at this unfair dealing, would not cede the tract demanded, unleſs the Philæni would ſuffer themſelves to be buried alive in the place which they had pitched upon for their boundary. To this propoſal they inſtantly agreed, and had afterwards two altars erected to their memory; which ſerved as a land mark or limit to the Carthaginian territories on the ſide of Cyrenaica for many ſucceeding ages. Salluſt, Mela, and Valerius Maximus, relate all the particulars of this ſtory.

PHILÆNORUM ARA, in *Ancient Geography*, the *altar* of the Philæni, a place of Africa, on the ſouthern coaſt, and nearly at the bottom of the gulf which forms towards the S.E. the greater Syrtis. It derives its name from the circumſtance mentioned in the preceding article.

PHILAMMON *of Delphos*, in *Biography*, the ſon of Chryſothemis of Crete, obtained the prize at the Pythic games the ſecond time they were celebrated. His father was victor at the firſt, and his ſon Thamyris won the third prize. Chryſothemis was the ſon of Carmanor, who lived before Homer, and was the twin brother of Antolycus, maternal grand father of Ulyſſes. Their mother, Rhiona, daughter of Dedalion, brother of Ceyx, king of Trachia, was beloved the ſame day by Apollo and Mercury; at the end of nine months Antolycus and Philammon were born. Philammon ſung to his lyre the birth of Apollo and Diana. Plutarch ſays that he ſung in verſe the birth of Latona, Apollo, and Diana. It was troops of mortals, male and female, who danced and ſung the praiſes of the gods to the ſound of inſtruments. His ſon Thamyris was celebrated for the diſpute which he had with the Muſes.

PHILANDER, in *Zoology*. See DIDELPHIS.

PHILANTHROPOS, in *Botany*, a name uſed by ſome authors for the common *aparine*, *cleavers*, or *gooſe-graſs*.

PHILANTHROPY, φιλανθρωπια, *love of mankind*, a general benevolence towards the ſpecies. See PASSIONS.

PHILARMONICI, is the denomination of a literary ſociety eſtabliſhed at Verona in 1543. See ACADEMY.

PHILAUTIA, φιλαυτια, formed from φιλος, *amicus*, and αυτος, *ipſe*, in the *Schools*, *ſelf-love*, a vicious fondneſs and complaiſance for a man's ſelf. See PASSION and SELF-LOVE.

PHILE, MANUEL, in *Biography*, a modern Greek poet, was a native of Epheſus, and flouriſhed about the year 1321, under the emperor Michael Paleologus the younger, to whom he dedicated a poem on the properties of animals, compoſed in Iambic verſe. It was printed firſt in Greek at Venice, in 1530. In the year 1730 an edition in Greek and Latin was given by Corn. de Pauw at Utrecht. He was author of other poems, ſome of which are contained in Fabricius' Biblioth. Græc. All his poems, under the title of Carmina, were edited by Wensdorf, at Leipſic, in 1768. Moreri.

PHILEBERT, in *Geography*, a town of France, in the department of the Lower Loire, and chief place of a canton, in the diſtrict of Nantes. The place contains 2032, and the canton 7473 inhabitants, on a territory of 305 kiliometres, in ſix communes.

PHILELEUTHERUS, φιλελευθερος, formed of φιλος, and ελευθερος, *free*, a lover of liberty.

PHILELIA, the name of a ſong among the ancient Greeks, in honour of Apollo. Athenæus, lib. xiv. cap. 3.

PHILEMON, in *Biography*, a Greek comic poet, ſon of Damon, flouriſhed about the year 274 B.C. in the reign of king Antigonus Gonatas. He was a rival of Menander, againſt whom he frequently gained the prize. The titles of ſome of his plays are preſerved; and the "Mercator" of Plautus is profeſſedly taken from the Εμπορος of Philemon. It is ſaid that he died at the age of 97 or 99, and that the cauſe of his death was a fit of laughter, occaſioned by ſeeing his aſs eat figs. Philemon the younger, ſon of the preceding, was alſo a comic writer, and, according to Suidas, compoſed 54 comedies, of which fragments remain, and have been publiſhed with thoſe of Menander, and alſo in the Poet. Græc. Minor.

PHILESIA, in *Botany*, ſo named by Commerſon, from φιλεω, *to love*, in alluſion to its lovely aſpect; nor could many plants be more worthy of ſuch a diſtinguiſhing appellation. See ENARGEA.

PHILETA, in *Ancient Geography*, a town of Aſia Minor, in the vicinity of Caria.

PHILETERIUM, in *Botany*, a name uſed by ſome authors for the *behen album*, the common white-flowered bladder-campion, called *white ben*.

PHILIA, in *Ancient Geography*, an iſle of Egypt, on the confines of Ethiopia, near the town of Tacompſon. Steph. Byz.—Alſo, a promontory of Thrace, upon the Euxine ſea, near Philopolis. Ptolemy.

PHILIASKOI, in *Geography*, a town of Ruſſia, in the government of Tobolſk, on the Irtiſch; 120 miles N. of Tobolſk.

PHILIDOR, ANDRE', in *Biography*, born at Dreux in 1726, was deſcended from a long line of muſical anceſtors, who, in different branches of the art, had been attached to the court ever ſince the time of Louis XIII. The family name was Danican; and it is pretended that this monarch, himſelf a dilettante muſician, occaſioned the ſurname of Philidor, a famous performer on the hautbois, whom this prince had heard in his progreſs through France, to be given to Danican, whoſe inſtrument being the hautbois, when the king heard him perform, he cried out "here's another Philidor!" Andrew was educated as a page or choriſter in the chapel royal, under Campra, maitre de chapelle. In 1737 he produced his firſt motet, or full anthem, which was performed in the chapel, and complimented by the king as an extraordinary production for a child of eleven years old. On his change of voice, and quitting the chapel, he eſtabliſhed himſelf at Paris, where he ſubſiſted by a few ſcholars, and by copying muſic; but every year he went to Verſailles with a new motet.

The progreſs which he had made at cheſs awakened in him a deſire to travel, in order to try his fortune; and in 1745 he ſet out for Holland, England, Germany, &c. In theſe voyages he formed his taſte in muſic upon the beſt Italian models. In 1753 he tried his ſtrength as a muſical compoſer in London, by new ſetting Dryden's ode on St. Cæcilia's day. Handel is ſaid, by his biographer, to have found his choruſſes well written, but diſcovered a want of taſte in his airs.

As his time was more occupied by cheſs than muſic, he printed in London, at a large ſubſcription, in 1749, his "Analyſis of the Game of Cheſs," *Analyſe des Echec*. In 1754 he returned to Paris, in the month of November, and devoted his whole time to muſic. He had his "Laudæ Jeruſalem" performed at Verſailles; but it was found to be too Italian, and as the queen of Louis XV. diſliked that ſtyle of muſic in the church, his hopes of obtaining, by this compoſition, a place of maitre de chapelle, were fruſtrated.

In 1757 he compoſed an act of a ſerious opera, but Ribel, opera manager, would not let it be performed, telling him that he would have no airs introduced in the ſcenes of that theatre.

In 1758 he produced ſome airs for "the Pilgrims of Mecca," at the comic opera; Corbi, the manager, propoſed to him the undertaking to ſet an entire opera for that theatre; and the firſt drama he ſet was "Blaiſe le Savetier," Blaiſe the Cobler, which was performed at La Foire St. Laurent, in 1759, with the greateſt ſucceſs, and afterwards five more ſucceſsful comic operas iſſued from his pen, among which "Le Marechal ferrant," or the Blackſmith, ſupported more than a hundred repreſentations. In 1762, at the union of the Opera Comique and the Theatre Italien, he produced "Sanch Panca;" in 1763, "Le Bucheron," and a muſical entertainment for the piece; in 1764, "Le Sorcier;" in 1765, "Tom Jones," which at firſt was hiſſed, but afterwards acquired great favour. In 1767 his ſerious opera of "Ernclinde" was performed at the great opera-houſe, which was the beginning of the revolution in the ſtyle of muſic at that theatre. In 1769 he ſet for the comic opera "Le Jardinier de Sidon;" in 1770, "Le Jardinier ſuppoſé;" in 1771, the "New School for Wives;" in 1772, "Le Bon Fils;" in 1773, the "Navigator;" in 1775, "Les Femmes vengées;" and in 1779, in London, "The Carmen Seculare" of Horace.

In the conduct of this performance, Philidor placed himſelf under the guidance of Baretti. The performance was attended at Freemaſons' Hall by all perſons of learning and talents, in expectation of a revival of the muſic of the ancients, and, by many, of its miraculous powers. To what kind of muſic the "Carmen Seculare" was performed at Rome, we pretend not to ſay; but in London we could trace the compoſer's models for the choruſſes in the oratorios of Handel, and the operas of Rameau; and for the airs in his own comic operas, and the favourite melodies then in vogue in that theatre, many of which, with Italian words, and Italian ſinging, particularly thoſe of Gretry, would be elegant and pleaſing muſic any where.

Philidor, however, in ſetting the ſecular ode, it muſt be confeſſed, manifeſted his knowledge of counterpoint in the ſtyle of the old maſters; and that, in ſpite of cheſs, he had found time for the ſerious ſtudy of muſic; we believe that no one found himſelf much the wiſer concerning the muſic of the ancients after hearing this muſic performed to Latin words, than after hearing an oratorio of Handel, or an opera of Rameau. This miraculous cheſs-player, and ingenious and pleaſing compoſer of comic operas, died in London in 1795. Laborde.

PHILINUS, in *Medical Hiſtory*, a phyſician, born in the iſland of Cos, was a diſciple of Herophilus, and flouriſhed in the thirty-eighth century, A.M. He was a diſtinguiſhed member of the Empirical ſect, of which, indeed, he divides the honour with Serapion, of Alexandria, of being eſteemed the founder. He is ſaid, by Athenæus, to have been the author of a treatiſe on herbs, and of ſome commentaries on the works of Hippocrates. See Le Clerc, Hiſt. de la Med.

PHILIP II., in *Biography*, king of Macedon, was the third ſon of king Amyntas. In his youth he was ſent, by his father, as a hoſtage to Thebes, where he was educated in the houſe of Polymnas, the father of Epaminondas. On the death of his brother Perdiccas, he returned ſuddenly and ſecretly to Macedon, where he aſſumed the regency, as guardian to his infant nephew. It was, however, with the unanimous conſent of the nation, then ſurrounded by enemies, and under circumſtances of great difficulty, that he took upon himſelf the royal title and authority, in the year 360 B.C., being then in the 23d year of his age. His firſt meaſures were thoſe of a prudent politician. By declaring Amphipolis free, he took away the chief cauſe of a war with the Athenians, who had ſent an army in ſupport of a competitor to the crown; and by preſents diſtributed among the leading people of Pœonia, he prevented a war with that people. He next turned his attention to the eſſential point of new-modelling and diſciplining his army, in which he applied the leſſons of military art that he had derived from the Thebans. He very ſoon acquired the confidence of his troops, defeated Argæus, his competitor for the crown, invaded and ſubdued the Pœonians, and forced the Illyrians to ſubmit to a treaty, by which they reſigned all their conqueſts in the Macedonian territory.

Philip was a decided character, and he ſet out in life with a determinate object, of which he appears never to have loſt ſight, *viz.* the extenſion of his dominions, and the elevation of the kingdom of Macedon to that conſequence among the Grecian ſtates, which circumſtances had hitherto prevented it from aſſuming. This purpoſe he ſteadily purſued, by policy or by force, as beſt ſuited the occaſion, neither deterred by difficulties, nor moved by conſiderations of juſtice. One of his firſt offenſive meaſures was an attack upon Amphipolis, to which city he had, by his treaty with Athens, renounced all claim. He took it by ſtorm, baniſhed or put to death ſuch of the citizens as oppoſed his intereſt, and treated the reſt with kindneſs. He next reduced Pydna and Potidea, the latter of which he gave to the Olynthians. He next acquired the country between the rivers Strymon and Neſtus, rich in gold mines, and at that time poſſeſſed by the Thracians. He took Crenides, its principal town, the name of which he changed to Philippi; and inſtantly began to work the mines, which ſupplied him with a metal not leſs powerful in effecting his purpoſes than iron. The Phocian or ſacred war occupying at this time the attention of all Greece, Philip was at liberty to purſue unmoleſted his plans of aggrandizement. Being deſirous of ſubjecting Thrace, he determined to poſſeſs himſelf of Methone, a ſmall city, incapable of ſupporting itſelf by its own ſtrength, but which gave him much uneaſineſs, and obſtructed his deſigns, whenever it was in the hands of his enemies. Accordingly he razed it to the ground. Here he loſt one of his eyes. After of Amphipolis had offered his ſervices to Philip, telling him that he was ſo excellent a markſman, that he could bring down birds in their moſt rapid flight. "Well," ſaid the monarch, "I will take you into my ſervice, when I make war upon ſtarlings." Stung with the reply, he reſolved upon revenge. After, having thrown himſelf into the city, let fly an arrow, on which was written, "To Philip's right eye." This carried the moſt unqueſtionable evidence as to his ſkill in ſhooting, for it hit the king exactly in his right eye. Philip ordered the arrow to be ſent back, with the following label: "If Philip takes the city, he will hang After;" and he was as good as his word.

An invitation from the Theſſalians, to come and reſtore order in their country, which the contentions in the family of the Pheræan tyrants had thrown into confuſion, was gladly accepted by Philip, who, after ſome variety of fortune, totally defeated the forces of Lycophron, and his Phocian auxiliaries. It was a vaſt advantage to his deſigns, that he was able to engage ſuperſtition in his favour, by the decided part he took againſt the Phocians, whoſe ſeizure of the temple of Delphi had occaſioned the ſacred war. The jealouſy of the Athenians, however, rendered of no avail his attempt to paſs the Pyla, or defiles leading into Greece: he, therefore, bent his whole force to the humiliation of that powerful republic. He was not contented with hoſtile meaſures, but employed his gold to corrupt the venal orators of Athens, and would probably have obtained an aſcendancy in the councils of the ſtate, had it not been for the ſuperior genius of Demoſthenes. An attack upon the powerful republic of Olynthus was his next meaſure. The Athenians, rouſed by the eloquence of Demoſthenes, ſent ſuccours to the Olynthians; but it was too late: Philip had, by corrupting two of its magiſtrates, gained poſſeſſion of the city, with an immenſe booty. The two magiſtrates complained to Philip of the treatment they had experienced from his ſoldiers, who reproached them as traitors; to which the monarch replied: "You muſt not regard them; they are ruſtics, who always call things by their right names."

He was next ſolicited to put an end to the Phocian war; and with a large army paſſed the ſtraits of Thermopylæ, entered Phocis, aſſuming the character of vicegerent of the god Apollo, whoſe ſanctuary had been violated. The Phocians, not daring to reſiſt, ſubmitted to his mercy; and Philip, having referred the judgment of their cauſe to the grand council of Amphictyons, and executed their decree, marched back into Macedon. This event occurred in the year 348 B.C.

After this he marched againſt a Scythian prince, whom he totally defeated. Returning with a rich booty, he was refuſed a paſſage through the territory of the Triballi, a tribe of fierce barbarians, unleſs he would ſhare his plunder with them. Diſdaining this condition, he proceeded to force his way. An engagement enſued, in which he received a wound in the thigh, was thrown to the ground, and would probably have been killed, had he not been reſcued by his ſon Alexander, then a youth. In the end he obtained a ſignal victory, and returned to Macedon in triumph.

A length, by a train of fortunate circumſtances, he was enabled to march into Greece; and at Cheronæa, in the year 338 B.C., the battle was fought which put an end to the liberty of Greece. The confederates at firſt obtained ſome advantages, but were afterwards thrown into confuſion by the Macedonian phalanx, and totally defeated with great ſlaughter. Philip's joy at this ſucceſs for a time overcame the uſual moderation of his character, and he indulged himſelf in ludicrous ſarcaſms againſt the Athenians, and inſults to his priſoners, till he was recalled to reaſon by the manly reproof of the orator Demades, who told him, that when fortune ſeemed to have aſſigned him the part of Agamemnon, he ought not to diſhonour himſelf by playing that of Therſites. He inſtantly checked his ſallies of wit, treated Demades as a friend, and releaſed all the Athenian priſoners. At their requiſition, he even reſtored to them their baggage, but not without humorouſly remarking upon the demand, "theſe people do not ſeem to think we have been fighting in earneſt." He then ſent ambaſſadors to renew the peace with Athens upon the moſt favourable terms; and after leaving a garriſon in Thebes, he withdrew from Bœotia, without doing any injury to the country. By this well-timed moderation he eſtabliſhed his authority in Greece, much more effectually than he could have done by ſeverity.

Philip was now at leiſure to turn his thoughts to ſome other great object worthy of his ambition, and he determined to return upon the Perſian empire the evils it had formerly inflicted upon Greece, and carry his conqueſts into the opulent regions of Aſia. With this view he ſummoned a general aſſembly of the Grecian ſtates, ſettled the terms of an univerſal peace, as it was called, and got himſelf acknowledged ſupreme chief of the nation, in the intended war againſt Perſia. He fixed the quota of each ſtate in the combined army, and then returned to Macedon, to make his own preparations. Shortly after, to pacify ſome family diſcontents, he gave in marriage his daughter Cleopatra to the brother of Olympias, his divorced queen, and the mother of Alexander the Great. The nuptials were to be celebrated with great ſplendour at Ægæ; and at the ſame place and time he appointed the ambaſſadors of all the Grecian ſtates to aſſemble, in order to partake of a grand entertainment before his departure for Aſia. The concourſe was prodigious, and all ſtrove to ſurpaſs each other in demonſtrations of reſpect and attachment to the effective ſovereign of Greece. It happened that a young Macedonian, named Pauſanias, had ſome time before received an injury from Attalus, the brother of Philip's ſecond wife, and had ſought redreſs of the king in vain. He reſolved upon revenge, to which, it has been thought, he was excited by Olympias, the diſcarded wife of the monarch, and likewiſe by Darius the Perſian. Philip, during the feſtivity, going in ſtate to the theatre, with his guards at a diſtance, for the purpoſe of ſhewing the confidence he placed in his people, was ſuddenly ſtabbed to the heart by Pauſanias, who had planted himſelf at the door of the theatre, and fell dead at his feet. The aſſaſſin was near eſcaping to his horſe, but being accidentally thrown down, he was diſpatched by his purſuers. Thus fell Philip, at the age of 47, in the year B.C. 336, "juſt," ſays the hiſtorian, "as he was about, probably, to anticipate his ſon Alexander in thoſe great exploits, which have given the latter ſuch ſuperiority of fame, though founded on the preparations made by his father: for had not Philip, by his extraordinary efforts of military ſkill and policy, firſt rendered himſelf maſter of Greece, his ſon would never have been in the condition to lead a conquering army into Aſia."

Pauſanias's body was immediately hung on a gibbet; but in the morning it appeared crowned with a golden diadem, the only method that Olympias had to expreſs her reſentment of Philip. In a few days after, ſhe took occaſion of giving farther proof of her triumph and exultation in Philip's fall, by cauſing the ſame funeral honours to be paid to the remains of Pauſanias, which were prepared for Philip: both bodies were burnt on the ſame pile, and the aſhes of both were depoſited in the ſame tomb. Such was the commencement of the completion of Hermocrates' prediction, who being aſked by Pauſanias, "What that man ſhould do, who wiſhes to tranſmit his name with luſtre to poſterity," replied, "He muſt kill him who hath achieved the greateſt actions: thus ſhall the memory of the hero be joined with his who ſlew him, and both deſcend together to poſterity."

In the character of Philip was a ſingular mixture of good and bad qualities. He was crafty and diſſembling; he ſcrupled the uſe of no means of fraud or violence to obtain his purpoſes, and was occaſionally rigorous to his enemies. At the ſame time, he had much kindneſs and benignity in his nature, was affable, ſocial, liberal, and clement; a kind maſter, and generally a juſt ſovereign. He was himſelf learned, and a patron of learning. A variety of anecdotes are recorded of this prince, which redound greatly to his credit. Of theſe we ſhall ſelect two or three, that ſhew the greatneſs of his mind, in bearing patiently reproof from inferiors. It was his cuſtom, as it had been that of his predeceſſors, to adminiſter juſtice in perſon; but a love of conviviality would ſometimes interfere with the more imperious calls of duty. Having ſeveral times told a woman, who came with a petition, that he was not at leiſure; ſhe at length loſt her temper, and replied, "If you have not leiſure to do juſtice, ceaſe to be a king." Struck with the propriety of the reprimand, he inſtantly attended to her caſe, and gave redreſs. At another time, having given an haſty deciſion againſt a woman, upon riſing from a banquet, ſhe cried, "I will appeal." "To whom?" ſaid Philip. "To Philip ſober," ſhe replied. He reconſidered, and retracted his judgment. After his breach with his ſon, whom he had baniſhed from his court, being viſited by his friend Demaratus of Corinth, and aſking him if all was quiet in Greece; "You have reaſon, truly," he replied, "to concern yourſelf about the quiet of Greece, when you have filled your own family with ſtrife and diſorder." Philip took the reproof kindly, and recalled his ſon. Univer. Hiſt. Plutarch.

Philip V., the next of the Macedonian Philips who require to be noticed in our work, was the ſon of Demetrius II., who at his death, in the year 232 B.C. (ſee his article) left him, then but three years of age, in the tutelage of his uncle Antigonus Doſon. On the deceaſe of the latter, in the year 221, Philip took the reins of government into his own hands. At this time he diſplayed many qualities which gave promiſe of a happy and illuſtrious reign. He poſſeſſed quick parts, a ſolid underſtanding, and a retentive memory. He had been ſent by Antigonus at an early age into Peloponneſus, to ſtudy the art of government under that eminent patriot and ſtateſman, Aratus of Sicyon; and his uncle, upon his death-bed, had charged him to follow his counſels in every thing relative to Grecian politics. By the advice of Aratus, he joined the Achæans in the ſocial war between them and the Etolians; and ſoon after his acceſſion he departed for Greece, and arrived at Corinth. During the courſe of this war he diſtinguiſhed himſelf by his vigour and enterpriſe, and performed various brilliant actions. His miniſter Apelles, who was greatly in his confidence, abuſed that confidence, and was guilty of various acts of treachery againſt his ſovereign, for which, at length, he, his ſon, and ſome others, were put to death. The war continued ſome time longer to the advantage of Philip and his allies, till the ſucceſſes of Hannibal in Italy inſpired the young king with ambitious projects of extending his dominions, while the two powerful nations, the Romans and Carthaginians, were exhauſting each other. A peace was concluded among the Grecian ſtates, and Philip, after the battle of Cannæ, entered into a treaty offenſive and defenſive with Hannibal, who then appeared likely to turn the balance of empire in favour of Carthage. He now began to purſue a ſimilar plan of policy with that of his predeceſſor Philip II., and by fomenting diſturbances in the Grecian ſtates, endeavoured to bring them under ſubjection to himſelf; upon which, Aratus diſcovering the change in his character, withdrew from his court, and lived as a private perſon at Sicyon. Not long after, Philip employed, it is ſaid, one of his officers to adminiſter a ſlow poiſon to the venerable patriot; of the conſequences of which he died. From this period Philip was engaged in almoſt inceſſant wars, in which he ſhewed no want of courage and activity, though he frequently failed in his enterpriſes; but in the year 197 B.C., Flaminius, the Roman commander, brought him to a general engagement at Cynoſcephalæ, which terminated in the king's total defeat, and reduced him to ſupplicate for peace. This was granted upon the terms, that he ſhould withdraw all his garriſons from the Greek cities of Europe and Aſia, which were to be left free; that he ſhould deliver up his priſoners and deſerters, and all his decked ſhips; ſhould reduce his army; ſhould carry on no war beyond the limits of Macedon, without the conſent of the Roman ſenate; and ſhould pay a thouſand talents to the conquerors. His younger ſon, Demetrius, was to be ſent for education to Rome as a hoſtage. Such was the end of the projects for aggrandiſement, which had kept him in perpetual action from the period of his acceſſion to the throne. It was now his great object to make uſe of the peace he was compelled to keep, in recruiting his ſtrength for any favourable opportunity that might offer of reſuming his arms. He augmented his revenues not only by increaſing the taxes and cuſtoms, but by opening the old mines, and working new ones; and in order to repair the loſs of people ſuſtained in the wars, he promoted marriage among his ſubjects, and brought a great number of Thracians to ſettle in Macedonia. Having more confidence in them than in his other ſubjects, he had practiſed the violent and cruel policy of tranſporting the inhabitants of his maritime towns into the inland and remote diſtrict of Pæonia, and giving their houſes to be occupied by the Thracians and other barbarians. This and other tyrannical acts rendered him extremely unpopular, but a family diſſention, more than all other evils, embittered his declining days. To this we have already alluded in the article Perses, in which we have ſhewn in what manner the king was impoſed on to agree firſt to confine, and then to put to death, his younger ſon Demetrius. The diſcovery of the fraud, which had been practiſed upon him, and of the innocence of Demetrius, threw him into a ſtate of grief and remorſe, which almoſt deprived him of his reaſon, and he died miſerably in the year 178 B.C., at the age of 58, after having taken ineffective meaſures to exclude his ſon Perſes from the throne.

Philip, Roman emperor, was an Arab, born at Boſtra in the Trachonitis, and the ſon, it is ſaid, of a captain of robbers, which circumſtance, however, does not, as an Arabian, prove him to have been of baſe extraction. It is probable he entered very early into the imperial ſervice. In the reign of the third Gordian, he was appointed to ſucceed him as prætorian prefect. This elevation was regarded by him as an immediate ſtep to the throne, and his firſt meaſures were directed to deprive the young emperor of the affection of his ſoldiers; and ſuch was his villainous ſucceſs, that by his intrigues, the army was induced unanimouſly to demand Philip for their emperor, and Gordian was obliged to conſent to receive him at once in the character of a colleague and tutor. He ſoon arrogated to himſelf the ſupreme authority, and finding that Gordian ſtill had many and warm adherents, he took care to have him removed, but in what manner is not known. To the ſenate he wrote, that the young emperor was dead of a diſeaſe. This happened in the month of March, A.D. 244. Philip was about forty years old at the time he came into poſſeſſion of the throne, and his firſt act was to declare his ſon, a child of ſeven years of age, his partner in the empire. His popular manners and mild adminiſtration gained him the attachment of his new ſubjects, and having provided for his ſecurity abroad, by placing his brother at the head of the Syrian army, and his father-in-law at that of the troops in Mœſia and Macedonia, he marched againſt the Carpians, a barbarous tribe who infeſted the banks of the Danube. After defeating them, and obliging them to ſue for peace, he returned to Rome.

The year 248 was regarded as the thouſandth year from the foundation of Rome, and on this occaſion Philip celebrated the ſecular games with great magnificence. Theſe were the laſt celebrations of the kind, and they were ſucceeded in the following ages by the Chriſtian jubilees. He likewiſe publiſhed an ordinance, by which he aboliſhed that public licence of unnatural practices, which had hitherto ſubſiſted even under the beſt emperors. Philip had thus far worn in peace the crown which he had acquired by the worſt of crimes; but in the fifth year of his reign, a revolt was excited in the eaſtern provinces. To reduce the troops to ſubmiſſion, Philip obliged Decius, a ſenator of high reputation, much againſt his will, to accept the government of Pannonia and Mœſia. As ſoon as he arrived in that country, he was compelled by the ſoldiers to aſſume the imperial purple, and either led or followed the army to the confines of Italy. Philip marched to meet him with a more numerous, but leſs warlike body of troops. An engagement enſued near Verona, which terminated in the defeat and death of the emperor. His ſon alſo was killed by the prætorians as ſoon as intelligence of the event reached Rome. This event occurred in June 249.

It has been a matter of warm controverſy whether Philip was or was not a Chriſtian, not that his conduct would in any degree do honour to the religion of the meek and benevolent Jeſus, but in order that it might be aſcertained whether he was entitled to the honour of being the firſt Chriſtian emperor. Dr. Lardner enters at large into this ſubject; he ſays, "Baronius, Huet, and ſome others, take the affirmative ſide of the queſtion, others the negative. Tillemont ſays, it is not without difficulties, and Moſheim has done his utmoſt to perplex this queſtion; and, the more to increaſe the difficulty, argues, that he might be a Chriſtian ſecretly, though not openly." Having quoted his authorities on both ſides of the queſtion, he gives his reaſons to prove that Philip was not a Chriſtian, which are as follow: 1. That divers Chriſtian writers ſay, that Conſtantine was the firſt Roman emperor that made a profeſſion of faith in the Chriſtian religion; 2. That all heathen writers are ſilent about the Chriſtianity of Philip and his ſon; 3. That Philip celebrated the ſecular games at Rome, in the thouſandth year of the city; 4. That the Philips were deified after their death. Upon the whole, therefore, ſays Dr. Lardner, "I can ſee no reaſon to believe that the emperor Philip was by belief or profeſſion a Chriſtian. There is no doubt, however, that he was a protector of the new faith, and ſhewed reſpect to its miniſters." Origen addreſſed ſeveral epiſtles to him, his wife and mother, which are not preſerved.

PHILIP I., king of France, ſon of Henry I., was born in 1052. At the death of his father in 1060, he was left under the guardianſhip of Baldwin, earl of Flanders, who adminiſtered the public affairs with much ability and wiſdom till his death in 1067. Philip then, at the age of 15, was declared of age, and aſſumed the government. One of his firſt exploits was to enter Flanders with an army, to ſupport the family of Baldwin's eldeſt ſon againſt the younger, but meeting with a defeat near St. Omers, he abandoned the cauſe. After this, he was involved in wars with William of England, called the Conqueror, and with theſe two kings commenced that rivalry between the Engliſh and French crowns, which ſubſiſted ſo long, and with ſo much mutual loſs and bloodſhed.

After the death of William, Philip took little part in foreign affairs; he was naturally indolent and fond of pleaſure, and a paſſion in which he became involved, occupied him with domeſtic diſputes during many years of his reign. He had married Bertha, daughter of the count of Holland, by whom he had three children; but upon ſome diſguſt, he divorced her on the pretence of kindred, and married Bertrade, wife of Foulques, count of Anjou. In conſequence of this irregularity, he was excommunicated by pope Urban II., and his ſubjects were diſcharged from their allegiance. He repented, was abſolved, but fell into the ſame ſin again, which produced a repetition of the puniſhment. At length Bertha died, and the marriage with Bertrade was at leaſt connived at. To ſtrengthen his authority, which had been greatly weakened by his own miſconduct, he aſſociated in the government, in the year 1104, his ſon, Lewis le Gros; but Bertrade, who had children of her own, rendered the ſituation of Lewis ſo diſagreeable, that he withdrew to the court of England, where his mother-in-law made ſome attempts upon his life, which, however, he fortunately eſcaped, and obliged the unnatural queen to beg forgiveneſs of her crimes. Philip, after a long and inglorious reign of 48 years, died in 1108. The firſt cruſade was undertaken in his reign, but though it was very popular, he took ſcarcely any part in it. Univer. Hiſt. Hiſt. of France, 1790.

PHILIP II., king of France, ſurnamed *Auguſtus*, ſon of Lewis the Young, was born in 1165, and ſucceeded to the throne on the death of his father, in 1180. Though but fifteen years of age, and under the nominal tutelage of the count of Flanders, he aſſumed the reins of government, which he managed during his whole reign with equal vigour and prudence. One of his firſt meaſures was to baniſh from his court the licentious players and buffoons who infeſted it; he next expelled from his kingdom all the Jews, who by their art and induſtry had poſſeſſed themſelves of a large ſhare of its wealth. Their ill conduct and extortions were made the pretext for this ſeverity, but the true cauſe appeared in the king's ſeizure of all their immoveable property, and his cancelling all debts due to them from his ſubjects. He afterwards found it expedient to recall them, at the ſame time, by laws made for the occaſion, ſetting ſome limits to their uſurious extortions. The mercenary bands which had been engaged in the ſervice of his father and the king of England, now committing great outrages in the kingdom, under the name of Brabançons, Philip ſent troops againſt them, which cut off the greater part, and expelled the reſt. The capture of Jeruſalem, in 1187, rouſed the zeal of the weſtern Chriſtians, and a new cruſade was ſet on foot by the pope. In conſequence, the kings of France and England took the croſs, and promiſed to ſuſpend their differences. Their friendſhip was but ſhort lived; a war between the monarchs enſued, and Henry of England was obliged to make a humiliating compromiſe, which he did not long ſurvive. Richard, who ſucceeded to the Engliſh crown, agreed with Philip upon a conjoint expedition to the Holy Land, in which both ſeemed actuated by the generous ſpirit of chivalry. They met in the iſland of Sicily, and quarrelled about the king of that place. When the diſputes were adjuſted, they proceeded to the ſiege of Acre, which fell before them. New differences aroſe, and Philip returned to his own dominions in 1191. Soon after his return, Philip married Ingelburga, ſiſter of the reigning king of Denmark, againſt whom, on the marriage night, he conceived a diſguſt, which induced him immediately to ſeparate from her. Philip, on pretence of remote affinity, procured from ſome of his biſhops a divorce, and he eſpouſed Agnes, daughter to the duke of Merania. Upon the complaint of the king of Denmark, pope Celeſtin declared this marriage null, and his ſucceſſor, Innocent III., upon Philip's refuſal to take Ingelburga again, laid the kingdom under an interdict. The king, after ſome reſiſtance, thought it prudent to come to terms with the court of Rome, and to take back his lawful wife, at leaſt to let her enjoy the title of queen in a diſtant caſtle.

Philip now turned his thoughts to Normandy, which was poſſeſſed by John, king of England; and when the latter had rendered himſelf odious to the whole world by the murder of Arthur of Britanny, Philip ſummoned him as a vaſſal to appear at his court of peers, and upon his refuſal, procured a ſentence againſt him of confiſcation of all his lands in France. This was not an act of mere form, for Philip proceeded againſt him with great celerity; and in a ſhort time, availing himſelf of John's inactivity and cowardice, reannexed to the crown of France the whole of the fine province of Normandy, after it had been three centuries detached from that crown. He carried war ſtill farther, ſo that in a ſhort time, of all the Engliſh territories in France, Guienne alone remained to that ſovereign. In 1213, upon a quarrel between John and the pope, the latter declared the Engliſh crown vacant, and offered it to Philip, who accepted it, and made preparations for taking poſſeſſion of it. John, however, by his mean and debaſing conceſſions, made the pope his friend, and aſſumed a degree of vigour which was not ſuppoſed to adhere at all to his mind. He formed a new confederacy; fitted out a fleet, which gained a greater naval victory than almoſt any recorded in the Engliſh annals; 300 of Philip's veſſels were taken, 100 were ſunk, and almoſt 1000 more were burnt, to prevent their falling into the hands of the victors. Philip, however, compenſated this diſgrace by a ſignal victory, which he obtained at Bouvines, in Flanders, in 1214, over the confederate army. He was preſent in the action, and was expoſed to great danger through his martial ardour. The count of Flanders and ſeveral other great men became his priſoners. This ſucceſs did not prevent him concluding a peace with John for five years. After this, ſome attempts were made to fix the French prince, Lewis, on the throne of England, but the enterprize ended in the complete expulſion of the French from the iſland. Philip died in 1223, in the 59th year of his age. He was accounted, and very juſtly, one of the ableſt and greateſt princes of his line: he was equally eminent for civil and military qualities, and ſcarcely any French monarch made ſuch additions to the power and dominions of the crown. He was the firſt who maintained a ſtanding army, even during peace, and he introduced ſeveral improvements in the military ſyſtem. He was a patron to learning, raiſed up uſeful edifices, made roads, built bridges, fortified the principal towns, and employed for the benefit of the country the great ſums which he amaſſed by taxes and economy. For the great additions which he made to his kingdom, he was called *The Conqueror*. He was eaſy and affable in his manners, and though little ſcrupulous in his politics, was not devoid of principles of equity and generoſity. As a general, his reputation at leaſt equalled that of any of his contemporaries; and the ingenuity with which he invented a variety of warlike engines, for the deſtruction of the human race, may be either applauded or regretted. But the character of the hero was ſurpaſſed by that of the ſtateſman; his policy extended the narrow limits of kingly power, and his ſucceſſors on the throne of France were indebted to Philip II. for the grandeur to which they attained. Univer. Hiſt. Stockdale's edition of Campbell's Lives of the Admirals. Hiſtory of France, 1790.

Philip III., king of France, ſurnamed *Le Hardi*, ſon of Lewis IX., was born in 1245. He was with his father at Tunis at the time of his death, in 1270, when he ſucceeded to the regal title and dignity, and received the homage of the kings of Sicily and Navarre. He continued ſome time to carry on the war begun by his father with the Moors, in which he diſplayed ſo much courage, as to confer upon him his ſurname. At length he made an honourable peace, and returned to France. By the death of his uncle, the count de Poictiers, and his counteſs, without heirs, their domains reverted to the crown, conſiſting of part of Poitou, Auvergne, part of Saintonge, Aunis, and the county of Toulouſe. Out of this ſeceſſion, he made a preſent to the papal ſee of the county of Venaiſſin, which remained in its poſſeſſion till the French revolution, which commenced in 1789, and which cannot even now be ſaid to be terminated. Philip engaged in two wars concerning the ſucceſſion to the crown of Caſtile, which produced no remarkable event, and which were terminated by the interpoſition of the pope. During his reign there happened the revolution in Sicily called the Sicilian veſpers, in which his uncle, Charles of Anjou, loſt his crown. The revolters were ſupported by Peter, king of Arragon, who claimed the kingdom of Sicily; but the pope excommunicated him, and conferred the title of king of Arragon upon the count of Valois, Philip's ſecond ſon, and a cruſade was declared againſt Peter. Philip, in ſupport of his ſon's claim, entered Catalonia with an army, and took Gerona. The fleet was afterwards deſtroyed by that of Arragon, the chagrin of which, together with an epidemic diſeaſe, put an end to his life at Perpignan, in the year 1285, being the 41ſt year of his age, and the 16th of his reign. This monarch was the firſt who granted letters of nobility, that rank having previouſly been either hereditary, or derived from the poſſeſſion of certain fiefs, or the profeſſion of arms. He died regretted by an army which he had unſucceſsfully commanded, and lamented by a people whom he had reluctantly impoveriſhed. Univer. Hiſt. Hiſt. of France, 1790.

Philip IV., king of France, ſurnamed *Le Bel*, ſon of the preceding, was born in 1268, and ſucceeded to the crown in 1285, when he was ſeventeen years of age. He was already titular king of Navarre, in right of his wife Joan, heireſs to that crown. Finding his affairs in a very diſordered ſtate, he was deſirous of terminating the war in Spain, which he accompliſhed. The great rival of Philip IV. was Edward I. of England, who had done homage to the French king. Both ſovereigns were high ſpirited, and in conſequence of ſome acts of hoſtility, Philip demanded ſatisfaction, and cited his rival as a vaſſal before the parliament, to anſwer for the outrage. He did not appear, and Philip inſtantly proceeded to the arbitrary meaſure of confiſcating all his poſſeſſions in France. Edward did not wiſh for a war, being already engaged in a conteſt with Scotland, and Philip obtained Guienne without reſiſtance. The war which enſued in 1295 was carried on with vigour on both ſides, in the courſe of which Philip became involved in the moſt ſerious diſputes with the pope, Boniface VIII. who was unqueſtionably one of the moſt arrogant pontiffs of the Roman ſee. Philip had demanded a ſubſidy of his clergy, and the pope inſtantly iſſued a bull, prohibiting the clergy of every rank and order from paying any kind of tax to a layman, without permiſſion of the holy ſee, and denouncing the awful penalty of excommunication againſt the defaulters, as well thoſe who paid as thoſe who received. Philip, on his part, forbade the exportation of money, jewels, goods, &c. out of the kingdom, without permiſſion ſigned with his own hand. The pope, at length, ordered his legates to proceed to excommunication, but they were too prudent to comply without previous remonſtrance, and the diſpute was for the preſent compromiſed. Philip even conſented to make the pope arbitrator between him and Edward; and his award was, that not only Guienne ſhould be reſtored to the king of England, but that the earl of Flanders, who had been deprived of part of his kingdom in aſſiſting him, ſhould have it reſtored to him. The rancour ſtill ſubſiſting between Philip and Boniface, ſoon broke out with more fury than ever. The pope ſummoned the king to acknowledge that he held his temporal ſovereignty from him, and he ordered the French prelates and doctors to aſſemble at Rome, for the purpoſe of holding a council. Philip was firm, and convoked the ſtates-general of his kingdom, for the purpoſe of averting the blow aimed againſt his authority. The nobles, and the third eſtate, (now probably ſummoned for the firſt time,) warmly and decidedly ſupported the crown. The clergy temporized, and requeſted leave to go to Rome in conformity with the ſummons of the pope. The king and the barons joined in a prohibition; nevertheleſs, a number of them choſe to obey the court of Rome rather than their king. The concluſion of this violent quarrel was, that the king was excommunicated by the pope, and his crown was offered to Albert of Auſtria, but Philip appealed to a future pope and council, and by the aſſiſtance of the Colonna family arreſted Boniface at Anagnia, who eſcaped to Rome, where he ſoon after died.

During theſe tranſactions, a fierce war raged in Flanders, which country Philip had determined to unite to his own, and in the courſe of which the king defeated the Flemings in a bloody action, in which he diſplayed extraordinary valour at Mons-en-Puelle. He afterwards took Liſle, but finding the enemy ſtill numerous and obſtinate, he concluded a peace on advantageous terms. Theſe military tranſactions did not preclude Philip's attention to the reformation of internal abuſes. For this purpoſe he rendered ſedentary at Paris the parliament which had hitherto been ambulatory, and attached to the court, and from that time it became more properly a court of law. Benedict VI., who ſucceeded Boniface, had already abſolved Philip from the cenſures of the church, and after his death Philip procured the election of Clement V., having firſt made him promiſe upon oath to do what he ſhould deſire. He accordingly revoked the bull of pope Boniface, which prohibited the clergy from paying taxes to the king without permiſſion from Rome; granted him a tenth of their revenues for five years; annulled the declaration of the abſolute ſovereignty of the popes and finally was prevailed upon to conſent to a judicial proceſs againſt the memory of Boniface. The king's pecuniary wants led him more than once to the vile expedient of altering the ſtandard of the coin, and it was raiſed in 1306 to triple the value it had borne under St. Lewis, to the great diſcontent of the nation. The ſame neceſſity produced a new expulſion of the Jews, with the confiſcation of their property. A matter ſtill more injurious to Philip's character was the cruel perſecution which, in conjunction with the pope, he inſtituted againſt the Knights Templars. (See TEMPLARS, *Knights*.) Upon the moſt trifling evidence, the whole body of Templars throughout France were apprehended in one day, and committed to different priſons. Fifty-nine of them were burnt alive by ſlow fires, all aſſerting their innocence, and enduring their ſufferings with the greateſt conſtancy. The order was ſolemnly aboliſhed by the pope, and all its property confiſcated. The landed eſtates were conferred upon the order of Knights Hoſpitallers, ſince changed to that of Malta. Of the perſonal property, Philip took two-thirds by way of re-imburſement of the expences of the proceſs, which laſted ſome years. Philip was not without many domeſtic vexations: the wives of his three ſons were accuſed, and two of them convicted, of adultery. Theſe were ſentenced to perpetual impriſonment, and their lovers, Philip and Walter de Launay, ſeverely atoned for the tranſports of illicit love: after ſuffering the torment of being flayed alive, they, with an uſher of the chamber, the confident of their amours, were ſuſpended on a public gibbet. The many troubles to which Philip was ſubjected threw him into a lingering decline, which put an end to his life, after an eventful reign of twenty-nine years, in the year 1314. Though avarice and cruelty have caſt a ſhade over his talents and virtues, yet the vigour which he diſplayed in his conteſt with the pope, and the ſucceſs with which he reſiſted the formidable thunders of the Vatican, muſt not be forgotten. He made great additions to the power of the crown, by his introduction of lawyers and their maxims of juriſprudence into the parliament, and by the conſequence which he gave to the third eſtate, in ſummoning them to the ſtates-general. He was an encourager of letters, and promoted the tranſlation of ſeveral works into the French language. Univer. Hiſt. Hiſt. of France, 1790, vol. i.

PHILIP V., king of France, ſurnamed *Le Long*, was the ſecond ſon of the preceding, and born in 1293. On the death of his elder brother Lewis, in 1316, he obtained the regency till the widow whom he left pregnant ſhould be delivered. She brought forth a ſon, who lived but a few days, after which Philip was declared king of France, to the excluſion of Joan, the late king's daughter, who, however, inherited the kingdom of Navarre. Philip, by his firmneſs and attention to juſtice, quelled ſome diſturbances that were about to break out in the provinces. His ſtrict regard to his word had nearly impelled him to engage in a new cruſade, to which he thought himſelf bound by having taken the croſs with his father; but it fortunately ſuited the intereſts of the pope, whoſe ſee was at Avignon, to keep him in France. The Mahometans were apprized of the king's intention, and according to the common report, engaged the Jews to poiſon the wells, in which deadly work they were aſſiſted by the lepers, a numerous body of that time, living in richly endowed hoſpitals. To this machination, of which there was no ſpecific evidence, the credulity and prejudices of the age imputed an epidemic diſeaſe, that carried off vaſt numbers of the people; and the pretended conſpiracy was puniſhed with horrible executions, among which was that of 160 Jews in one burning pile, and with the confiſcation of the eſtates of the hoſpitals of the lepers. After this, Philip finding himſelf in a ſtate of tranquillity as to foreign affairs, meditated various reforms at home. One, which he carried into effect, was the excluſion of eccleſiaſtics from a ſeat in parliament, that they might not be diverted from their ſpiritual concerns. He had an enlarged mind for the times in which he lived, and planned an uniformity of coins, weights, and meaſures throughout France. From the counts of Valois, Clermont, and Bourbon, he purchaſed their claims of coinage within their own dominion; but though he carefully explained the benefits that would ariſe to the country, in general, from perſevering in this undertaking, he found himſelf continually embarraſſed by new and unexpected obſtacles. The mind of Philip was too ſenſibly wounded by the injurious ſuſpicions of his ſubjects; he beheld his honeſt endeavours productive of jealouſy and diſappointment; the violence of a fever only gave way to the mortal ravages of a dyſentery, and after languiſhing about five months, he died in the ſixth year of his reign. The hiſtorians of that credulous age have attributed his death to poiſon, but they all agree in acknowledging that he conſtantly merited, though he was never able to acquire, the eſteem and affection of his ſubjects. He is characteriſed as a wiſe, conſcientious, public-ſpirited prince, pious without bigotry, and a great lover of learning.

Philip VI., king of France, ſurnamed *De Valois*, born in 1293, was ſon of Charles of France, count of Valois, and grandſon of Philip le Hardi. At the death of Charles le Bel, in 1328, who left no male heir, but his wife being pregnant, the regency was diſputed between Philip and Edward III. king of England, who was ſon of Iſabella, ſiſter to the late king. The title to the regency was in truth that of the ſucceſſion to the crown, and it was adjudged to Philip, on the principle that Edward could not derive a claim through a female. The queen being, in a ſhort time, delivered of a daughter, Philip aſſumed the title of king, and was crowned at Rheims with unuſual pomp. His firſt great act was to reſtore the count of Flanders to that throne from which he had been expelled by his ſubjects for his attachment to the intereſts of France. The terror of his arms induced the Flemings to make their ſubmiſſion, and conſent to the reſtoration of their count. The competition for the crown between Philip and Edward naturally left much ill blood, and Philip, to increaſe the difference, ſummoned Edward to do homage for Guienne and his other fiefs in France, who returned for anſwer, that it did not become the ſon of a king to humiliate himſelf before the ſon of a count. The threat, however, of confiſcation of his revenues brought him very unwillingly to Amiens the next year, where he appeared with a magnificent retinue, and was met by Philip in equal ſtate. After many diſputes concerning the nature of homage, he was permitted to pay it in general terms. But after his return, a deputation was ſent to England, which induced Edward to acknowledge that a liege homage was due to the king of France. He accordingly returned to France the next year, and was received by Philip with great reſpect, ſo that their amity ſeemed to be well eſtabliſhed; but this was only in outward appearance, and an incident ſoon occurred which cauſed their ſecret animoſity to burſt into a flame. The count of Artois, after the death of the laſt count, had been adjudged to Maud, his daughter, in oppoſition to the pretenſions of Robert d'Artois, Maud's nephew. Robert retired to England, and did not ceaſe to urge the commencement of hoſtilities againſt Philip, who had proved himſelf inimical to his claims. In 1339 the war commenced. Edward, having made an alliance with the emperor Lewis of Bavaria, and alſo with Arteville, the brewer of Ghent, laid ſiege to Cambray, but without ſucceſs; and Philip, with a very numerous army, covered his frontiers ſo well, that his rival could obtain no advantage over him. At the ſame time the French fleet made great depredations on the Engliſh coaſt, took and burnt Southampton, and landed in various other places. Theſe inſults were however completely revenged the next year, by the great naval combat of Sluys, in which Edward in perſon deſtroyed half the French fleet with the crews. The war was continued with various ſucceſs for ſeveral years. In the ſummer of 1346, Edward landed at La Hogue with 30,000 men, accompanied by his ſon, the Black Prince. They immediately began reducing the ſtrongeſt cities in the neighbourhood, after which they ſpread fire and ſword on every ſide, even to the very gates of Paris. All the efforts of Philip, who long kept the field, though wounded, were unable to turn the fortune of the day. The French were defeated, in the famous battle of Crecy, with a loſs of men greater than the number of the whole Engliſh army, comprehending many of the principal nobility. In the courſe of this war France was reduced to the moſt diſtreſsful condition; the people diſheartened and ruined by exceſſive impoſitions, famine deſolating the country, and a peſtilence raging in the capital. Fortunately for Philip, peace was as neceſſary for Edward as for him, and a truce was negociated for three years. Philip now became captivated with the charms of the princeſs Blanche of Navarre, whom he had deſtined for the ſecond wife to his eldeſt ſon, that he eſpouſed her himſelf, and married his ſon to the widow of Philip of Burgundy, count d'Artois. The feſtivities on account of theſe nuptials were however very ſoon ſucceeded by mourning for the king's death, which happened in 1350, when he was in the 57th year of his age, and the 23d of his reign. He lived to loſe the affections of his ſubjects, by whom he was once idolized, though his misfortunes rather than his faults were the occaſion. Univer Hiſt. Hiſt. of France, 1790.

Philip I., king of Spain, and archduke of Auſtria, ſon of the emperor Maximilian I., was born in 1478. A marriage between him and Joanna, daughter of Ferdinand of Arragon and Iſabella of Caſtile, took place in 1496; and the death of her only brother, Don Juan, left Joanna the heireſs of their vaſt dominions. In 1502, the archduke and his ſpouſe viſited Spain, where they were acknowledged by the Cortes as the lawful ſucceſſors to the crown of that kingdom. In paſſing through France, Philip had done homage to the king, Lewis XII., for the earldom of Flanders, which he inherited in right of his mother, Mary, daughter of Charles the Bold, duke of Burgundy. The temper of Philip was ill ſuited to the ſolemn ſtatelineſs of the Spaniſh court, and notwithſtanding the intreaties of his wife, who doated on him, he haſtily returned to the Low Countries. He now ſigned a treaty with Lewis, by which he hoped all differences between the crowns might be adjuſted, but his father-in law, Ferdinand, finding his affairs proſperous in Italy, paid no regard to it. Iſabella died in 1504, and left the regency of Caſtile to Ferdinand, till her grandſon Charles ſhould come of age. Ferdinand was however obliged to reſign the regency, and Philip was put in poſſeſſion of the royal authority. The diſlike which this prince always ſhewed to the Inquiſition, and the preference which he gave to his Flemiſh favourites, began to produce alarming diſcontents, when death put a period to his reign, in the year 1506, at the age of twenty-eight. He is diſtinguiſhed only as being the father of the emperor, Charles V., ſee his article. Univer. Hiſt. Robertſon.

Philip II., king of Spain, ſon of the emperor Charles V., and Iſabella of Portugal, was born in 1627. When he was only in his ſixteenth year he was married to Mary, daughter to the king of Portugal, and at the ſame time his father, on leaving Spain for Germany, committed the adminiſtration of that country to him, with minute inſtructions for his conduct, and aſſigning him the duke of Alva as his counſellor in military affairs. No event of conſequence happened under his regency in Spain, and in 1547, Charles being deſirous of having him near his perſon, he conſigned his authority to his couſin Maximilian, and embarked for Germany. In this progreſs, he acted the part of a great prince with a dignity ſuitable to his high rank, and gave a favourable impreſſion of himſelf to all the diſtinguiſhed perſonages in Italy and Germany, who were introduced to him on the way. He met the emperor at Bruſſels, and the ſtates of the Low Countries formally recognized Philip as their future ſovereign; and in all the towns which he viſited, he was received with extraordinary rejoicings; but in the midſt of theſe feſtivities he diſplayed a ſeverity of diſpoſition, and an excluſive attachment to his Spaniſh attendants, which inſpired the Flemings with a permanent diſlike.

In 1550 he appeared with his father at the diet of Augſbnrg. This was a ſtep towards the ſcheme which Charles had much at heart, *viz.* that of procuring his ſon's ſucceſſion to the imperial dignity. But independently of other obſtacles, Philip's whole demeanor was ſo offenſive to the Germans, that his preſence only proved an additional impediment, and he was ſent back to Spain. Mary of England having ſucceeded to the crown on the death of her brother Edward VI., Charles inſtantly thought of her as a fit wife for his ſon, who was now a widower. Philip, though much younger than Mary, agreed to the propoſal, the marriage was agreed on, and Philip came over to England in 1554 for its celebration. He found the people wholly averſe from the union: the parliament ſhewed its diſapprobation by rejecting a motion that England ſhould give aid to the emperor in his war with France, and they went farther, by refuſing their conſent to Philip's coronation as the queen's huſband. Finding little ſatisfaction in this country, and being rather diſguſted than gratified by his wife's importunate fondneſs, he withdrew to Flanders. In 1555 the emperor Charles reſigned his authority and crown, and Philip at once roſe from a ſubordinate ſtation to that of the moſt powerful prince of Europe. At Bruſſells he received the full ſurrender of the ſovereignty over that part of his dominions; and in a few weeks afterwards he was put in poſſeſſion of the crown of Spain, and all its vaſt dependencies. The firſt meaſure of Philip as ſovereign was to conclude a truce for five years with the king of France. This truce was broken in a few months by the French, and pope Paul IV., the avowed enemy of Philip, declared him to have forfeited the kingdom of Naples, which was a fief of the holy ſee. Philip had too much religion to take up arms againſt the head of the church, nevertheleſs, he found himſelf conſtrained to ſend his general the duke of Alva againſt him, to bring his holineſs to terms, in which he ſoon ſucceeded. War was in the mean time renewed in the Low Countries, and Philip viſiting England, uſed all his endeavours to engage that country to join him as an ally. Mary perſuaded her miniſters to declare war againſt France, and in the end ſhe loſt Calais: but Philip gained a great victory over the French at St. Quintin, in Auguſt 1557, and to mark his gratitude for the event, he built a church, a monaſtery, and a palace to the honour of St. Lawrence, on whoſe feſtival the battle was fought. The Eſcurial was the monument erected on this occaſion. In the ſame year, Philip's ſuperſtitious fears induced him to grant a peace to the pope, upon terms more humiliating to himſelf than to the vanquiſhed. In 1558 Mary died, and Philip made propoſals of marriage to her ſucceſſor Elizabeth, of whom he had been the protector, when her life was endangered by the jealous bigotry of her ſiſter. She was, however, too well acquainted with Philip's diſpoſition, and too ſenſible of the diſlike borne him by the Engliſh nation, to liſten to the propoſal. In 1559 peace was concluded, which put an end to the long and deſtructive conteſt between the Spaniſh and French monarchies. In the courſe of that year he returned to Spain, and was treated by the Spaniſh inquiſition with an *auto de fè* (ſee the article ACT *of faith*); and his devout behaviour at the burning of his wretched ſubjects, which ſhews the blackneſs and malignity of his heart, has been commended by Spaniſh hiſtorians, who were nearly as ſavage as the prieſts who performed the horrid deed. At this period thoſe commotions began to prevail in the Auſtrian Netherlands, which produced the moſt memorable events in Philip's reign. The principles of the reformation had made great progreſs in thoſe ſtates, and Philip, equally deſpotic in his temper, and bigotted to his religion, was determined to uſe his authority to ſilence all diſcontents. For the effectual ſuppreſſion of hereſy, he eſtabliſhed a court of inquiſition, on the model of that infernal one in Spain, and he retained a body of foreign troops in the country, to overawe oppoſition, notwithſtanding the remonſtrances of the ſtates, who ſaw that the ſubverſion of their liberties was the aim of his policy. It was the maxim of this tyrant, "that a king had better be without ſubjects, than be a king of heretics." At one time, however, he found it neceſſary to temporize, having againſt him a moſt formidable oppoſition, headed by the prince of Orange, and the counts of Egmont and Horn. He was, at the ſame time, in conjunction with the court of France under Catharine de Medicis, and her ſon Charles IX., laying a plan for the total extirpation of the Proteſtants. When this was matured, the perſecution of the heretics was reſumed; and in 1567, the criſis of tyranny and cruelty arrived in the miſſion of the deteſted duke of Alva, who was prepared with means, as extenſive as his own heart was black, for cruſhing all reſiſtance, and carrying into full execution the coercive plans of the Spaniſh court. The eſtabliſhment of the bloody council, the execution of counts Egmont and Horn, with a multitude of others of inferior condition, were among the immediate effects of the duke of Alva's preſence. Though Philip was, perhaps, only the remote cauſe of theſe evils, yet he never ſhewed any ſigns of compunction for the miſeries which were occaſioned under the ſanction of his name and authority; and it is pretty certain the ſevereſt meaſures had his full approbation.

Philip was now doomed to domeſtic diſquiet; his eldeſt ſon Carlos engaged in intrigues againſt his government, and being unſucceſsful, he was driven to deſpair, and exhibited ſuch marks of derangement, as to juſtify the king in ſecuring him in a place of confinement. In a few months the prince died, but by what means is not known: ſome writers aſcribe his death to the conſequences of his own irregularities, and others have not ſcrupled to charge the king with being privy to it. This event took place in 1567. A revolt of the Moriſcoes in Granada occupied the Spaniſh arms two or three years, and gave Philip much uneaſineſs; it was, however, concluded in 1570, and in the ſame year he married his fourth wife, the archducheſs Anne of Auſtria. In 1571, the Spaniſh arms, in conjunction with thoſe of the confederates, acquired great glory by the naval victory obtained under the command of Don John of Auſtria, Philip's natural brother, over the Turks at Lepanto. In the Low Countries the cruelties of Alva had excited ſuch a determined ſpirit of reſiſtance, that he ceaſed to be ſucceſsful in his military enterprizes, and was recalled in 1573. Requeſens was ſent to ſucceed him; and upon his death in 1576, the government was committed to Don John of Auſtria, with full powers to grant any terms for concluding a war already extremely burdenſome, *except liberty of conſcience.* On the death of Don John, in 1578, the prince of Parma ſucceeded to all his authority, and for ſome years proceeded in a career of ſucceſs, which finally terminated in the recovery of the ten ſouthern provinces to the crown of Spain. On the death of Sebaſtian, king of Portugal, Philip laid claim to the crown, and by the help of the bloody duke of Alva obtained the object of his wiſhes. The aſſaſſination of William, prince of Orange, in 1584, delivered him from an inveterate foe, and was the cauſe of indecent rejoicings at the Spaniſh court; but his ſon Maurice proved a ſtill more formidable opponent. For ſome time cauſes of mutual complaint had ſubſiſted between the courts of Spain and England, and in 1586, Elizabeth, ſeeing the imminent danger of the united ſtates of the Netherlands, and impending hazard to her own crown and the Proteſtant religion, ventured to enter into an open treaty with them, by which ſhe engaged to ſupply them with men and money. At the ſame time ſhe ſent ſir Francis Drake with a powerful armament to attack the Spaniſh ſettlements in America. Philip retaliated by exciting an inſurrection in Ireland, and by his well-known *Armada*; which ſee. The ſame political ſyſtem of exciting civil diſturbances among his neighbours, together with zeal for the Catholic religion, the principal ſupporter of which he affected to be thought, induced him to give his aſſiſtance to the famous league in France. He became the avowed enemy of Henry IV. a declared Proteſtant, and even after he had renounced his faith he continued his hoſtility, and employed his influence at Rome to retard that king's abſolution as long as poſſible. This conduct produced a declaration of war from Henry in 1595, which was carried on with various ſucceſs. In the mean time war continued with England, in which Spain ſuffered the ſevereſt diſaſters. Philip, at length, broken by diſappointments and infirmities, was deſirous of reſtoring tranquillity to his kingdom, and in 1597, peace was concluded between France and Spain, but he ſurvived it only a few months. When he found his end approaching, he cauſed himſelf to be conveyed from Madrid to the Eſcurial, where he died in September 1598, in the 72d year of his age, and the 43d of his reign. His character has been fully diſplayed in the account of his conduct and actions. He had ſagacity to diſcover, and wiſdom to employ, men of abilities: he was a friend to learning and the arts, where they did not interfere with his religious prejudices. His domeſtic adminiſtration was in ſome reſpects laudable, but his boundleſs ambition and bigoted principles rendered his whole reign a period of war and contention, and waſted the vaſt reſources which he poſſeſſed, without effecting any of the great objects at which he aimed, and the Spaniſh monarchy dates its decline from his reign. Univer. Hiſt. Robertſon and Hume.

Philip III., king of Spain, ſon of the preceding by Anne of Auſtria, was born at Madrid in 1578; of courſe he was in his 21ſt year when he ſucceeded to the crown. He had the character of a virtuous prince, but was very deficient in thoſe talents that ſeem neceſſary to the well-governing of a great ſtate. He almoſt immediately married Margaret of Auſtria; and as ſoon as James I. aſcended the Engliſh throne, overtures of accommodation were made on the part of Spain, which terminated in a peace between the two kingdoms in 1604. The war with the Dutch ſtates continued, but ſo little hope remained of a final recovery of theſe provinces, that a truce negociated with the United Provinces as an independent government was concluded in 1609. In the ſame year a meaſure was adopted which inflicted a deep wound on the population, the wealth, and the induſtry of Spain. This was the total expulſion of the Moriſcoes, of whom a great number was ſtill remaining in the ſouthern provinces, which they rendered rich and fertile: They were charged with being the enemies of Chriſtianity, and with holding a traiterous correſpondence with the Moors of Barbary, and other foes of the ſtate. The barons, their landlords, who regarded them as very profitable tenants, denied the truth of the charge. The influence of the clergy prevailed, and the Moriſcoes, to the number of 400,000, were expelled from all the provinces of Spain, upon a very ſhort warning, and under circumſtances of great injuſtice. An edict, conferring honour and exemptions upon all who would engage in agriculture, was intended to remedy the miſchiefs of this meaſure, but ſkill and induſtry are not to be created at the pleaſure of a miniſter, and Spain to this day feels the loſs of her ableſt cultivators. A double marriage between Philip's eldeſt ſon, the prince of Aſturias, and Iſabella, ſiſter to Lewis XIII. of France; and between this monarch and the infanta of Spain, concluded in 1614, was one of the great political events of this reign. Philip died in 1621, of a morbid melancholy, ſaid to have been occaſioned by the mal-practices of his prime miniſter; but others impute it to a circumſtance of court etiquette; a brazier placed ſo near as to incommode his majeſty could not be removed for want of the preſence of the proper officer, till he had received a ſerious injury from the heat. Univer. Hiſt.

Philip IV., king of Spain, ſon of the preceding, by Margaret of Auſtria, was born in 1605, and ſucceeded his father in 1621. He immediately gave the reins of government to his favourite the count d'Olivares, who was his confident and miniſter of his pleaſures. By his perſuaſions the young king aſſumed the title of Great, which few monarchs have leſs deſerved. Forming a ſtrong alliance with the emperor of Germany, he re-kindled a war in Italy, in the hope of eſtabliſhing the Spaniſh influence in that country, while the French were occupied with inteſtine troubles, which Olivares ſecretly fomented. The ſecret hoſtility between the two crowns terminated in open war in 1635, the events of which were in the beginning favourable to Spain; but fortune at length turned, and in addition to various diſaſters by ſea and land from the enemy, two very ſerious internal calamities diſtreſſed the Spaniſh court. A plan formed for aboliſhing the privileges of particular provinces, was tried in Catalonia with ſuch ill ſucceſs, that in a furious revolt the viceroy was killed, and the whole province broke out into open rebellion. In the ſame year, 1640, Portugal threw off the yoke of Spain, and placed the duke of Braganza upon the throne, which had been occupied by his anceſtors. This and other misfortunes induced the king to diſmiſs his miniſter, and Olivares was diſgraced. Affairs were little improved under the new adminiſtration. Maſſaniello's revolt at Naples, in 1646, augmented the confuſion; but on the other hand a proviſional treaty of peace ſigned with the Dutch, freed Spain from one of the moſt troubleſome wars it had ever experienced. The peace was finally ratified in 1648. Barcelona, with the greateſt part of Catalonia, were recovered in 1652; but the junction of Cromwell with France, the ſucceſſes of Blake againſt the Spaniards at ſea, and their defeats in the Low Countries, and on the frontiers of Portugal, rendered the Spaniſh court ſincerely deſirous of a general peace, and in 1659 the famous treaty of the Pyrenées was concluded. The kings of Spain and France had an interview in the iſle of Pheaſants, on the confines of the two kingdoms, where they ſigned the peace, and Lewis received for his bride the infanta, Philip's daughter. The war for the recovery of Portugal ſtill continued; but by a total defeat of the Spaniſh general in the plain of Montes Claros in 1665, the cauſe of Spain was rendered hopeleſs. Philip fainted away on receiving the news, and in the September of the ſame year he died, after a reign of 44 years. The prince did not want for talents, and would probably have done honour to his high ſtation, had he fallen into good hands while he was young; but an early introduction to licentious pleaſures, and ſubjection to an ambitious favourite, who diverted him from all attention to buſineſs, rendered his reign inglorious to himſelf, and diſaſtrous to his kingdom. Univer. Hiſt.

Philip V., king of Spain, born in 1683, was ſecond ſon of Lewis, dauphin of France, and bore the title of duke of Anjou. He ſucceeded Charles II., and was proclaimed king of Spain at Fontainebleau, and at Madrid in November 1700. He arrived in his new kingdom in the beginning of the following year, and married the daughter of the duke of Savoy. At firſt every thing ſeemed to promiſe a quiet acceſſion and proſperous reign, but a ſtorm was ſecretly riſing, which ſoon diſſipated theſe flattering appearances. Several of the European powers, jealous of the influence which France would acquire over the Spaniſh counſels under a French prince, made a league to place the archduke Charles on that throne. Into this grand alliance entered England, Holland, and almoſt all the German princes, with the emperor, and it was afterwards joined by Portugal and Savoy. Philip gave an opportunity for forming a party againſt him in Spain, by a journey into Italy to appeaſe a revolt in Naples, and to take poſſeſſion of the duchy of Milan. He was preſent with the duke of Vendome at the battle of Luzzara, where he gave proofs of great perſonal courage. Returning into Spain, he found that diſaffection to his cauſe had made alarming progreſs; and the archduke Charles was publicly declared king of Spain, at Vienna, in 1703. An Engliſh fleet conveyed him the next year to Portugal, and he now found that he had an arduous conteſt to ſuſtain for his crown. The war of which Spain then became the ſeat, was attended with various viciſſitudes of fortune. Gibraltar was taken by a coup-de-main by the Engliſh, and a formal ſiege for its recovery proved fruitleſs, as all have done ſince. In 1705 Barcelona was taken by the allies, and was thenceforth the ſeat of king Charles's government. The allied army penetrated to Madrid, of which it took poſſeſſion. Philip, however, very ſoon recovered the capital, which was much more attached to him than to his competitor. The war was continued with various ſucceſs till 1710, when the duke of Vendome arrived from France to take the command, and his ability ſoon changed the face of affairs. This general, accompanied by Philip, made priſoners of general Stanhope and all his army, and defeated count Staremberg. From this time Philip maintained a decided ſuperiority, and when, in 1712, the congreſs for a general peace was opened at Utrecht, Charles withdrew from Catalonia, and the crown of Spain was no longer contended for. Philip, on his part, ſigned an act of renunciation for himſelf and his ſucceſſors to all right of inheritance to the crown of France; and the ſtates of the kingdom ſettled the ſucceſſion to the Spaniſh throne upon the male deſcendants of Philip, in preference to the females, though nearer in blood. Peace was concluded in 1713; but Barcelona held out till taken by marſhal Berwick in 1714. Philip had gone through this conteſt for a crown with a conſiderable ſhare of reputation, though it was evident, that he was rather formed to be governed than to govern. In military tranſactions he committed the whole direction to the general officers, contented with giving the ſupport of his preſence. The affairs of Spain were ſoon put into the hands of the miniſter Alberoni, the confident of Philip's ſecond queen, Elizabeth Farneſe, princeſs of Mantua. The politics of that enterpriſing projector involved Spain in new troubles. He took poſſeſſion of Sardinia in 1717, and of Palermo in Sicily, and would have conquered the whole iſland, had not the neighbouring powers taken the alarm. A confederacy was formed againſt him by France, England, and Holland: ſir George Byng deſtroyed the greater part of the Spaniſh fleet, and Philip was obliged, in 1720, to part with his miniſter Alberoni, as the condition of peace. Soon after this he fell into a morbid melancholy, which, without affecting his intellectual faculties, had ſuch an effect upon his temper and habits of life, as denoted a total derangement. Though in perfect health, he would keep to his bed for months together, tranſacting buſineſs at hours the oppoſite to thoſe which he had uſually kept. He ſometimes imagined that he was dead, and aſked why they did not bury him. Nothing was found effectual in ſoothing his mind, and rendering him at all manageable, but muſic, and the celebrated ſinger Farinelli, who was retained about his perſon, became a moſt important character at court. At length, in 1724, he abdicated the throne in favour of his eldeſt ſon Lewis. The young king dying in a few months of the ſmall-pox, Philip was perſuaded to reſume the ſceptre. His melancholy in a great meaſure diſappeared, and he applied himſelf diligently to affairs of the ſtate, eſpecially to improving the adminiſtration of juſtice, and encouraging manufactures, arts, and ſciences. In the war of 1733, he joined France againſt the emperor and the infant Don Carlos, conquered Sicily and the kingdom of Naples, which were ceded to him at the peace of 1736. In 1739 a maritime war broke out with England, on occaſion of the right of ſearch claimed by Spain in the American ſeas. Philip did not live to ſee the end of this, dying in 1746, at the age of 63, after a reign of 45 years. His character has been thus drawn: "If he was placed in a ſituation out of the reach of danger, he quietly remained there; if circumſtances brought him in the midſt of the warmeſt fire, he preſerved the ſame phlegm, and amuſed himſelf with the fears of thoſe about him. He was eaſy with his ſervants, familiar and good-humoured to thoſe about him; but his qualities were rather paſſive than active, and his attachments were more the reſult of habit than ſenſibility. He was devout; but his devotion conſiſted in minute punctilios; he was conſcientious, and narrowly ſcrupulous. Timid, reſerved, and taciturn in public, he obſerved characters and actions with judgment and accuracy, but ſuffered things to take their courſe." Univer. Hiſt.

Philip, duke of Burgundy, ſurnamed the *Good*, was born at Dijon in 1396. After the death of his father, in 1419, Philip, who ſucceeded him to the dukedom, joined the party of the Engliſh under Henry V., and aſſiſted in carrying deſolation through France, during the cloſe of the reign of Charles VI. and the beginning of the reign of Charles VII. In 1435 he was reconciled to the king of France by the treaty of Arras, and became one of the moſt powerful and wealthy ſovereigns of his time, having united to the duchy of Burgundy almoſt the whole of the ſeventeen provinces of the Low Countries. When the dauphin Lewis, afterwards Lewis XI., quarrelled with his father, and withdrew to the dominions of Burgundy, Philip gave him an hoſpitable reception, but refuſed to aſſiſt him in making war upon his father. The duke's ſon, the count de Charolois, afterwards Charles the Bold, was of a fiery diſpoſition, and not likely to accommodate himſelf to the diſpoſition of their gueſt. On the acceſſion of Lewis, the duke and his ſon were preſent at his coronation, and every thing ſeemed, at firſt, to denote peace and amity, but ſome perfidious conduct of Lewis cauſed the count de Charolois openly to join in the "league for the public good," againſt him, in which he was countenanced by his father, who reſigned to him the adminiſtration of his ſtate. He died at Bruges in 1467, leaving behind him the character of a wiſe and generous prince, who had promoted the proſperity of his ſubjects. He inſtituted the order of the Golden Fleece. Univer. Hiſt.

Philip, duke of Orleans, regent of France, the ſon of Philip, brother of Lewis XIV., by Charlotte Elizabeth of Bavaria, was born in 1674. From a child he manifeſted great quickneſs of parts, with a boundleſs curioſity, and a capacity for almoſt every kind of acquirement. His preceptor, St. Laurent, a man of real principle and great merit, unfortunately died before his education was finiſhed, and he fell into the hands of the abbé Dubois, who entirely ſubverted his moral habits, and he gave himſelf up to open profligacy; yet he was naturally humane, frank, brave, and affable. He had a great ſhare of penetration and ſagacity, and would probably have made a ſhining figure in any kind of buſineſs, had not indolence and the love of pleaſure deſtroyed in him all conſtancy of purſuit, and firmneſs of character. His chief application was beſtowed on the arts, and he was a practiſer, as well as an amateur, of painting, muſic, chemiſtry, and mechanics. He made his firſt campaign, as a military man, in 1691, under marſhal Luxemburg; and in the following year commanded the reſerve at Steinkirk, where he received a wound. In the ſame year he married a natural daughter of the king by madame de Monteſpan, a degradation to which he was perſuaded by Dubois. After paſſing ſome years during peace in a round of pleaſures, and varied ſtudies, he was ſent, in 1606, to command in Piedmont the army that was beſieging Turin. When prince Eugene approached, for the purpoſe of raiſing the ſiege, it was the advice of the duke of Orleans to march out of the trenches to meet him; but the commander-in-chief was of a different opinion. In the rout that enſued, the duke received two wounds, and was obliged to recroſs the Alps in great diſorder. In the following year he went into Spain, and arriving immediately after the battle of Almanza, profited by that victory in the reduction of Valencia and Arragon, and took Lerida in Catalonia. A proſpect of the reſignation of Philip V. of Spain, to which we have already referred, induced the duke to engage in ſome intrigues, for ſecuring the crown of that country for himſelf. They were diſcovered, and his intentions defeated. Lewis, by his will, had nearly deprived him of all authority, though the power of the regency naturally fell to him; but ſoon after the monarch's death, the will was ſet aſide by the parliament of Paris, and the regent was eſtabliſhed in his full rights. He began his adminiſtration well, and ſhewed that his ideas of government were juſt and liberal; but an indolence, almoſt become natural to him, led him to devolve all the cares of his office to Dubois, the moſt unprincipled of men, and a total change from the manners and politics of the old court immediately took place. To bigotry and devotion ſucceeded open impiety: to form and decorum, eaſe and licentiouſneſs. A political connection was eſtabliſhed with the Engliſh cabinet under George I., which ſuited the perſonal intereſts of both the king and the regent. The former was conſcious that he was far from being firmly ſeated on his throne; and the latter had reaſon to apprehend that, in caſe of the death of the minor king, a claim would be advanced by Philip, king of Spain, notwithſtanding his ſolemn renunciations. Indeed Philip's miniſter, Alberoni, excited a conſpiracy in France, to deprive the duke of Orleans of the regency, and gain it for his maſter. This led France to join in a confederacy with the maritime powers, to defeat the projects of this miniſter, and remove him from his ſtation; which they effected. The regent gave all confidence to Dubois, whom he created counſellor of ſtate, and then miniſter and ſecretary for foreign affairs; after which, to the ſcandal of all order and forms of religion, he raiſed this libertine to the archiepiſcopal ſee of Cambray, and obliged the pope to create him cardinal. The derangement of the finances induced the regent and his miniſter eagerly to adopt the deluſive projects of the famous Law, (ſee the article,) which occaſioned an unheard-of ruin to vaſt multitudes, and many unjuſt and arbitrary proceedings, which rendered the government odious. Dubois died in 1723, and from that time the regent took the cares of prime miniſter into his own hands; but his indolent habits rendered him unfit for buſineſs, and he ſoon abandoned it to his ſecretaries of ſtate. Exhauſted by the viciſſitudes of public cares and private debaucheries, he died in December 1729, being in the 50th year of his age. The agreeable qualities of the duke have cauſed his memory to be treated with an indulgence to which he was not entitled. Vice, when allied with wit and good humour, is too eaſily pardoned. In the character of the duke of Orleans there was little reſpectable, to balance much that was contemptible, and even deteſtable. Duclos ſays of him, "Good and bad treatment, ſervices and offences, moved him ſlightly; he gave, but did not recompenſe; he readily pardoned, ſeldom eſteemed, and ſtill ſeldomer hated." He was, in truth, long before he died, ſunk in the groſſeſt debauchery, which proceeded to lengths that ſhocked even the licentious. He was ſuſpected of regarding his daughter, the ducheſs of Berry, with more than paternal fondneſs; at leaſt, it is certain that he initiated her in the looſeſt principles: and as a public man, he may be ſaid to have laſtingly injured the morals of the nation, and deſtroyed its credit.

Philip *Iſlands*, in *Geography*, two iſlands in the South Pacific ocean, diſcovered by captain Hunter in the year 1791, on his return from New South Wales to England. He deſcribes them as joined together, or nearly ſo, by a long ſandy ſpit, above water, which reaches for about two-thirds of the diſtance from the eaſtmoſt or largeſt iſland to the weſtmoſt, which is ſmall. A ſand bank above water encompaſſes the largeſt, and extends from the foot of the higher land about half a mile into the ſea. A few natives were ſeen on the ſhore as the ſhip paſſed by it. Theſe iſlands are dangerous to navigators in the night, on account of the ſandy ſpits which project from them: they were covered with ſhrubs, and had but few tall trees among them, and the land is low. The largeſt is in S. lat. 8° 6′. E. long. 140° 3′. They were computed to belong to the New Carolines, but they ſeemed to be wholly detached, and are about five miles aſunder. Captain Hunter called them Philip iſlands in honour of Arthur Philip, governor of New South Wales.

PHILIPPEAU, an iſland, 24 miles in circumference, ſituated in the N.W. part of lake Superior. N. lat. 48° 12′. W. long. 88° 58′.—Alſo, a bay of the gulf of St. Lawrence, near the ſtraits of Belleiſle. N. lat. 51° 20′. W. long. 55° 40′.

PHILIPPEVILLE, a town of France, in the department of the Ardennes, and chief place of a canton, in the diſtrict of Rocroy; 12 miles N.W. of Givet. It was anciently called "Corbigny," until Mary of Auſtria fortified it in 1577, when it received its preſent name, in honour of Philip II. king of Spain. The place contains 1202, and the canton 4880 inhabitants, on a territory of 155 kiliometres, in 13 communes.

PHILIPPI, Henry, in *Biography*, a learned Jeſuit, a native of Luxemburg, was born in the vicinity of St. Hubert's, in the Ardennes, in the year 1575. He commenced his noviciate in the order of Jeſus at the age of 21, and quickly ſurpaſſed all his contemporaries in the ſeveral departments of academical learning; but he was particularly verſed in ſcriptural hiſtory and chronology. Having been admitted to the degree of doctor of divinity, he taught philoſophy, ſcholaſtic divinity, and biblical literature, in the univerſities of Gratz, Vienna, and Prague. After this he was appointed tutor and confeſſor to Ferdinand III., king of Hungary and Bohemia; in whoſe ſervice he died, at Ratiſbon, in 1636, about the age of 61, while attending his royal pupil at the diet which elected him king of the Romans.

He was author of a great number of works, among which are the following: "Chronologica Synopſis ſacrorum Temporum," 1624; "Manuale Chronologicum veteris Teſtamenti," 1635; "Chronologiæ veteris Teſtamenti accuratum Examen," 1637, &c.

Philippi, in *Ancient Geography*, a town of Macedonia, at a ſmall diſtance towards the E. from mount Pangæus, near the ſea. Its firſt name was Credinas, and ſince Datus. It occupied the ſummit of a ſmall eminence. Philip, the father of Alexander, having taken poſſeſſion of it, fortified it and gave it his own name. The Romans eſtabliſhed in it a colony. It was ſituated on the great route from Theſſalonica. It is mentioned in the Acts of the Apoſtles. St. Paul preached here and wrought miracles; and addreſſed an epiſtle to its inhabitants. Some have thought that it was on a plain near this town that Brutus and Caſſius were defeated.

Philippi, or *Theſſaliæ Philippi*, the town of Thebes, in Theſſaly. This name might poſſibly have been given to a town bearing a different appellation. It appears, however, that the battle between Brutus and Caſſius on the one ſide, and Auguſtus and Mark Antony on the other, was fought here.

Philippi *Inſula*, an iſland of the Arabian gulf. Strabo.

Philippi, in *Geography*, a town of European Turkey, in Romania; 25 miles S. of Emboli.

PHILIPPIANS, *Epiſtle to the*. See Epistle.

PHILIPPICS, Philippicæ, φιλιππικοι λογοι, in *Literature*, a name given to the orations of Demoſthenes againſt Philip, king of Macedon; the deſign of which was to rouſe the Athenians to guard againſt Philip, whoſe growing power and crafty policy had endangered and ſoon after overwhelmed the liberties of Greece.

The Philippics are eſteemed the maſter-pieces of that great orator: Longinus quotes abundance of inſtances of the ſublime from them; and points out a thouſand latent beauties therein. In effect, that pathetic in which Demoſthenes excelled, the frequent interrogations and apoſtrophes with which he attacked the indolence of the Athenians, where could they be better employed? How much delicacy ſoever there be in the oration againſt Leptines, the Philippics have yet the advantage over it, were it only on account of the ſubject, which gives Demoſthenes ſo fair a field to diſplay his chief talent, we mean with Longinus, that of moving and aſtoniſhing. See ſeveral appropriate extracts in Blair's Lectures, vol. ii.

Dionyſius Halicarnaſſeus ranks the oration on the Haloneſe among the Philippics, and places it the eighth in order; but though the authority of that great critic be of no ſmall weight, yet that force and majeſty by which Cicero characteriſes the Philippics of Demoſthenes, ſeem to exclude the oration on the Haloneſe out of the number; and authoriſe the almoſt univerſal opinion of the learned, who reject it as ſpurious.

Libanius, Photius, and others, but above all the languidneſs of the ſtyle, and the lowneſs of the expreſſions, which reign throughout the whole, father it on Hegeſippus.

Philippic is alſo applied to the fourteen orations of Cicero againſt Mark Antony. It was Cicero himſelf that gave them this title in his epiſtle to Brutus; and poſterity have found it ſo juſt, that it has been perpetuated to our times.

Juvenal, Sat. x. calls the ſecond the *divine Philippic*, and witneſſes it to be of great fame, *conſpicuæ divina Philippica famæ*. That orator's intitling his laſt and moſt valued orations after the Philippics of Demoſthenes, ſhews the high opinion he had of them.

Cicero's Philippics coſt him his life; Marc Antony having been ſo irritated with them, that when he arrived at the triumvirate, he procured Cicero's murder, cut off his head, and ſtuck it up in the very place whence the orator delivered the Philippics.

PHILIPPINA, in *Geography*, a town of Mexico, in the province of Guatimala. N. lat. 12° 50′. W. long. 91° 30′.

PHILIPPINE, a town of Flanders, ſituated on an arm of the Scheldt, and ſtrongly fortified; 15 miles E. of Sluys.

Philippine *Bay*, or *Bahia de Cortes*, a bay on the S. of Cuba. N. lat. 22 . W. long. 83° 30′.

Philippines, or *Philippine iſlands*, a large group of iſlands in the Eaſt Indian ſea, diſcovered by Magellan or Magalhaens in 1521, and called by him the Archipelago of St. Lazarus, on one of which he loſt his life, after having taken poſſeſſion of them in the name of the king of Spain. They were afterwards called the Philippines in honour of that infamous tyrant Philip of Spain. The popular name of Manillas is, in the opinion of Mr. Pinkerton, preferable, as native and ancient. Philip II. ſoon after his acceſſion to the throne, founded a ſcheme for planting a colony in theſe iſlands, which had been neglected ſince the time of their diſcovery; and he accompliſhed it 1564, by means of an armament fitted out for New Spain. Manilla, in the iſland of Luzon or Luzonia, was the ſtation choſen for the capital of this new eſtabliſhment. The chief iſlands of this group are Luzon, the capital of which is Manilla, Mindanao, Palawan, Mindoro, Pani, Buglas or iſle of Negroes, Zebu, Leyt or Leita, and Samar or Samal. On the coaſt of Zebu is the ſmall iſle of Mactan, where the celebrated navigator Magellan was ſlain. See an account of theſe iſlands under their reſpective names. The other little iſlands might be counted by hundreds. This great and extenſive group preſents, in general, many volcanic appearances, and moſt of the iſles abound with lava and volcanic glaſs, ſulphur, and hot ſprings; or, at leaſt, thus they are deſcribed by the French writers. They preſent wild boars, deer, and uſeful animals of various kinds; and among vegetables the bread-fruit muſt not be forgotten, which fruit appears on the eaſtern coaſts of Sumatra, and thence extends its benefits through innumerable iſlands in the Indian and Pacific ocean.

Philippines, *New*. See Pelew *Iſlands*.

Philippines, *Company of the*, a commercial eſtabliſhment in Spain, which ſucceeded the Caraccas company, and abſorbed their capital. This company took its riſe in the year 1785, with a capital of 1,200,000*l.* and with valuable privileges granted to it for 25 years. Previouſly to this eſtabliſhment, two ſhips ſailed annually, one from Acapulco, a ſeaport of Mexico, and croſſing the Pacific ocean, carried the treaſures of America to the Philippines; the other, returning by the ſame courſe from Manilla, the capital of Luconia, came to Acapulco, where it was met by veſſels from Lima, loaded with cacao, quickſilver, and hard dollars; in barter for which the merchants ſent back china ware, ſpices, perfumes, ſilk, calicoes, muſlins, and printed linens, the produce of the eaſt.

When the Philippine company began its operations, this traffic ceaſed; and now, under the ſpecious idea of ſaving time, with freight and inſurance, required in conveying the gold and ſilver, but chiefly ſilver, of Peru and Mexico, by Europe to the eaſt, theſe precious metals are ſent directly weſtward to the place of their final deſtination, whilſt the moſt bulky and periſhable produce of the eaſt, to the ſame amount in value, is diverted from its former courſe, and made to deſcribe, in the oppoſite direction, that ſegment of the circle, which had anciently been traced by the ſilver and the gold.

The Philippine iſlands, almoſt innumerable, and caſt up by volcanoes, are healthy, fertile, and, beſide all the grains of Europe, produce gold, copper, iron, ſhip-timber, hemp, alum, ſaltpetre, cattle, hides, ſago, rice, raiſins, cacao, ſugar, tobacco, wax, fiſh, and couries, which are the money of Hindooſtan. Theſe, with the ſilver, indigo, and cochineal of America, the company barters with the merchants of Aſia for muſlins, cottons, ſilks, ſpices, tea, quickſilver, and china ware, which, with the ſuperabundant produce of the iſlands, are now brought by the Cape of Good Hope to Europe, and are admitted under eaſy duties into Spain with a drawback of one-third on their exportation.

But the hopes which this beneficial trading eſtabliſhment excited ſoon vaniſhed, and like other monopolies, the advantages reſulting from it became of no long duration.

PHILIPPISTS, in *Eccleſiaſtical Hiſtory*, a ſect or party among the Lutherans; the followers of Philip Melancthon.

That reformer having ſtrenuouſly oppoſed the Ubiquiſts, who aroſe in his time; and the diſpute growing ſtill hotter after his death, the univerſity of Wittemberg, who eſpouſed Melancthon's opinion, were called, by the Flacians, who attacked it, Philippiſts.

PHILIPPOPEL, in *Geography*. See FILIPPOPOLI.

PHILIPPOPOLIS, in *Ancient Geography*, a town in the interior of Thrace, according to Ptolemy, who ſays that it recognized Philip, the ſon of Amyntas, for its founder or its reſtorer. It was ſituated on the Hebrus.—Alſo, a town of Arabia, mentioned in the acts of the council of Chalcedon.

PHILIPPOW, in *Geography*, a town of Lithuania; 40 miles W. of Grodno.

PHILIPS, AMBROSE, in *Biography*, an Engliſh poet, was born of a Leiceſterſhire family in 1671. He was educated at St. John's college, Cambridge, where he obtained a fellowſhip, and took deacon's orders. He attached himſelf to the Whig party, and obtained an introduction to Addiſon and Steele. He had already made himſelf known by his poetical compoſitions, and in 1703 he dates a copy of verſes from Utrecht; but his ſituation or object at that place is not known. In 1709 he was at Copenhagen, where he was probably in ſome public capacity. From this place he wrote his much admired lines to the earl of Dorſet. On his return, he found his friends out of power, and he employed himſelf in tranſlating Perſian tales for Tonſon the bookſeller. In 1712 he appeared as a dramatic writer, in his tragedy of "The diſtreſt Mother," which was acted with great applauſe at Drury-lane, and which is ſtill in reputation as a ſtock play. The literary diſtinction that he had now obtained was probably the cauſe of an exaggerated compliment from Tickell, which eventually expoſed him to ridicule and mortification. That writer, in a paper of the Guardian upon poetry, made the paſtoral pipe deſcend in ſucceſſion from Theocritus to Virgil, Spencer, and Philips. Pope, who found his own juvenile paſtorals undervalued, ſent to the ſame periodical paper a compariſon between his own and thoſe of Philips, in which he ironically gave the preference to the latter. Addiſon detected the purpoſe, and the paſtoral reputation of Philips was ruined. From this moment open hoſtilities were declared between the two poets, envenomed by the double power of party and rivalry. At the acceſſion of George I., Philips was made one of the magiſtrates for the city of Weſtminſter; and he applied to Addiſon, then ſecretary of ſtate, for another place, who told him, that he was conſidered as already provided for by his office as juſtice; to which he indignantly replied, that "though poetry was a trade he could not live by, he ſcorned to owe his ſubſiſtence to another that he ought not to live by." In 1718 he was editor of a periodical paper, called "The Freethinker," in which he had ſeveral reſpectable coadjutors. It was printed collectively in three volumes, but has long ſince been forgotten. After this he brought out two more tragedies, *viz.* "The Briton," and "Humphrey Duke of Gloceſter," which were well received. In 1724 he accompanied, in quality of ſecretary, his friend Dr. Boulter to Ireland, created archbiſhop of Armagh. Here he enjoyed other emoluments, which enabled him to repreſent in parliament the county of Armagh. On his return to England in 1748, he found himſelf the ſurvivor of moſt of his early friends and enemies. He died in the following year, at the age of 78. His poems were publiſhed collectively in one volume, 1748; and they now make a part of the body of Engliſh poetry. "The paſtorals have more natural deſcription than Pope's melodious imitations; but they are not excellent in this reſpect: and the air of ſimple ruſticity thrown over them, while it gives no reſemblance to real life, diſguſts by meanneſs and puerility. That the author, when he aimed at the elegance of cultivated verſe, could attain it, is proved by his two tranſlations from Sappho, and his letter from Copenhagen, which are undoubtedly his beſt performances: the latter is ſcarcely ſurpaſſed as a deſcriptive piece." Johnſon's Lives of the Poets.

PHILIPS, JOHN, an Engliſh poet, born in 1676 at Brampton, in Oxfordſhire, was the ſon of Dr. Stephen Philips, archdeacon of Salop. He received his claſſical education at Wincheſter ſchool, where he gained great reputation by his Greek and Latin exerciſes. In 1694 he removed to Chriſt-church college in Oxford, where he fully maintained the claſſical diſtinction he had acquired, and obtained the eſteem of ſeveral literary characters. In 1703 he became known to the public by his poem of "The ſplendid Shilling;" and the reputation which he acquired by this effuſion was the cauſe of his being ſelected by Harley and St. John, the heads of the Tory party, to celebrate the victory of Blenheim, in competition with Addiſon, the poet of the Whigs. His poem on this occaſion did not add to his fame. His didactic poem on Cyder, in 1706, is his principal piece, and to this his name is chiefly aſſociated. It at once became popular, and raiſed him to eminence among the poets of his time. He had meditated a poem on the "Laſt Day," which he did not live to finiſh. He died in February 1708, in the 32d year of his age, to the regret of his friends, to whom he was endeared by his blameleſs and benevolent character. A tablet was erected to his memory in the Hereford cathedral, where he was buried; and a monument was placed in Weſtminſter abbey by lord chancellor Harcourt, with a long and claſſical epitaph, compoſed by biſhop Atterbury. The "Splendid Shilling" and the "Cyder" of this poet are read with pleaſure. "In both, the Miltonic verſe and diction are imitated: the *firſt*, for comic effect, by contraſting the ſolemnity of the ſtyle with the levity of the ſubject; the *ſecond*, for the purpoſe of elevating a topic taken from common life. Dignity and variety are likewiſe attempted to be given to the didactic poem, by a cloſe imitation of the plan and manner of Virgil's Georgics, particularly in frequent digreſſions, from which the writer uſually returns with much ſkill to his proper ſubject. On the whole, the piece is rather to be admired for its art and learning than its poetry: it has little either of grandeur or beauty, and Milton is copied rather in his faults than his excellencies."

PHILIPSBURG, in *Geography*, a town of America, in New Jerſey, and county of Suſſex, on the E. bank of the Delaware, oppoſite to Eaſton in Pennſylvania; 41 miles N.W. of Trenton.

Philipsbubg, or *Philipſtown*, a townſhip of Dutcheſs county, New York, on the E. ſide of Hudſon river, 19 miles above New York, containing 2754 inhabitants. This townſhip has within it a ſilver mine, which yields virgin ſilver.

Philipsburg, a town and fortreſs of the duchy of Baden, in the biſhopric of Spire, near the Rhine; formerly called "Udenheim." Here Proteſtants and Catholics enjoy a free exerciſe of their religion; five miles S.S.E. of Spire.

PHILIPSTADT, a town of Sweden, in the province of Warmeland, ſurrounded by lakes and mountains. It was built by, and held its charter of privileges from Charles IX., who called it after the name of his ſon, Charles Philip. In 1775 it was conſumed by fire, and afterwards rebuilt; 30 miles N.E. of Carlſtadt. N. lat. 59° 40′. E. long. 13° 27′.

PHILIPSTOWN, a poſt-town of Ireland, and the ſhire-town of the King's county, in the province of Leinſter. It is a very ſmall place, and has loſt its former privilege of being repreſented in parliament, in conſequence of the Union. It obtained its name from king Philip, huſband of Mary, queen of England, who made this part of the county ſhire-ground in 1557. It is 38½ miles S.W. from Dublin.

PHILISTINES, in *Ancient Geography* and *Hiſtory*, the name of a people of Paleſtine, who were deſcendants partly of the Caſluhim and partly of the Caphtorim, who ſprang from Mizraim, the ſon of Ham, who was the ſon of Noah. Their anceſtors came originally from Egypt, and ſettled in Paleſtine, to which they gave their name. Their moſt ancient form of government was monarchical, and their firſt kings were denominated Abimelech; for ſuch were the kings who were concerned in the tranſactions with Abraham and Iſaac, which are recorded in the book of Geneſis. But theſe firſt kings were under great limitations. The kings of the ſecond race were diſtinguiſhed by the appellation of Achiſh, though they alſo bore the name of Abimelech. During their beſt times, they reſided at Gath: from this place the royal ſeat was removed to Aſcalon; and from that city to Gaza. The Philiſtines appear to have had ſtrong notions of liberty. They did not practiſe circumciſion; and in their earlieſt times, they held adultery in the greateſt abomination. They were a very warlike people; and they alſo diſtinguiſhed themſelves by their induſtry; but their character was very different at different periods. In the days of Abraham and Iſaac, they were a righteous and hoſpitable nation; but a revolution afterwards took place in their government, religion and morals, ſo that they reſembled other idolatrous nations, and practiſed ſimilar enormities. They became in proceſs of time exceedingly ambitious and arrogant, and their enmity to the Iſraelites was inveterate and irreconcileable. For their deities they entertained the moſt profound veneration, and they repoſed in them an unbounded confidence. They were much addicted to trade. Their language differed little from that ſpoken by the Hebrews, ſo that theſe different people were able to converſe together without much difficulty; and, without doubt, they had the arts and ſciences in common with their ingenious and learned contemporaries, and perhaps ſome of them in greater perfection; for the invention of the bow and arrow is aſcribed to theſe people. Their religion varied at different periods. Under their firſt race of kings, they uſed the ſame rites with the Hebrews. In ſucceeding times they became ſuperſtitious and idolatrous; and each of the principal or five cities had an idol of its own. Marna, or Marnac, was worſhipped at Gaza; Dagon was the object of worſhip at Azotus; Bualzebub, or Beelzebub, was the god of Ekron; Derceto was the goddeſs of Aſcalon; and Aſhtaroth, or Aſtarte, was worſhipped at Gath. For the celebration of their religious rites and feſtivals they erected large and ſpacious temples; and they preſented their gods with the chief part of their ſpoil, carrying them about with them when they went to war.

This extraordinary nation came directly out of Egypt, and finding the Avims or Avites (Deut. ii. 23.) ſeated in a pleaſant and fruitful land, and themſelves ſtrong enough to expel them, they made the attempt and ſucceeded. Beſides the intercourſe of their kings with Abraham and Iſaac, to which we have already referred, we find no particular mention of them for a long ſeries of years. Their ancient form of government was diſſolved, the Iſraelites were the objects of their averſion, and they are repreſented under diſtinct juriſdictions, and at ſtrife with the children of Iſrael. With Joſhua they do not ſeem to have had any war, but after his death, they were deprived by the tribes of Simeon and Judah of three of their cities, *viz.* Gaza, Aſcalon, and Ekron; of which, however, they afterwards obtained poſſeſſion, either by grant or by conqueſt. About 120 years after the reduction of theſe three cities (B.C. 1305), the Philiſtines held the Iſraelites in ſubjection, till they were delivered by Shamgar, and they alſo ſuffered in common with the Iſraelites by the incurſions of Zebah and Zalmunna, kings of Midian. In the days of Jephthah, they united with the Ammonites in oppreſſing the Iſraelites. They again reduced the Iſraelites, and kept them in ſubjection for forty years (B.C. 1137), and in the following year they took Samſon priſoner, who reſcued himſelf and killed 1000 of his adverſaries. But their hiſtory is recorded in ſcripture, and it is needleſs for us to purſue it in a minute detail of the various events which it comprehends. Until the reign of David they maintained their independence; but he reduced them to a ſtate of ſubjection, and made them tributaries to his throne. It may be alſo concluded, that having ſo often, and to ſo little purpoſe, engaged in bloody and deſtructive wars, they grew wiſer, and rather applied themſelves to commerce, and the arts of peace. Notwithſtanding their vigorous oppoſition to ſucceſſive kings of Iſrael, they afterwards courted the favour of Jehoſhaphat, king of Judah, by a voluntary payment of the tribute, which had been impoſed upon them by their conqueror David; and which, it ſeems, they had neglected to pay to ſome of Jehoſhaphat's predeceſſors. In the year 888 B.C. they rebelled againſt Jehoram, the ſon of Jehoſhaphat, invaded his kingdom, and rifled his palace, and carried their rage againſt him to ſuch a height, as to exterminate all his family, except Athaliah, and her ſon Ahaziah, who had the good fortune to eſcape their fury. At this time they carried off a great number of captives, whom they ſold to the Edomites, the worſt enemies of the Iſraelites, next to themſelves, and ſome to the Grecians, thus removing them to ſuch a diſtance, that they could have little or no chance of viſiting their native country again. This ſucceſs is ſuppoſed to have been owing, in a great meaſure, to the aſſiſtance afforded them by the Arabians, who, at the ſame time, made war upon the Iſraelites, either ſeparately, or in conjunction with the Philiſtines. Their ſucceſs, however, proved unfortunate to them in the iſſue; for (807 B.C.) they were invaded by Uzziah, king of Judah, who diſmantled Gath, Jabnah, and Aſhdod, and built ſtrong cities among them, in order to awe, and keep them in ſubjection. In the reign of Ahaz, perceiving the weak ſtate of the kingdom of Judah, they again took up arms, and warred againſt Ahaz ſo ſucceſsfully, as to repair the loſſes they had ſuſtained in the time of Uzziah, his grandfather; for they reduced the cities of Bethſhemeſh, Ajalon, Gedaroth, Schochoh, Timnah, and Gimzo, with the territories belonging to them, and ſettled there; thus adding a large portion of the kingdom of Judah to their own country. This happened about the year 740 B.C. (2 Chron. xxviii. 18.) But they did not long retain this acquiſition: for (713 B.C.) Hezekiah, the ſon of Ahaz, whom they had conquered, overran their whole country (2 Kings, xviii. 8.); and, at the ſame time, they were attacked by the Aſſyrians, in the reign of Sennacherib, who ſent his general Tartan to reduce them. Their city Aſhdod was beſieged and taken by him (Iſaiah, xxi. 1.); and thus they were reduced to the loweſt ebb of misfortune. By their ſubjection to the Aſſyrians, they not only loſt their liberty, but their country became the ſeat of a long and obſtinate war. For Pſammetichus, king of Egypt, being jealous of the growing power of the Aſſyrians, and apprehenſive that Egypt might ſhare the fate of its neighbour, undertook to drive them out of Paleſtine. With this view, he laid ſiege to Aſhdod or Azotus (674 B.C.), which laſted 29 years before he could reduce it. From this time they were tributary to the great monarchies, as they ſucceeded each other. In the beginning of this ſlavery, they were miſerably haraſſed by the Egyptians, who, deſirous of making their barrier as ſtrong as poſſible, ſeized on a great part of their country, and particularly on the city of Gaza. What became of them at laſt may be beſt learned from the threats of the prophets, and particularly Zephaniah, who paints their deſtruction in very lively colours: "Gaza ſhall be forſaken, and Aſkelon a deſolation; they ſhall drive out Aſhdod at the noon day, and Ekron ſhall be rooted up. Wo unto the inhabitants of the ſea-coaſts, the nation of the Cherethites! The word of the Lord is againſt you: O Canaan, the land of the Philiſtines, I will deſtroy thee, that there ſhall be no inhabitant; and the ſea-coaſts ſhall be dwellings and cottages for ſhepherds, and folds for flocks." Zeph. ii. 4–6. Joel, iii. Amos, i. Jerem. xlvii. Ezek. xxv. Zech. ix. 5. Anc. Un. Hiſt. vol. 1.

PHILISTUS, in *Biography*, an eminent hiſtorian of antiquity, was, according to ſome writers, a native of Naucratis, according to others of Syracuſe. He was born about the year 431 B.C., and was ſent to Athens for his education, where he ſtudied under Iſocrates and the poet Evenus. Fixing his abode at Syracuſe, he promoted the ſchemes of Dionyſius the elder, to overthrow the liberties of his country, and was placed by him in the important poſt of governor of the citadel. That prince connived at the criminal intercourſe which Philiſtus maintained with his mother; but upon the diſcovery of a ſecret marriage, which he had contracted with the daughter of Dionyſius's brother, the tyrant baniſhed him. Philiſtus retired to Adria, where he employed his leiſure in compoſing a hiſtory of Sicily and of the reign of Dionyſius. He remained in baniſhment till after the acceſſion of Dionyſius the younger, when he was recalled upon the perſuaſion of thoſe courtiers who were jealous of the influence acquired by the virtuous Dion, and his friend the philoſopher Plato, who had been invited to the court of Syracuſe. Philiſtus by his arts ſoon procured the baniſhment of Dion, and brought himſelf into high eſteem by his tyrannical maxims. When Dion returned with an armed force to reſcue his country from tyranny, Philiſtus was made admiral of the fleet to oppoſe him. An engagement enſued, in which the royal fleet was defeated, and Philiſtus was taken priſoner and put to death, in the year 357 B.C. He was a man of learning and abilities, but his memory has been ſtigmatized for the bad uſe he made of his talents. He was author of ſeveral works, but is chiefly famous for his "Antiquities of Sicily," and his "Hiſtory of Dionyſius the Elder;" and that of part of the reign of Dionyſius the younger, in two books. In his ſtyle he was the imitator of Thucydides; his hiſtories were long preſerved in libraries, but no part of them has reached modern times.

PHILITIA. See PHIDITIA.

PHILIZERS, or PHILAZERS. See FILAZER.

PHILLIS, in *Ancient Geography*, a country of Thrace, in the vicinity of mount Pagæus.

PHILLYRA, a river of the Peloponneſus, in Arcadia.

PHILLYREA, in *Botany*, φιλλυρεα of Dioſcorides, ſuppoſed to be ſo called from *Phillyra*, the mother of Chiron. The modern Greeks know this ſhrub under the name of φύλλικα, or φυλλίκι.—Linn. Gen. 10. Schreb. 13. Willd. Sp. Pl. v. 1. 42. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 1. 19. Sm. Fl. Græc. Sibth. v. 1. 2. Prodr. v. 1. 3. Juſſ. 106. Tourn. t. 367. Lamarck Illuſtr. t. 8. Gærtn. t. 92.—Claſs and order, *Diandria Monogynia*. Nat. Ord. *Sepiariæ*, Linn, *Jaſmineæ*, Juſſ. *Oleinæ*, Brown.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, minute, permanent; its mouth four-toothed, erect. *Cor.* of one petal, funnel-ſhaped; tube ſcarcely any; limb in four deep, ovate, acute, recurved ſegments. *Stam.* Filaments two, oppoſite, awl-ſhaped, ſhort, divaricated; anthers terminal, elliptical, ſimple. *Piſt.* Germen ſuperior, roundiſh; ſtyle ſimple, the length of the ſtamens; ſtigma thickiſh, cloven. *Peric.* Berry globoſe, of one cell. *Seed* ſolitary, globoſe, large, with a thin brittle ſkin.

Eſſ. Ch. Corolla in four nearly ovate ſegments. Berry ſuperior, globoſe, ſingle-ſeeded.

Obſ. The thin coat of the ſeed, ſo different from the hard nut of a true *Olea*, appears ſufficient to keep this genus diſtinct from that. Mr. Saliſbury and Mr. Brown have, nevertheleſs, united them. See OLEA; where the word Calyx in the eſſential character is by miſtake put for Corolla.

1. Ph. *media.* Olive-leaved Phillyrea. Linn. Sp. Pl. 10. Willd. n. 1. Ait. n. 1. (Phillyrea; Matth. Valgr. v. 1. 155. Ph. tertia; Cluſ. Hiſt. v. 1. 52. Ph. latiore folio; Ger. Em. 1395.)—Leaves elliptic-lanceolate, entire; rarely ſomewhat ſerrated.—Native of the ſouth of Europe; very common on rocks, banks, and ruins in Italy, as on the Coliſeum, and other ruins, at Rome, flowering from March to May. In our gardens it is a hardy evergreen, flowering in May and June, and was cultivated by the earl of Eſſex in 1597, according to the firſt edition of Gerarde. A buſhy ſmooth *ſhrub*, with many ſtraight, roundiſh, pale brown, leafy, wand-like *branches*. *Leaves* oppoſite, on ſhort ſtalks; of a dull, ſcarcely ſhining green above; paler, opaque, and dotted, beneath; with a mid-rib and fine lateral veins: their uſual length is about an inch and a half, their form elliptical, with a ſmall point; the margin ſlightly revolute, for the moſt part quite entire, but ſome *leaves* are minutely and diſtantly toothed towards the point. There are, beſides, ſeveral varieties in the ſhape of the *leaves*, which are occaſionally more oblong or lanceolate, as well as in the length and direction of the *branches*. *Stipulas* none. *Flowers* ſmall, yellowiſh-white, in little denſe, ſhort, bracteated, axillary *cluſters*. *Fruit* globular, dark purple, the ſize of a ſmall pea, bitter and nauſeous.

2. Ph. *anguſtifolia.* Narrow-leaved Phillyrea. Linn. Sp. Pl. 10. Willd. n. 2. Ait. n. 2. Ger. Em. 1395.

(Ph. quarta et quinta; Cluſ. Hiſt. v. 1. 52.)—Leaves linear-lanceolate, entire; or nearly ſo.—Native of Italy, Spain, and Portugal. It is ſold in the markets at Liſbon to make brooms, and called *Lentiſco*, according to a note of Lœffling's, in the Linnæan herbarium. This differs from the former merely in its narrower and ſomewhat longer *leaves*, which are dotted, and occaſionally toothed, preciſely as in that ſpecies, nor can we conſider it as more than a variety, though kept diſtinct, and even ſubdivided into ſeveral varieties of its own, in the Hortus Kewenſis.

3. Ph. *latifolia.* Broad-leaved Phillyrea. Linn. Sp. Pl. 10. Willd. n. 3. Ait. n. 3. Sm. Fl. Græc. Sibth. v. 1. 2. t. 3. (Ph. ſecunda; Cluſ. Hiſt. v. 1. 52. Ger. Em. 1396.)——β; Ph. prima; Cluſ. Hiſt. v. 1. 51. Ger. Em. 1600.—Leaves ovate, ſomewhat heart-ſhaped, ſerrated; rarely entire; ſometimes ſharply toothed.—Very abundant in the ſouth of Europe, on open hills, and as frequent as moſt evergreens in our ſhrubberies. Dr. Sibthorp conſiders this as the identical φιλλυρεα of Dioſcorides, being very common in Greece and its iſlands. The *leaves* are of a dark ſhining green, dotted beneath, of a broad ovate figure, about an inch long, pretty uniformly ſerrated; in the variety β they are very ſharply and ſtrongly toothed, and ſometimes rather elongated. The Ph. arbor Galloprovinciæ; Lob. Ic. v. 2. 132, appears to be an entire-leaved variety of this. Linnæus referred it to *media*, but it agrees with the common *latifolia* in the darker hue of the *leaves*, as well as their ſhort broad figure. We have no doubt of *latifolia* and all its varieties being diſtinct from the other two; the only queſtion is whether they are diſtinct from each other.

Phillyrea, in *Gardening*, contains plants of the hardy, evergreen, ſhrubby kind, of which the ſpecies cultivated are; the lance-leaved phillyrea (P. media); the narrow-leaved phillyrea (P. anguſtifolia); and the broad-leaved phillyrea (P. latifolia).

Of the firſt ſort there are ſeveral varieties, namely, the privet-leaved and olive-leaved; which are of humbler growth, ſeldom more than eight or ten feet high; the branches of the firſt are weaker, ſpread wider, and are covered with a light brown bark: the leaves are ſtiff, almoſt two inches long, and half an inch broad in the middle, drawing to a point at both ends, and ſit cloſe to the branches; the flowers are in little axillary cluſters, ſmall and whiter. In the latter the branches are ſtronger, and ſpread out wider; the bark is of a lighter colour; the leaves are ſtiff, ſmooth, and entire, on very ſhort footſtalks, of a lucid green, and terminating in a point; the flowers in cluſters, on pretty long peduncles, from the axils of the young branches, ſmall and white. And in the Kew catalogue there are three other varieties mentioned: namely, the long-branched, which has long upright branches; the drooping, which has the branches hanging down and ſtraddling; and the box-leaved.

In the ſecond ſort there is a variety termed roſemary-leaved, which is of humbler growth, ſeldom riſing more than four or five feet high, ſending out ſlender, oppoſite, ſtraight branches, ſparſedly diſpoſed; the leaves dark-green, ſtiff, and entire; about an inch long, and not more than an eighth of an inch broad; ſeſſile; the flowers are ſmall, white, in cluſters from the ſide of the branches; the berries very ſmall, rarely ripening in this climate. And in the Kew catalogue another variety is mentioned, under the name of dwarf phillyrea.

The third ſort has alſo a variety, the prickly broad-leaved, which is as high as the ſmooth one, ſends out ſeveral ſtrong branches, which grow erect, and are covered with a grey bark; the leaves are an inch and half long, and an inch broad, firm, of a lucid green, and ſerrate, each ſerrature ending in a ſpine. And the Kew catalogue has another, under the name of the ilex-leaved.

Method of Culture.—Theſe plants are capable of being increaſed either from ſeeds or layers, but the latter being the moſt expeditious method is chiefly preferred in this climate.

And the beſt ſeaſon for laying them down is in autumn, when the ground ſhould be dug round the ſtems of the plants intended to be laid, rendering it very looſe; then making choice of a ſmooth part of the ſhoot, a ſlit ſhould be made in it upwards, in the manner practiſed in laying carnations, bending the branch gently down to the ground, making a hollow place to receive it; and having placed the part which was ſlit into the ground, ſo as that the ſlit may be open, it ſhould be faſtened down with a forked ſtick that it may remain ſteady, covering that part of the branch with earth about three inches thick, keeping the upper part erect. The layers muſt be kept clean from weeds in the ſpring and ſummer following, as, if ſuffered to grow up amongſt them, they will prevent their taking root. In the autumn following, moſt of the plants thus laid will be rooted, at which time they may be taken off, and carefully planted in a nurſery, where they may be trained three or four years in the manner they are intended to grow; during which time the ground ſhould be dug between the rows, and be cut about the roots of the plants every year, to cauſe them to ſtrike out ſtrong fibres, ſo as to ſupport a good ball of earth when they are removed. Their ſtems ſhould likewiſe be well ſupported with ſtakes, in order to make them ſtraight, otherwiſe they are very apt to grow crooked and unſightly. When they have been thus managed three or four years, they may be removed into the places where they are deſigned to remain. The beſt time for this is the end of September, or beginning of October; but in the removing them their roots ſhould be dug round; and all downright or ſtrong roots, which have ſhot out to a great diſtance, be cut off, that they may have balls of earth preſerved to their roots, otherwiſe they are liable to miſcarry: and when placed in their new ſituations, ſome mulch ſhould be laid upon the ſurface of the ground to prevent its drying.

The plants ſhould likewiſe be ſupported with ſtakes until they have taken faſt hold of the earth, to prevent their being turned out of the ground, or diſplaced by the winds, which deſtroy the fibres that are newly put out; and greatly injure the plants.

They delight in a middling ſoil, which is neither too wet and ſtiff nor too dry, though the latter is to be preferred to the former, provided it be freſh. The ſorts with ſmall leaves are commonly two years before they take root when laid: therefore they ſhould not be diſturbed, as the raiſing them out of the ground greatly retards their rooting.

In the ſeed method, the ſeeds ſhould be ſown in the autumn ſoon after they are ripe, as when they are kept out of the ground till ſpring they do not grow the firſt year. They ſucceed beſt when ſown in pots or boxes filled with light loamy earth, and placed under a garden frame where they may be ſcreened from hard froſts, but always expoſed to the open air in mild weather. If the ſeeds are ſown early in the autumn, the plants appear in the ſpring; but if they ſhould not come up, the pots ſhould be plunged into the ground in an eaſt border, where they may only have the morning ſun, in which ſituation they ſhould remain the following ſummer: during which time they may be conſtantly kept clean from weeds, and in the autumn removed again under a frame for ſhelter in winter, and the ſpring following the plants will certainly come up, if the ſeeds were good. Towards the middle of April, the pots ſhould be again plunged into the ground on an eaſt border, to prevent the air from drying the earth through the pots, which is generally the caſe when the pots ſtand upon the ground; ſo that they muſt then be frequently watered, which ſhould not be practiſed to theſe plants where it can be avoided. In the autumn following the plants ſhould be carefully taken out of the pots and planted out in a nurſery-bed, covering the ſurface with old tan to keep out the froſt; and if the winter prove ſevere, they ſhould be covered with mats: afterwards they may be treated as thoſe from layers.

Theſe ſhrubs are ſo hardy as to thrive in the open air in this climate, and are never injured except the winters are very ſevere, which ſometimes cauſe their leaves to fall, and kill a few of the weaker branches, but theſe are repaired by new ſhoots the following ſummer; ſo that there are few evergreen trees which are hardier, or that more deſerve to be cultivated for the purpoſes of ornament.

The firſt and third ſorts and varieties are very proper to intermix with other evergreens of the ſame growth, to form clumps in pleaſure grounds and parks, or to plant round the borders of woods which are filled with deciduous trees, where in the ſummer time their dark ſhades make a fine contraſt with the brighter green leaves of the deciduous trees; and in the winter, when the latter are deſtitute of leaves, they have a fine effect. Theſe may be trained up to ſtems, ſo as to be out of the reach of cattle, and be planted in open places, where, if they are fenced againſt cattle till they are grown up, they may be afterwards expoſed. The others, which are of humble growth, ſhould be confined to gardens or other incloſures, where they may be ſecured from cattle, &c. They ſhould only have the irregular branches pruned in, occaſionally as they want it.

PHILO, a term originally Greek, formed of φιλος, *amicus*, *friend*, or *lover*; now uſed in compoſition in ſeveral words in our language.

Philo, in *Biography*, ſurnamed *Biblius*, from Biblos, the place of his nativity, was a grammarian who flouriſhed from the reign of Nero to that of Adrian. He wrote various books in the Greek language, ſuch as "De Parandis et Deligendis Libris;" "De Urbibus;" De claris Viris;" and "De Imperio Adriani:" but he is chiefly known as the tranſlator of Sanchoniatho's Phœnician hiſtory into Greek, of which a few fragments only remain, that have exerciſed the critical talents of ſeveral learned men. Moreri.

Philo *of Byzantium*, an architect, who flouriſhed about 300 years before the Chriſtian era, wrote a treatiſe of machines uſed in war, which is printed with "Mathematici veteres," in 1693. There is alſo a piece attributed to him, entitled "De ſeptem Orbis Spectaculis," printed at Rome in 1640.

Philo, a learned Jewiſh writer, who flouriſhed in the firſt century, and under the reign of Caligula, was of the ſacerdotal race, and brother to the chief magiſtrate of his nation at Alexandria, where he was born. He received his education at his native place, and diſtinguiſhed himſelf by his early proficiency in eloquence, philoſophy, and ſcriptural knowledge. He is ſpoken of by Euſebius as a man copious in ſpeech, rich in ſentiments, and eminent and ſublime in his acquaintance with the holy ſcriptures. He was particularly verſed in the Platonic philoſophy. It has been ſuggeſted that by attending to the nature of Jewiſh learning, and comparing it with the ſpirit of the Alexandrian, it will be perceived in what manner Philo ſtudied philoſophy. From the time of the Ptolemies, the uſe of allegories had been borrowed by the Jews from their Egyptian neighbours, and by the help of theſe, Platonic and Pythagorean learning was introduced among them, as the concealed and ſymbolical ſenſe of their own law. In this manner they were enabled to make what uſe they pleaſed of their ſyſtems, without appearing to be indebted to heathen philoſophers. Theſe ſyſtems likewiſe were adulterated with many dogmas from the oriental philoſophy, particularly on the ſubject of the divine nature. This philoſophy, which had been well received in Alexandria, Philo embraced, and he appears to have boldly interwoven the Platonic learning and opinions with the doctrines of the ſacred oracles, and aſcribed them to Moſes. It is alſo probable that he was, in part, influenced by the example of the Eſſenes and Therapeutæ, whoſe method of philoſophizing he imitated, though he did not adopt their manner of living: for he always ſpeaks of them in the higheſt terms of commendation. Philo was not ſo completely immerſed in philoſophical ſtudies as to neglect the cultivation of eloquence, and to withdraw his attention from civil affairs. On the contrary, he ſeems to have acquired a high reputation as an orator, and as a man of wiſdom and prudence in the conduct of important negociations: hence we find him placed at the head of a deputation ſent by his countrymen to Rome in the year 42, with the deſign of vindicating them from the calumnies with which they were loaded by the Alexandrians, and of defending their cauſe againſt Appian. It was on this occaſion he ſpeaks of himſelf as old and grey headed, and, therefore, his biographers have imagined he might be at that period about 60 years of age, or that he was born nearly twenty years before the commencement of the Chriſtian era. Though his miſſion proved fruitleſs, he committed the ſubſtance of his apology for the Jews to writing, and in it gave a favourable ſpecimen of his learning, talents, and integrity. By Euſebius, Jerome, and others, it is ſaid he came a ſecond time to Rome in the reign of Claudius, when he formed an acquaintance with St. Peter, and cultivated his friendſhip: and Photius affirms that he became a convert to the Chriſtian faith, and was baptized; but that afterwards, having met with ſome cauſe of offence, from motives of reſentment he renounced his creed. A very ingenious writer, the Rev. J. Jones, has, however, attempted to prove that Philo was the hiſtorian and apologiſt of Chriſt; of his followers, and of the goſpel. In a work entitled "Eccleſiaſtical Reſearches," publiſhed in 1812, he has entered very much at large into the enquiry, and in a ſubſequent volume, or "Sequel to the Eccleſiaſtical Reſearches," he has given "A ſummary or conciſe view of the arguments proving Philo and Joſephus to be Chriſtian writers." To theſe works we refer the reader, it being inconſiſtent with the limits of our article to enter into the argument. In Dr. Enfield's abridgment of Brucker's Hiſtory of Philoſophy, we have an account of the opinions held by Philo, and of his manner of blending the doctrines of Plato and Moſes: and in Fabricius and Cave the ſubjects of his various treatiſes, which have reached modern times, have been particularized. The firſt collection of them was publiſhed by Turnebus, in the oriental Greek, at Paris, in 1552, of which, in 1561, there was given a Latin verſion. They were afterwards publiſhed in Greek and Latin at Geneva in 1613, and at Paris in 1640: but the lateſt and moſt complete edition is that of London, in 1742, by Dr. Mangey, in two vols. folio.

PHILOCALIA, in *Ancient Geography*, a fortified place of Cappadocia, on the coaſt of the Euxine ſea, with a river of the ſame name. Pliny.

PHILOCANDROS, one of the iſlands of the Ægean ſea, called the Sporades, according to Pliny and Steph. Byz. Ptolemy places it among the Cyclades.

PHILOCRENE, a ſmall town of Aſia, in Bithynia.

PHILODEMI de Musica, is the title of a work in Greek, recovered from the cinders of Herculaneum. The ſubject is muſic. At firſt it was reported to be a treatiſe on the art; then a panegyric; and laſtly a ſatire, which it turns out to be, of the moſt bitter kind.

The labour of unfolding the Papyrian rolls was begun more than 50 years ago. The ſubterraneous city of Herculaneum was diſcovered in 1742; and we find, from a letter of La Condamine, and another from Camillo Paderni, printed in the Philoſophical Tranſactions of our Royal Society, vol. xlix., that the work of unfolding this MS. was begun in 1749.

It was ſome time before the name of the author was diſcovered, and ſtill longer before it could be aſcertained of what country or ſect he was, or at what period he exiſted.

The name of Philodemus was, however, well known in Greece. Among others who bore that title, was a very ancient follower of Pythagoras, who was a native of Locris, in Magna Græcia; and two others more recent, one born in Greece, and the other in Aſia Minor.

Theſe muſt not be confounded with the author of a work on the ſubject of muſic, which was reſcued from the lava of Veſuvius, by being preſerved in the ruins of Herculaneum. Philodemus, the author of this work, was a philoſopher of the ſect of Epicurus, and a poet of conſiderable eminence. He is praiſed by Cicero; and Horace refers to one of his epigrams; nor has he been overlooked by Diogenes Laertius, or Strabo, who informs us, that he was a native of Gadera in Syria. He reſided at Rome, and was the acquaintance of Tully, and the tutor of Lucius Piſo, the conſul.

Cicero deſcribes him as a perſon of liberal manners, and a cultivated mind. His morals, however, were looſe; as appears by ſeveral of his poetical effuſions, which ſtill remain. Of his works, indeed, previous to the diſcovery of the literary treaſures in Herculaneum, only thirty-one of his epigrams were known to exiſt. The editors of theſe treatiſes have added two more to the number, and with a learned reſearch concerning Philodemus himſelf, have preſented his work to the literary world; and it is, undoubtedly, the moſt curious publication, on the whole, which has appeared ſince the revival of letters.

The work has been publiſhed more than ten years; but about the time of its iſſuing from the preſs, the arrival of the French at Naples prevented its circulation. And though printed in 1793, no copies had reached England till 1801; when the late reverend and learned Mr. Cratcherode procured poſſeſſion of two copies, one of which he ſent immediately to Oxford, and dying himſelf ſoon after, the other had been ſeen but by a few. In 1802 we obtained a copy; and as the work had never, to our knowledge, been reviewed, or otherwiſe noticed in our country; and being written on a ſubject which the new Cyclopædia embraces in all its branches, a production ſo curious ſeemed to demand particular notice among muſical articles; for which purpoſe it has been reſerved for ſeveral years in poſſeſſion of the editor to be introduced in its proper place.

The work, publiſhed in folio, in a moſt accurate and ſplendid manner, is dedicated to the king of Naples by the Herculaneum academicians.

Great praiſe is due to the editors for the ſagacity and erudition manifeſted in filling up the chaſms in the Latin tranſlation, and ſupplying the defective parts of the original, which have been injured by the fire or by unrolling.

Whoever is well read in the Greek writers on muſic that are come down to us, and in the different doctrines of the muſical ſects of antiquity, muſt perceive that the editors were well qualified for the arduous undertaking.

And though we are now no nearer knowing what the Greek muſic really was than heretofore, the curioſity of the learned muſt be conſiderably gratified by a fac-ſimile exhibition of the manners in which the ancient Greek volumes were written.

This work of Philodemus was publiſhed in confutation of another work on muſic, the author of which was dead before Philodemus was born. The author of it appears to have been Diogenes, not the Cynic, but the Stoic philoſopher of Babylon, ſo ſtyled becauſe he was born at Seleucia, a town near Babylon. He was a diſciple of Chryſippus. The Athenians ſent him on an embaſſy to Rome with Carneades and Critolaus, 155 years before Chriſt. Diogenes died at 88, after having recommended wiſdom during his whole life, as much by his conduct as diſcourſes. One day, while he was delivering a lecture againſt choler, exclaiming with great force againſt that paſſion, a young man ſpit in his face to try his patience. "I am not angry (ſays Diogenes) but I am in doubt whether I ought not to chaſtiſe ſuch brutal inſolence."

The work on muſic which Philodemus has attacked ſo furiouſly, was probably his περι φωνης, mentioned by Laertius.

Perhaps Diogenes, as is uſual with panegyriſts, aſked too much admiration of his favourite art, and Philodemus, like a true determined adverſary, grants too little.

There were perpetual diſputes about muſic in Greece, not only among profeſſors, but philoſophers. The editors of this ancient tract have defended muſic well againſt this pagan Αμουσος, who not only denies its miraculous powers, but its utility on any occaſion. However, Pythagoras, Plato, Ariſtotle, and Plutarch, among the ancients, and many wiſe and virtuous men among the moderns, ſuch as Bacon, Milton, Dr. Wallis, Arbuthnot, Monteſquieu, &c. have thought differently from the muſical atheiſt, Philodemus, and allowed that, of all the arts, "muſic is the only one that cannot corrupt the mind." For the reſt, we are much of the ſame opinion with Philodemus, as to a love for muſic being the attribute of a good heart; particularly when we reflect on the paſſions which Ptolemy Auletes, Nero, and our Henry VIII. had for the art; we are then very ready to relinquiſh the opinion of Shakſpeare and other poets on the ſubject.

The round aſſertions by Philodemus againſt muſic, are the following.

Chap. I.

1. It does not produce ſuch effects in the mind, as can give riſe to nobler manners, or excite diligence.

2. In this all hearers are alike; their ſenſe of hearing is the ſame; but the difference in the effects of muſic ariſe from ſome previous operations, ſome preconceived opinions. The diſtinctions of the enharmonic and chromatic genera are owing to theſe opinions, and the operations to which they give riſe; thoſe who underſtand nature and her works, will derive ſatisfaction from the pleaſurable parts of muſic of every kind. Muſic is undoubtedly multiform; but ſtill it cannot infuſe the forms of manners, which approach to virtue.

3. Muſic demands a previous degree of knowledge. A mere ſimple modulation cannot rouſe the inactive mind, nor can it induce any diſpoſition to morals, which was not implanted by nature; neither can it calm the agitated mind, or guide it from one propenſity to another. Nor is muſic an imitative art, more than cookery. To the perception of the ear, enharmonic and chromatic are the ſame, and their mixtures are the ſame, their differences being only known to profeſſors.

CHAP. II.

Whether muſic, per ſe, is proper for divine worſhip?

4. The gods do not demand the honour which we beſtow: nature impels our mind to beſtow it on them: hence the different ceremonies in different countries aroſe. Muſic, however, was never ordered by them: it is not muſic which is ſerviceable in worſhip, but rather public prayers: it is not known by tradition, that muſic was much employed by the ancients, and never, but by particular Greeks on particular occaſions. In modern times it has become a trade, and is admitted as an eſſential part of religious ceremonies, and at the games, which was not the caſe in old times.

5. Even if we allow that the gods inſtituted ſpectacles and ſhows in honour of themſelves; yet it does not follow that they ordained the addition of muſic.

CHAP. III.

Whether muſic contributes to render more effective encomiaſtic and hymeneal poems, epithalamia, and threnodes.

6. Muſic gives no additional power to encomiaſtic poems: and at marriages is introduced merely as cooks add ſauce, without increaſing the real and genuine *good* of nuptials. The effect on theſe occaſions is produced by the poems, not by the muſic; the paſſion of love is not aſſiſted by the union of the two; nor can they really procure any alleviation to affliction when epicedia are performed.

CHAP. IV.

On muſic at the games.

The muſic of the games is not univerſally commended; nor does it produce any univerſal benefit. The opinion of low and ignorant people I do not regard.

7. In the games the ſkill and art may pleaſe; but we ſhould not miſs it if the dance were removed from the drama; as it tends not to honeſty nor honour; and as to the female dancers, no greater incitement to intemperance and licentiouſneſs can be imagined.

CHAP. V.

Whether muſic has in its nature any power of moving?

8. Whether the influence which the ſolemn muſic has at the Dionyſiaca be, like the games, of divine original? The ſubject needs not diſcuſſion.

9. It is ſaid, that as fire has in it a burning quality, ſo muſic has in it ſomething that excites to action. Hence, obſerves the abſurd definer, the rowers in veſſels, and the reapers and the vine-dreſſers, worked to the ſound of muſic. While the ſong is ſinging, however, the workmen reſt. Should, then, according to the fable of Orpheus, ſhould a muſician ſtand by, and play, when a houſe is building?

10. He (that is Diogenes, the author of the treatiſe which Philodemus anſwers) aſſerts alſo, that not merely the mind, but even the body, is influenced by muſic; and that artificers are rendered more ſkilful by it; and that muſic had greater power over the mind than argumentative ſentiments.—In modern times muſic is much neglected: poetry is ſtill cheriſhed and brought forward.

11. Muſic was never reckoned univerſally neceſſary as a ſtudy or purſuit; nor was Themiſtocles acquainted with it.

12. Muſic after entertainments, when the voice and the mind are diſordered by wine, cannot ſtir up the hearers to enter into regular converſation. Nor is it of real utility in the education of children; as it is diſputed what virtue takes its form in the mind according to the ſpecies of muſic.

CHAP. VII.

Whether muſic contributes to love?

13. Muſic contributes nothing to the paſſion of love.

CHAP. VIII.

What does muſic add to feaſts?

14. The words of ſongs, and not the muſic, may animate and purify the minds of gueſts.

CHAP. IX.

Whether muſic has any tendency to conciliate friendſhip?

[The anſwer to this queſtion could not be recovered.]

CHAP. X.

What is to be thought of the childiſh ſtories of Thales and Terpander?

18. The invitation of Thales to the Lacedæmonians, in order to ſettle a diſpute, as ordered by the Pythian oracle, examined.

19. The calm produced was not by muſic, but by his admonitions, which might be ſung.

CHAP. XI.

Whether muſic ought to be recommended as contributing to religion.

20. What has been written about muſic, as contributing to divine worſhip, may be applied to various arts: the cook, the chaplet-weaver, the perfumer, the baker, the farmer, the painter, the architect, and ſtatuary, may be ſuppoſed to ſerve the ſame cauſe with equal propriety.

21. The muſic adds little to the power of poetry, in celebrating the honour of the gods. Diogenes perſuaded himſelf, that the gods are delighted, ſome with one ſong, and ſome with another, and that there are peculiar ſongs ſuitable to each of the divinities.

CHAP. XII.

Whether muſic ſharpens the intellects, and has any relation to other ſciences?

22, 23. It is aſſerted, that muſic does not ſharpen the mental faculties; and that it has only a ſlight relation to grammar. The aſſertion of ——— and his followers, about the connection of muſic with philoſophy, is declared falſe.

CHAP. XIII.

Whether muſic diſpoſes the mind to virtue?

24, 25. When Diogenes aſſerts that muſic approaches nearly to true philoſophy, is moſt ſerviceable in all the duties of life, and adds to every virtue; he trifles; as I have ſhewn in the third book of my Hypomnemata, or Commentaria. It is ridiculous to ſuppoſe, that any inarticulate ſounds can diſpoſe the mind to a ſpeculative diſpoſition, with reſpect to uſeful ſubjects.—If Plato had ſaid that muſic was of advantage to juſtice, he would probably have aſſigned reaſons for the aſſertion; but he only obſerves that juſtice bears an analogy to muſic; and aſſerts not that a muſician is a juſt man, nor that a juſt man is a muſician.

26. No man ever ſtudied muſic in order to facilitate his road to the acquiſition of virtues. When the poet and muſician unite in the ſame perſon, the hearer's mind derives advantage from the ſentiments, not from the rhythm of the verſes, or the muſic to which they are ſung.

CHAP. XIV.

What is to be underſtood by the name of muſic?

It has been ſaid that we have uncultivated minds, when we ſuppoſe that philoſophers and thinking muſicians imagine, that ſongs and rhythm, without ſignificant words, impel to virtue, while mankind believe that language, aided by melody and rhythm, produce this effect. So Plato aſſerts: we contend not therefore with the ignorant, but with philoſophers; moreover, we are ſurpriſed at the name of *muſician* being given to an inſtrumental performer; and we are not willing to rank Pindar, Simonides, and all the lyric poets in the number of muſicians.

[In this chapter Philodemus ſeems to write againſt ſome of his contemporaries, as well as Diogenes, Pindar and Simonides, who were muſicians as far as they exhilarated the hearts of men; and poets, as far as their verſes inſtructed mankind. This is an important chapter, but in a miſerable ſtate.]

Chap. XV.

Whether muſic correſponds with the celeſtial bodies?

[This chapter is ſo mutilated, that little of it can be underſtood. Philodemus, however, appears to ridicule the notion of Pythagoras, concerning the muſic of the ſpheres, which was heard only by the gods, and inaudible to mortal ears.]

Chap. XVI.

Whether muſic can change the affections of the mind?

31. [Philodemus contradicts what appears to have been advanced by Diogenes, concerning the power of muſic to lead the heart from vice to virtue. He ſeems to ſay, that this can be effected only by arguments; and that if ſuch effects are produced on the ſtage, it is by the words, not the muſic; for harangues, without muſic, have achieved this; and if mere ſounds could effect this change by the ears, that which pleaſed the ſmell or taſte, might do the ſame by means of the roſe, and the palate.]

Chap. XVII.

Whether muſic is of any real utility?

They are deceived who have aſſerted, that the art is of real utility to mankind in general. Thoſe arts which benefit life, ſuch as agriculture, weaving, architecture, are truly uſeful; which cannot be ſaid of what merely delights. It does not appear that muſic corrects the failings of her own ſons; nor would Damon have made ſuch an aſſertion before the true court of the Areopagites, as he did before a fictitious one. The power of giving pleaſure muſt not be confounded with utility; or elſe philoſophy would perchance be regarded as inferior to muſic and many other arts.

Chap. XVIII.

Whether the gods invented muſic?

The gods did not invent muſic, but man, by his reaſoning powers, taught himſelf ſinging. The powers of reaſoning may invent and teach what is bad, as well as what is good. At any rate, muſic did not proceed from the gods more than any other art, nor does their worſhip demand its aid. Its exhibitions are not to be preferred in inſtructing mankind.

Chap. XIX.

For what purpoſe is muſic uſually taught?

The profeſſors of muſic have exalted this art, in order to augment their own conſequence, though they are generally of low birth and poor.

[This laſt chapter is terribly mutilated, and difficult, if not impoſſible, to be underſtood.]

Riches and fame are derived from other profeſſions; and public affairs are rather objects of ſtudy and attention than muſic.

[Philodemus ſeems to have written this treatiſe, in order to counteract any ill effects which might ariſe from the enthuſiaſtic exaggerations of the virtues and powers of muſic, in the eſſay publiſhed by the Stoic Diogenes.]

PHILODOTUS, in *Zoology*. See Manis.

PHILÖE, or Philé, in *Geography*, an enchanting iſland of Egypt, on the Nile, in the vicinity of Aſſouan or Syene, of which, and alſo of its monuments, and of the cataracts in its neighbourhood, we have beautiful drawings in the ſecond volume of Denon's Travels. This iſland is about half a league round, and was formerly inhabited in common by the Ethiopians and Egyptians. When Denon viſited it, there were no inhabitants on the ſhore; on the approach of the French they had quitted it, and had retired to a ſecond and larger iſland. At the iſland of Philöe, the Nile makes a bend, as if, ſays Denon, to come and viſit this enchanting iſland, where the monuments are only ſeparated by tufts of palm trees or rocks, that appear to be left merely to contraſt the forms of nature with the magnificence of art, and to collect in one rich ſpot every thing that is moſt beautiful and impreſſive. As the Nile ceaſes here to be navigable on account of the cataracts, all the merchandiſe of the Ethiopian trade, which is landed at Philöe, muſt be tranſported by land to Syene, to be there re-embarked. Beyond Philöe the river is quite open and navigable. After Philöe had been attacked by the French, the whole population carried off, and the iſland left a perfect deſert, Denon returned, and ſtruck with the ſumptuous appearance of its edifices, he concluded that it was to produce a ſimilar effect upon ſtrangers entering their territory, that the Egyptians had collected upon their frontier ſuch a ſplendid collection of monuments. Philöe was the entrepôt of a commerce of barter between Ethiopia and Egypt; and wiſhing to give the Ethiopians a high idea of their reſources and magnificence, the Egyptians had raiſed ſo many ſumptuous edifices on the confines and natural frontier of their empire, Syene and the cataracts. The ruins in this iſland conſiſt of a ſmall ſanctuary, formed by a portico of four columns, with very elegant capitals, to which had been added at a later period another portico, which was without doubt attached to the circumvallation of the temple. The moſt ancient part was more ornamented than the reſt; the uſe made of it in the rites of the Catholic religion has impaired the original character, by adding ſquare arched door-ways. In the ſanctuary, cloſe to the figures of Iſis and Oſiris, may ſtill be ſeen the miraculous impreſſion, as Denon calls it, of the feet of St. Anthony, or St. Paul the hermit. Within the ſpace of 600 yards, there are ſeven or eight monuments, which, upon examination, appeared to have been conſtructed at different periods, by ſeveral nations, and to have belonged to different forms of religious worſhip. The union of theſe various edifices, each of them in itſelf regular, and crowded together in this narrow ſpot, formed an irregular group of moſt pictureſque and magnificent objects. Denon could here diſtinguiſh eight ſanctuaries or ſeparate temples, of different dimenſions, and built at different times; the limits of each had been reſpected in the conſtruction of the ſucceeding ones, and thus the regularity of the whole had been impaired.

Beſides the vaſt encloſure, particularly deſcribed by Denon, in which numerous temples were connected and grouped together by dwellings for the prieſts, there were two temples ſtanding apart; the ſmaller of which was ſingularly beautiful, in perfect preſervation, and ſo ſmall, that it almoſt excited the deſire of carrying it away. Within it were ſome remains of a domeſtic ſcene, which ſeemed to be that of Joſeph and Mary, and ſuggeſted the ſubject of the flight into Egypt, in a ſtyle of the utmoſt truth and intereſt. Beſides the Egyptian monuments, Greek and Roman ruins are found at the S.E. end of the iſland, which ſeemed to be the remains of a ſmall port, and a cuſtom-houſe; of which the wall of the façade is decorated with pilaſters and arcades of the Doric order; ſome ſtanding fragments of columns ſhew an open gallery, or a kind of portico in front; between theſe ruins and the Egyptian monuments, the ſur-baſe of a Catholic church may be remarked, which is built of antique fragments, mixed with croſſes and Greek ornaments of the later ages; for in theſe countries Catholiciſm has been too poor to remove entirely her own worſhip from the pomp of idolatrous temples. After having eſtabliſhed her ſaints in the face of the Egyptian deities, ſhe has often painted a St. John, or St. Paul, by the ſide of the goddeſs Iſis, and diſguiſed Oſiris into St. Athanaſius; or dilapidating the Heathen temples, ſhe has uſed the ready made materials in conſtructing her own edifices of religious worſhip.

PHILOLAUS, formed of φιλος, and λαος, *people*, in *Mythology*, a denomination under which Eſculapius was honoured in a temple at Aſopus, in Laconia.

Philolaus, in *Biography*, a Pythagorean philoſopher, who flouriſhed about 375 years B.C. was a native of Crotona. He was a diſciple of Archytas, and a contemporary with Plato. He was the perſon by whoſe means it is ſuppoſed the Pythagorean doctrine was firſt divulged, for it was from him that Plato purchaſed the written records of that ſyſtem. Philolaus fell a ſacrifice to political jealouſy, for aiming, or for being ſuſpected of aiming, at the poſſeſſion of deſpotic power in the government of his country. Philolaus referred every thing that exiſts to mathematical principles. He taught that reaſon, improved by mathematical learning, is alone capable of judging concerning the nature of things; that the whole world conſiſts of infinite and finite; that number ſubſiſts by itſelf, and is the chain which by its power ſuſtains the eternal frame of things; that the monad is not the ſole principle of all things, but that the binary is neceſſary to furniſh materials from which all ſubſequent numbers may be produced; that the world is one whole, which has a fiery centre, about which the celeſtial ſpheres revolve; that all things are preſerved in harmony by the law of neceſſity, and that the world is liable to deſtruction both by fire and water; hence, and from other tenets, held by this philoſopher, he is ſuppoſed to have believed in two independent principles in nature, God and matter, and that it was from this ſame ſource that Plato derived his doctrine upon the ſubject. It has been ſaid, but without ſufficient authority, that to Philolaus ſhould be aſcribed the invention of that true ſyſtem of the world, which Copernicus afterwards revived. Enfield's Hiſt. Phil.

Philolaus taught the diviſion of the tone in muſic, by which the dieſis or leimma reſulted on one ſide, and on the other the apotome of near a quarter of a tone; the apotome is the reſidue of a tone major, after the ſciſſon of the leimma.

He called the number 8 *geometric harmony*, as comprehending all the ratios of ſimple concords; for the 6th minor being five to eight, has only 8 for its greateſt term, or rather as it contains the greateſt ſyſtem of three octaves, the ancients did not enumerate the minor.

PHILOLOGY, Φιλολογια, formed from Φιλος, and λογος, *lover of diſcourſe;* a ſcience, or rather aſſemblage of ſeveral ſciences, conſiſting of grammar, rhetoric, poetry, antiquities, hiſtory, and criticiſm; which ſee reſpectively.

Philology is a kind of univerſal literature, converſant about all the ſciences, &c. their riſe, progreſs, authors who have cultivated them, &c.

Philology makes what the French call the *belles lettres*, which ſee. In the univerſities it is alſo called *humanities*, or *humaniores literæ*.

Anciently, philology was only a part of grammar.

Eratoſthenes, library-keeper at Alexandria, was the firſt who bore the ſplendid title of Philologus, according to Suetonius; or that of *critic*, according to Clemens Alexandrinus. He lived under Ptolemy Philadelphus, and died in the 146th Olympiad.

PHILOMATHES, φιλομαθης, formed from φιλος, *lover*, and μανθανω, *I learn*, a lover of learning or ſcience.

PHILOMELA, in *Ornithology*. See Certhia *flaveola*.

PHILOMELIUM, in *Ancient Geography*, a town of Aſia, in the Greater Phrygia. Ptolemy and Strabo.

PHILONIUM, in *Pharmacy*, an opiate, or electuary, of which there are two kinds, the Roman, and the Perſian.

The Roman, called alſo the great philonium, took its name from the phyſician Philo, who invented it. It conſiſts of the ſeeds of henbane, pepper, opium, and other ingredients. It is uſed to promote ſleep, and againſt colds, colics, &c.

The Perſian philonium conſiſts of ſeveral ingredients, among which are opium, terra ſigillata, lapis hæmatites, caſtor, and ſaffron. It is uſed to ſtop hæmorrhages, dyſenteries, &c.

Philonium *Londinenſe*, the name by which the medicine commonly called *philonium Romanum* has been formerly called in the London Diſpenſatory. The compoſition is alſo much altered, as well as the name, and was ordered to be made thus: take white pepper, ginger, caraway-ſeeds, of each two ounces, opium ſix drams, ſyrup of diacodium boiled to the conſiſtence of honey, three times the weight of all the reſt. The opium is to be diſſolved in a little wine, and then mixed with the ſyrup; after which the powders are to be ſtirred in, and the whole made into an electuary.

PHILOPATOR, φιλοπατωρ, formed from φιλος, *lover*, and πατηρ, *father*, in *Antiquity*, a title or ſurname, aſſumed by ſeveral of the kings of Egypt and Syria, importing, lover of one's father.

Ptolemy Philopator ſucceeded Ptolemy Euergetes; and had for his ſucceſſor Ptolemy Philometer. The Syrians had their Seleucus Philopator, Antiochus Philopator, &c.

PHILOPŒMEN, in *Biography*, the laſt great commander among the Greeks, was born at Megalopolis, in Arcadia, about the year 253 B.C. Having loſt his father at an early age, he was carefully educated by Caſſander, a noble Mantinean, and he received the inſtructions of two academic philoſophers, who inſtilled into his mind high principles of honour and patriotiſm. He had from a very early period a paſſion for military fame, and all the exerciſes of his youth were directed to the acquiſition of martial habits. When of an age to bear arms, he joined thoſe of his townſmen, who employed themſelves in incurſions upon the Laconian territory, in which expeditions he was the firſt to march out, and the laſt to return. The intervals of war he ſpent in hunting, and in the cultivation of his own eſtate. It was when he was about the age of thirty Cleomenes, king of Sparta, ſurpriſed Megalopolis by night; Philopœmen exerted himſelf with the utmoſt valour to drive him out again, and when he was unable to effect this, at the hazard of his life he covered the retreat of the inhabitants to Meſſene. After this he ſignalized himſelf in many great actions: engaged as volunteer in an inteſtine war raging in Crete, and on his return he was appointed by the Achæans to the command of the cavalry. By his zeal and activity he corrected many abuſes which had gained ground in that body, and rendered it famous throughout Greece for ſuperior courage and diſcipline. In the year 210, he was raiſed to the ſtation of prætor or commander-in-chief of the Achæan league. After ſpending ſome months in improving the military ſyſtem of the Achæans, with reſpect to their tactics and armour, he at length led them againſt Machanidas, tyrant of Sparta, who was marching with a powerful army to invade Achaia. He met the enemy at Mantinea, an engagement enſued, and Philopœmen gained a complete victory. This noble exploit was commemorated by the Achæans, by a brazen ſtatue placed in the temple of Delphi, repreſenting him in the attitude in which he ran his ſpear into the body of the tyrant. Nabis, the ſucceſſor of Machanidas, defeated Philopœmen at ſea, but he recovered this loſs in an action on land, took Sparta, razed its walls, and aboliſhed the laws of Lycurgus. The Meſſenians having revolted, Philopœmen marched againſt them, but was taken priſoner by falling from his horſe. He was conveyed to Meſſene, where the people, after the firſt triumph on their ſucceſs, were filled with compaſſion, at the ſight of one whom they had long conſidered as a hero and benefactor, reduced to that wretched condition. He was inhumanly thruſt into a ſubterranean dungeon, and on the next day an aſſembly was convened to determine his fate. The people were inclined to favour him, but the ſenate prevailed and carried a decree to put him to death. An executioner was accordingly ſent to his priſon with a cup of poiſon. As ſoon as the hero beheld him, he raiſed himſelf with difficulty from the ground, and enquired whether Lycortas and his companions had eſcaped; and being aſſured that they were all ſafe, he replied, "then we are not entirely unfortunate," and calmly drank the poiſon, which ſoon proved mortal. He died at the age of 70, in the year 183 B.C. His fate, which he ſo little deſerved, excited the grief and reſentment of the whole Achæan league, and numbers flocked to join a force led by Lycortas to revenge his death. The Meſſenian people opened their gates without reſiſtance, and put into his hands the authors of the deed, who were reſerved as ſacrifices to his manes. The aſhes of the noble commander were carried in great pomp to Megalopolis, where funeral honours of every kind were paid to his memory. Moſt of the cities of Greece alſo erected his ſtatue, with inſcriptions recording his great actions. Several years after his death, when Corinth was deſtroyed by the conſul Mummius, a Roman moved for the ſubverſion of all his ſtatues and monuments, as thoſe of an implacable enemy of Rome. Polybius, however, in an eloquent harangue defended his memory, and the conſul would not permit fuch a poſthumous inſult to a truly great man. Plutarch. Univ. Hiſt.

PHILOPOLIS, in *Geography*, a ſettlement of America, in Luzerne county, Pennſylvania, 12 or 14 miles W. of mount Ararat, and at the head of the weſtern branch of Tunkhanock creek, about 45 miles S.E. of Athens, or Tioga point. N. lat. 41° 40′. W. long. 75° 33′.

PHILOSEBASTUS, φιλοσεβαϛος, i. e. *a ſriend of Auguſtus*, was a title aſſumed by ſeveral princes and cities, as a public teſtimony of their attachment to any emperor. This title is found on the marbles of Cyzicum and in other inſcriptions.

PHILOSOPHER, φιλοσοφος, a perſon well verſed in philoſophy; or who makes profeſſion of, or applies himſelf to, the ſtudy of nature and morality.

When a race of ſelf-created preceptors aroſe in Greece, who aſſumed the name of "ſophiſts," or wiſe men, their arrogant pretenſions gave great offence to ſuch as were capable of diſtinguiſhing between real and counterfeit wiſdom, and led them to adopt an appellation more ſuitable to the character of men, who modeſtly profeſſed themſelves to be in the *purſuit*, rather than in the *poſſeſſion* of truth and wiſdom, *viz.* that of philoſophers. Cicero aſcribes the invention of this term to Pythagoras, and gives the following account of the manner in which it was introduced. Every one knows, that among the Greeks there were ſeven eminent men, who have ſince been univerſally denominated the "ſeven wiſe men" of Greece: that, at a ſtill earlier period, Lycurgus, and, even in the heroic ages, Ulyſſes and Neſtor, were called wiſe men; and, in ſhort, that this appellation has, from the moſt ancient times, been given to thoſe who have devoted themſelves to the contemplation of nature. This title continued in uſe till the time of Pythagoras. It happened, while this great man was at Phlius, that Leon, the chief the Phliuſians, was exceedingly charmed with the ingenuity and eloquence with which he diſcourſed upon various topics, and aſked him, in what art he principally excelled; to which Pythagoras replied, that he did not profeſs himſelf maſter of any art, but that he was a "philoſopher." Leon, ſtruck with the novelty of the term, aſked Pythagoras, who were philoſophers, and in what they differed from other men. Pythagoras replied, that, as in the public games, while ſome are contending for glory, and others are buying and ſelling in purſuit of gain, there is always a third claſs of perſons, who attend merely as ſpectators; ſo, in human life, amidſt the various characters of men, there is a ſelect number of thoſe, who, deſpiſing all other purſuits, aſſiduouſly apply themſelves to the ſtudy of nature, and the ſearch after wiſdom: theſe, added Pythagoras, are the perſons whom I call philoſophers. Cicero Tuſcul. Diſp. l. v. c. 3.

This appellation, thus aſſumed merely through modeſty, to intimate that even they who have made the greateſt advances in knowledge, are rather to be conſidered as "lovers of wiſdom," than as "wiſe men," ſoon loſt its original meaning, and was borne with as much haughtineſs and vanity, as if it had implied an excluſive right to the poſſeſſion of wiſdom. "Some there are," ſays Quintilian (Proœm. Inſt.) "who, deſpiſing the occupation of an orator, have employed themſelves in preſcribing rules for the conduct of life; theſe have inſolently aſſumed to themſelves the title of the *ſole profeſſors of wiſdom.*"

The ſects of philoſophers are very numerous; and their dogmata or tenets very contradictory.

Helmont, and ſome of the chemiſts, denominate themſelves *philoſophers by fire.*

The alchemiſts, and adepti, are frequently denominated *the philoſophers*, by way of eminence.

PHILOSOPHER'S *Stone*, the greateſt object of alchemy, is a long-ſought-for preparation, which, when found, is to tranſmute or exalt impurer metals, as tin, lead, and copper, into gold and ſilver.

Some of the Greek writers in the fourth and fifth centuries, ſpeak of an art, as being then known, of tranſmuting the baſer metals into gold; and towards the end of the thirteenth century, when the learning of the eaſt had been brought hither by the Arabians, the ſame pretenſions began to ſpread through Europe. It is ſuppoſed that this art, called *alchemy*, was of Egyptian origin: and that when the ancient Greek philoſophers travelled into Egypt, they brought back ſome of the allegoric language of this Egyptian art, ill underſtood, which afterwards paſſed into their mythology. Alchemy was the earlieſt branch of chemiſtry, conſidered as a philoſophical ſcience: in the other parts of chemical knowledge, facts preceded reaſoning or ſpeculation; but alchemy was originally ſpeculative. See Transmutation.

The alchemiſts ſuppoſed the general principles of metals to be chiefly two ſubſtances, which they called mercury and ſulphur; they apprehended alſo, that the pure, mercurial, ſulphureous, or other principles of which they imagined gold to be compoſed, were contained, ſeparately, in other bodies: and theſe principles, therefore, they endeavoured to collect, and to concoct and incorporate by long digeſtions; and by thus conjoining the principles of gold, if they could be ſo procured and conjoined, it might be expected that gold would be produced. But the alchemiſts pretend to a product of a higher order, called the *elixir*, the medicine for metals, the tincture, the philoſopher's ſtone; which, by being projected on a large quantity of any of the inferior metals in fuſion, ſhould change them into fine gold: which being laid on a plate of ſilver, copper, or iron, and moderately heated, ſhould ſink into the metal, and change into gold all the parts to which it was applied: which, on being properly heated with pure gold, ſhould change the gold into a ſubſtance of the ſame nature and virtue with itſelf, ſo as thus to be ſuſceptible of perpetual multiplication; and which, by continued coction, ſhould have its power more and more exalted, ſo as to be able to tranſmute greater and greater quantities of the inferior metals, according to its different degrees of perfection.

There are three ways by which the alchemiſts have attempted to arrive at the making of gold: the firſt by ſeparation; for it is affirmed, that every metal yet known contains ſome quantity of gold: only, in moſt, the quantity is ſo little, that it will not defray the expence of getting it out.

The ſecond is by maturation; for the alchemiſts hold mercury to be the baſis and matter of all metals; that quickſilver purged from all heterogeneous bodies would be much heavier, denſer, and ſimpler, than the native quickſilver; and that by ſubtilizing, purifying, and digeſting it with much labour, and long operations, it may be converted into pure gold.

This method of maturation is only for mercury: the other metals it is ineffectual for, on two accounts: 1. Becauſe their matter is not pure mercury, but has other heterogeneous bodies adhering to it: And, 2. Becauſe the digeſtion, by which mercury is turned into gold, would not ſucceed in other metals, in regard theſe had not been long enough in the mines.

Weight is the individual and inimitable character of gold, &c. Now mercury, they ſay, has ever ſome impurities in it; and thoſe impurities are lighter than mercury. Could thoſe be purged quite out, as it does not appear to them impoſſible but they might, mercury would be as heavy as gold: and what is as heavy as gold is gold, or at leaſt might very eaſily be made gold. See *Fixing of* Mercury.

The third method is, that of tranſmuting, or of turning all metals readily into pure gold, by melting them in the fire, and caſting a little quantity of a certain preparation into the fuſed matter, upon which the fæces immediately retire, are volatilized and burnt, and ſo carried off; and the reſt of the maſs is turned into pure gold. That which works this change in the metals is called the philoſopher's ſtone. See Transmutation.

Whether this third method be poſſible or not, is very hard to ſay. We have ſo many teſtimonies of it from perſons, who on all other occaſions ſpeak truth, that it is ſomewhat hard to ſay they are guilty of falſehood, even when they ſay, that they have been maſters of the ſecret. All required is, they ſay, to do that by art, which nature does in many years and ages. For that as lead and gold do but differ little in weight, therefore there is not much in lead beſide mercury and gold. Now, if I had any body which would ſo agitate all the parts of lead, as to burn all that is not mercury therein; and had alſo ſome ſulphur to fix the mercury; would not the maſs remaining be converted into gold? There is nothing in nature ſo heavy as lead, gold and mercury alone excepted. It is evident, therefore, there is ſomething in lead that comes very near to gold. But in lead there is alſo ſome heterogeneous matter different both from mercury and gold. If now nineteen ounces of lead be diſſolved by the fire, and eight ounces be thus deſtroyed, they argue that we ſhall have the reſt good gold; the ratio of lead to gold being as eleven to nineteen. If then the philoſopher's ſtone can purify the mercurial matter in lead, ſo as that nothing ſhall remain but the pure mercurial body, and you can fix and coagulate this, by means of ſulphur, out of nineteen ounces of lead you will have eleven of gold. Or, if you reduce the lead from eighteen to fourteen, you will then have converted it into mercury; and if you farther purify this mercury to its proper ſtandard, you will have gold; provided you have but a ſulphur with which to fix and coagulate it. Such is the foundation of the opinion of the philoſopher's ſtone; which the alchemiſts contend to be a moſt ſubtile, fixed, concentrated fire, which, as ſoon as it melts with any metal, does, by a magnetic virtue, immediately unite itſelf to the mercurial body of the metal, volatilizes and cleanſes off all that is impure therein, and leaves nothing but a maſs of pure gold. Many frauds and artifices have undoubtedly been practiſed in this operation; and there might be political reaſons why princes and others ſhould encourage thoſe who pretended a power of furniſhing this inexhauſtible ſource of wealth: but it would be wrong to cenſure as impoſtors, all thoſe who have declared themſelves convinced, from their own experiments, of the tranſmutability of baſe metals into gold. However, there are ſtrong reaſons to believe that the authors have been deceived themſelves by fallacious appearances. Mr. Boyle gives an account of a proceſs, by which he imagines part of the ſubſtance of gold to have been tranſmuted into ſilver. (See Menstruum *Peracutum.*) He alſo relates a very extraordinary experiment, under the title of the degradation of gold by an anti-elixir, which was publiſhed in his own life-time, and ſince reprinted in 1739. Hence many have been led to conclude in favour of the alchemical doctrine of the tranſmutability of metals. See an account of this experiment, with remarks upon it, by Dr. Lewis, in his Commerce of Arts, ſect. xii. p. 297, &c.

King Henry VI. granted letters patent to certain perſons, who undertook to find out the philoſopher's ſtone, and to change other metals into gold, &c. to be free from the penalty of the ſtat. 5 Hen. IV. made againſt the attempts of chemiſts of this nature. Pat. 34 Hen. VI. 3 Inſt. 74. See Alchemy.

Philosopher's *Tree*, a chemical preparation, called alſo *Arbor Dianæ*, Diana's Tree.

PHILOSOPHICAL, ſomething that relates to philoſophy.

Philosophical *Æther*. See Æther.

Philosophical *Chemiſtry*. See Chemistry.

Philosophical *Criticiſm*. Sbe Criticism.

Philosophical *Egg*, among the *Chemiſts*, is a thin glaſs body, or bubble, of the ſhape of an egg, with a long neck or ſtem; uſed in digeſtions,

PHILOSOPHICAL *Month.* See MENSTRUUM and MONTH.

PHILOSOPHICAL *Sin.* See SIN.

PHILOSOPHICAL *Tranſactions.* See TRANSACTIONS.

PHILOSOPHIZING, the act of conſidering ſome object of our knowledge, examining its properties, and the phenomena it exhibits, and enquiring into their cauſes or effects, and the laws thereof; the whole conducted according to the nature and reaſon of things, and directed to the improvement of knowledge.

PHILOSOPHIZING, *Rules of*, *Regulæ Philoſophandi*, as eſtabliſhed by ſir Iſaac Newton, are, 1. That no more cauſes of a natural effect be admitted than are true, and ſuffice to account for the phenomena thereof.

This agrees with the ſentiments of moſt philoſophers, who hold that nature does nothing in vain; and that it were vain to do that by many things, which might be done by fewer.

2. Natural effects, therefore, of the ſame kind, proceed from the ſame cauſes. Thus, *e. gr.* the cauſe of reſpiration is one and the ſame in man and brute; the cauſe of the deſcent of a ſtone, the ſame in Europe as in America; the cauſe of light the ſame in culinary fire, as in the ſun; and the cauſe of reflexion the ſame in the planets as the earth.

3. Thoſe qualities of bodies which are not capable of being heightened, and remitted, and which are found in all bodies, where experiments can be made, muſt be looked on as univerſal qualities of all bodies.

Thus the extenſion of body is only perceived by our ſenſes, nor is it perceiveable in all bodies; but ſince it is found in all that we have perception of, it may be affirmed of all. So we find, that ſeveral bodies are hard; and argue that the hardneſs of the whole only ariſes from the hardneſs of the parts: whence we infer, that the particles, not only of thoſe bodies which are ſenſible, but of all others, are likewiſe hard. Laſtly, if all the bodies about the earth gravitate towards the earth, and this according to the quantity of matter in each; and if the moon gravitates towards the earth alſo according to its quantity of matter; and the ſea again gravitates towards the moon; and all the planets and comets gravitate towards each other: it may be affirmed univerſally, that all bodies in the creation gravitate towards each other. This rule is the foundation of all natural philoſophy.

PHILOSOPHY, Φιλοσοφια, the knowledge or ſtudy of nature and morality, founded on reaſon and experience.

Philoſophy owes its name to the modeſty of Pythagoras, who refuſed the title σοφος, *wiſe*, given to his predeceſſors, Thales, Pherecydes, &c. as too aſſuming; and contented himſelf with the ſimple appellation of φιλοσοφος, *quaſi* φιλος της σοφιας, *a friend or lover of wiſdom.*

Chauvin rather derives the name from φιλια, *deſire*, or *ſtudy*, and σοφια, *q. d. ſtudium ſapientiæ*; and ſays that Pythagoras, conceiving that the application of the human mind ought rather to be called *ſtudy* than *ſcience*, ſet aſide the appellation *wiſe*, and in lieu of it took that of *philoſopher*. (See the article PHILOSOPHER.) Which title, St. Auguſtine obſerves, took ſo well with other authors, that whoever excelled in any thing relating to wiſdom or knowledge had afterwards no other appellation. Accordingly Socrates, Plato, &c. ever refrained from the ſwelling title of ſophos.

By philoſophy we mean the knowledge of the reaſons of things, in oppoſition to hiſtory, which is the bare knowledge of facts: or to mathematics, which is the knowledge of the quantity of things or their meaſures.

Theſe three kinds of knowledge ought to be joined as much as poſſible. Hiſtory furniſhes matter, principles, and practical examinations, and mathematics complete the evidence. Philoſophy being the knowledge of the reaſons of things, all arts muſt have their peculiar philoſophy, which conſtitutes their theory: not only law and phyſic, but the loweſt and moſt abject arts are not deſtitute of their reaſons, which might uſefully employ the time of the ſtudious: and the advantages reſulting from this kind of employment has been amply manifeſted in the diſcoveries of modern times.

One great obſtacle to the progreſs of arts and ſciences has been the neglect of practice in ſpeculative men, and the ignorance and contempt of theory in mere practical men. What chimeras and abſurdities the neglect of experience and practice has produced, need not be mentioned; the miſchiefs ariſing from a neglected theory are not ſo obvious: yet certainly it retards the progreſs of arts. All invention or improvement muſt be either caſual or rational, including analogy or inference from ſimilar caſes, under the term rational. Now, although the foundations of arts have often been owing to ſome caſual diſcovery, as gunpowder, or the loadſtone, yet is this not to be truſted to alone. Improvements do not always flow from this ſource, but rather from the reflections of artiſts; and, if theſe reflections were rendered more diſtinct, more communicable, and eaſier to be retained, by the proper uſe of ſigns and other philoſophical helps, great advantages might be expected: it being certain, that philoſophical knowledge is more extenſive, and more ſure in the application; and, beſides, gives a pleaſure to the mind not to be expected from that which is merely hiſtorical.

It is to be obſerved, that the bare intelligence and memory of philoſophical propoſitions, without any ability to demonſtrate them, is not philoſophy, but hiſtory only. However, where ſuch propoſitions are determinate and true, they may be uſefully applied in practice, even by thoſe who are ignorant of their demonſtrations. Of this we ſee daily inſtances in the rules of arithmetic, practical geometry, and navigation; the reaſons of which are often not underſtood by thoſe who practiſe them with ſucceſs. And this ſucceſs in the application produces a conviction of mind, which is a kind of medium between philoſophical, or ſcientifical, and hiſtorical knowledge.

The ingenious author of the Analyſt has gone ſo far as to ſuggeſt, that mathematicians have no other conviction of the truth of the doctrine of fluxions.

We have ſaid that philoſophy is the knowledge of the reaſons of things. It may be aſked, what are the reaſons of things, or what is the explanation of phenomena or facts? An ingenious author tells us, that the explication conſiſts only in ſhewing the conformity any particular phenomenon hath to the general laws of nature; or, which is the ſame thing, in diſcovering the uniformity there is in the production of natural effects. This he thinks evident to any one whoever ſhall attend to the ſeveral inſtances in which philoſophers pretend to account for appearances. By a diligent operation of the phenomena within our view, we may diſcover the general laws of nature, and from thence deduce, though not demonſtrate, other phenomena; all productions of this kind depending on a ſuppoſition that the Author of Nature always operates uniformly, and in a conſtant obſervation of thoſe rules we take for principles; which we cannot evidently know.

If we take a view of the ſeveral phenomena, and compare them together, we may obſerve ſome likeneſs and conformity between them. For example, in the falling of a ſtone to the ground, in the riſing of the ſea towards the moon, in cohesion

cohesion and cryſtallization, there is ſomething alike, namely, an union or mutual approach of bodies: ſo that any one of theſe, or the like phenomena, may not ſeem ſtrange or ſurpriſing to a man who has nicely obſerved and compared the effects of nature: for that only is thought ſo which is uncommon, or a thing by itſelf, and out of the ordinary courſe of our obſervation. That bodies ſhould tend towards the centre of the earth is not thought ſtrange, becauſe it is what we perceive every moment of our lives; but that they ſhould have a like gravitation towards the centre of the moon, may ſeem odd and unaccountable to moſt men, becauſe it is diſcerned only in the tides; but a philoſopher, whoſe thoughts take in a larger compaſs of nature, having obſerved a certain ſimilitude of appearances, as well in the heavens as the earth, that argue innumerable bodies to have mutual tendency towards each other, which he denotes by the general name attraction, whatever can be reduced to that, he thinks juſtly accounted for. Thus he explains the tides by the attraction of the terraqueous globe towards the moon, which, to him, doth not appear odd or anomalous, but only a particular example of a general rule or law of nature.

If, therefore, we conſider the difference there is betwixt natural philoſophers, and other men, with regard to their knowledge of the phenomena, we ſhall find it conſiſts not in an exacter knowledge of the efficient cauſe that produces them, for that can be no other than the will of a ſpirit; but only in a greater largeneſs of comprehenſion, whereby analogies, harmonies, and agreements are deſcried in the works of nature, and the particular effects explained; that is, reduced to general rules, which rules grounded on the analogy and uniformneſs obſerved in the production of natural effects, are more agreeable, and ſought after by the mind; for that they extend our proſpect beyond what is preſent, and near to us, and enable us to make probable conjectures, touching things that may have happened at very great diſtances of time and place, as well as to predict things to come; which ſort of endeavour towards omniſcience is much affected by the mind. Berkeley's Princ. of Hum. Knowledge, ſect. 104, 105.

Philosophy is a term uſed in various ſignifications among ancient and modern writers. In its *laxer ſenſe*, it ſignifies the love of truth: thus Plato frequently calls it *philalethia*.

In other places it ſignifies the knowledge of many things; thus Zeno calls philoſophy, καταληψις, *comprehenſion*, becauſe comprehending all truth. Agreeable to which is Cicero's definition of philoſopher, that he is one who ſtudies to know the natures and cauſes of all things human and divine, and to attend to every good rule and method of life.

Philoſophy has been applied by many modern writers not only to all ſpeculative ſcience, but the term has been uſed ſo as to comprehend ſkill in municipal law, the knowledge of medicine, the art of criticiſm, and the whole circle of polite literature. The term has been even transferred to theology, ſo that the Chriſtian religion has been called ſacred philoſophy; and eccleſiaſtical doctors and monks have been denominated philoſophers.

Philosophy, in a *narrower ſenſe*, is frequently confined to ſome one ſcience, or branch of ſcience: *v. gr.* to logic, as we find it in Plato and Ariſtotle: to phyſics, or the knowledge of nature; in which ſenſe it was chiefly uſed in the Ionic ſchool: and to ethics, or the rules of morality: thus it is Clemens of Alexandria relates that among the Greeks there are philoſophers who hold diſputes about virtue.

Agreeable to this laſt application, Pythagoras defines philoſophy a meditation on death: by which, according to Plato and Clemens, is meant an abſtraction or retirement from the body: which Apuleius thus explains: a philoſopher is to ſtudy nothing ſo much as to ſet his ſoul at liberty from its correſpondence with the body: thus Cicero calls philoſophy, *ars vitæ*, and Seneca, *lex vitæ*: and thus Plutarch. Conſtancy, fidelity, and a ſound mind, are the real philoſophy; all the other parts of wiſdom, tending any other way, are prettineſſes and curioſities: and in this ſenſe it was that philoſophy chiefly flouriſhed in the ſchools of Socrates, afterwards called the *Academic ſchool*, and among the Stoics.

Philosophy, again, is frequently uſed by Pythagoras and Plato for methaphyſics, or the knowledge of God: which Plato calls the true philoſophy, others the *prima philoſophia*; and in reſpect of which, the Platoniſts call all other philoſophy, *nocturnal*, νυκτερινη φιλοσοφια.

Gale includes the ſeveral notions hitherto delivered, under this one general definition: philoſophy is the knowledge of things natural, moral, ſupernatural, and notional; originally granted by God to our firſt parents, and tranſmitted to us for the honour of the Creator, and the good of the univerſe.

The definition of Epictetus is alſo pretty comprehenſive: philoſophy, he ſays, conſiſts in three things; the practice of precepts, the reaſon of precepts, and the proof of precepts.

Brucker, in his "Hiſtory of Philoſophy," defines philoſophy to be that love of wiſdom, which incites to the purſuit of important and uſeful ſcience. Philoſophy diſcovers and teaches thoſe principles by means of which happineſs may be acquired, preſerved, and increaſed: wiſdom applies theſe principles to the benefit of individuals and of ſociety. "Knowledge which is applicable to no uſeful purpoſe cannot deſerve the name of wiſdom."

"Qui ipſi ſibi ſapiens prodeſſe nequit, nequicquam ſapit."

The ſources of that knowledge of truth which leads to the poſſeſſion of happineſs are reaſon and revelation. To inſtruct men in thoſe truths which God hath communicated to mankind by revelation is the province of theology; which ſee. To teach them ſuch truths, connected with their happineſs, as are capable of being diſcovered by the powers of reaſon, is the province of philoſophy. Theſe two provinces are perfectly diſtinct, and ought to be kept ſeparate, except where the one may occaſionally ſerve to caſt light upon the other. The leading offices of philoſophy, ſays Brucker, may be eaſily deduced from the general idea of its object. As the permanent enjoyment of real good is the end to be attained, it is the buſineſs of philoſophy to inveſtigate the nature of good, and the means by which it may be acquired, and ſo to form and improve the whole man, that he may arrive at the complete poſſeſſion of true felicity. The buſineſs of philoſophy will therefore be to cultivate the underſtanding, and direct its operations: to correct and meliorate the will and affections, by diſcovering thoſe objects that are diſcernible, comparing their reſpective claims, and ſhewing how they may be rendered moſt productive of happineſs; to enquire out the cauſes of natural appearances, and hence arrive at the knowledge of the Firſt Cauſe, under thoſe characters and relations that are moſt intereſting to mankind; to conduct men to ſuch an acquaintance with the properties of natural bodies, and their reciprocal actions, as ſhall enable them to apply the objects around them to their own convenience; and, finally, to aſſiſt them in inveſtigating the principles of ſocial virtue, and ſo provide them with ſuch rules of conduct as ariſe from mutual convenience and intereſt, from the natural ſentiments of juſtice and humanity, and from the voluntary engagements of civil ſociety. Dialectics, phyſics, natural religion, ethics and policy are thus comprehended under the general term philoſophy.

From this view of the ſubject it will appear, that a hiſtory of philoſophy is a hiſtory of doctrines, and of men. As a hiſtory of doctrines, it lays open the origin of opinions, the changes which they have undergone, the diſtinct characters of different ſyſtems, and the leading points in which they agree or differ; and it is therefore, in fact, a hiſtory of the human underſtanding. As a hiſtory of men, it relates the principal incidents in the lives of the more eminent philoſophers; remarks, particularly, thoſe circumſtances in their character or ſituation, which may be ſuppoſed to have influenced their opinions; takes notice of their followers, and their opponents; and deſcribes the origin, progreſs, and decline of their reſpective ſects. It is in this comprehenſive manner, that our learned author has undertaken to trace the hiſtory of philoſophy and philoſophers from the earlieſt records to the preſent time. And if we may judge of the execution of this important undertaking from the excellent compendium of it given in our own language by Dr. Enfield, it muſt have required immenſe labour of reſearch, and it has been rendered in a very high degree inſtructive and intereſting. Our readers will find that we have availed ourſelves of this valuable work in various articles of the Cyclopædia.

After fully and modeſtly ſtating the manner in which he has proceeded in the accompliſhment of his undertaking, the author points out the principal advantages that may be expected from an attention to the riſe and progreſs of philoſophy. We ſhall thus perceive the extent of our intellectual capacities, the cauſes of their perverſion, and the means by which we may avail ourſelves for avoiding error, and ſucceſsfully purſue without deviation the attainment of truth. The hiſtory of philoſophy ſerves as a regiſter of diſcoveries in the world of ſcience, and as a ſkilful guide towards unknown regions, whither future adventurers may with advantage direct their courſe. This will alſo ſerve to acquaint us with the general ſources of ſcience, with the names and characters of valuable authors, the ſubjects of their works, and the aſſiſtance that may be expected from them in ſcientific reſearches; ſo that the hiſtory of philoſophy is an important branch of the hiſtory of univerſal erudition.

The learned author divides the hiſtory of philoſophy into three periods; the *firſt* traces its riſe and progreſs from the earlieſt times to the eſtabliſhment of the Roman empire. The *ſecond* repreſents its ſtate among the Heathens, whilſt it flouriſhed under the emperors, which brings the hiſtory down to the ſixth century; and among the Jews, Saracens, and Chriſtians, from the commencement of the Chriſtian era to the time of the revival of letters. The *third* period relates the attempts which have been ſince made for the reformation and improvement of philoſophy, and deſcribes the various forms which it has aſſumed from the revival of letters to the laſt century. Thus the whole hiſtory of philoſophy is conſequently divided into *ancient*, *middle*, and *modern.* The *firſt* period comprehends the Barbaric and the Grecian philoſophy: the former including all thoſe nations, which before the time when the Grecian philoſophy paſſed over to the Romans, did not uſe the Greek language; the latter, all thoſe countries in which that language was ſpoken. The *ſecond* period exhibits the ſtate of philoſophy during the courſe of 1200 years among the Romans, the Orientaliſts, the Jews, the Saracens, and the Chriſtians. In the *third* period of this hiſtory we ſee the ſucceſsful efforts of philoſophy to riſe above the unwholeſome atmoſphere of tyranny, ſuperſtition, and bigotry, into the pure regions of freedom and truth; and find the ſeveral ancient ſects reviving, new and better methods of philoſophizing diſcovered, the chains of authority in ſome meaſure ſhaken off, and farther advances made in true philoſophy within the courſe of a ſingle century, than had before been made in a thouſand years. We have thus ſketched the plan of this valuable work for the information of our readers, and we ſhall refer them for particular details to the appropriate articles in the Cyclopædia.

Some have given the following appellations to the ancient philoſophy, under its ſeveral ſtages: philoſophy, ſay they, became *impious* under Diagoras; *vicious* under Epicurus; *hypocritical* under Zeno; *impudent* under Diogenes; *covetous* under Demochares; *voluptuous* under Metrodorus; *fantaſtical* under Crates; *ſcurrilous* under Menippus; *licentious* under Pyrrho; and *quarrelſome* under Cleanthes.

The ſeveral dogmata maintained by the ſeveral philoſophers are infinite: Cicero makes no ſcruple to aver, that there is nothing in the world, how abſurd ſoever, but has been maintained by one philoſopher or other.

From the firſt broachers of new opinions, and the firſt founders of ſchools, philoſophy has become divided into innumerable ſects; ſome ancient, others modern: ſuch are the Platoniſts, Peripatetics, Epicureans, Stoics, Pyrrhonians, and Academics; and ſuch are the Carteſians, Newtonians, &c. See the riſe, doctrines, &c. of each ſect under PLATONISM, PERIPATETICS, EPICUREANS, STOICS, PYRRHONIANS, ACADEMICS, CARTESIAN, NEWTONIAN, &c.

Philoſophy may be divided into two branches, or it may be conſidered under two habitudes, *theoretical*, and *practical.*

PHILOSOPHY, *Theoretical*, or *Speculative*, is that employed in mere contemplation, and terminating in it. Such is phyſics, which is a bare contemplation of nature, and natural things: and it is again uſually ſubdivided into three kinds, *viz.* pneumatics, phyſics or ſomatics, and metaphyſics or ontologia.

The firſt conſiders being, abſtracted from all matter: its objects are ſpirits, their natures, properties, and effects. The ſecond conſiders matter and material things: its objects are bodies, their properties, laws, &c.

The third extends to each indifferently: its objects are either body or ſpirit.

In the order of our diſcovery, or arrival at the knowledge of them, phyſics is firſt, then metaphyſics; the laſt ariſes from the two firſt conſidered together: after an acquaintance with God, ourſelves, and natural bodies, we come to conſider what is natural to them all, or the attributes that agree to all: and thus form a ſort of univerſal philoſophy, or doctrine *de ente* in general.

But in teaching, or laying down, theſe ſeveral branches to others, we obſerve a contrary order; beginning with the moſt univerſal, and deſcending to the more particular. And hence we ſee why the Peripatetics call metaphyſics, and the Carteſians pneumatics, the *prima philoſophia.* Others prefer the diſtribution of philoſophy into four parts, *viz.* 1. Pneumatics, which conſiders and treats of ſpirits. 2. Somatics, of bodies. The 3d, compounded of both, anthropology, which conſiders man, in whom both body and ſpirit are found. 4. Ontoſophy, which treats of what is common to all the other three.

Philoſophy may be divided into three parts, intellectual, moral, and phyſical; the intellectual part compriſes logic and metaphyſics; the moral part obtains the laws of nature and nations, ethics and politics; and, laſtly, the phyſical part comprehends the doctrine of bodies, animate or inanimate: theſe, with their various ſubdiviſions, will take in the whole of philoſophy.

Wolfius makes the three parts of philoſophy to be the doctrine of God, the human ſoul, and of bodies. However, when he ſubdivides, and comes to treat the ſeveral branches ſeparately, his diviſions readily come under the three heads, intellectual, moral, and phyſical, before mentioned. The doctrine of God, and the human ſoul, may be ranged under the ſame head, metaphyſics, the notion of the divine nature being formed from that of the human ſoul, excluding limitations and imperfections. Muſchenbroeck divides philoſophy into ſix parts, *viz.* pneumatics, or the doctrine of ſpirits; phyſics, whoſe object is the univerſe and the bodies contained therein; teleology, which explores the deſign and end of the exiſtence of all bodies, and of all their actions and changes, as far as human ſagacity can diſcover them; metaphyſics, which comprehends the general and abſtract natures and qualities of objects, containing ontology and coſmology, practical or moral philoſophy, which lays down rules for the right conduct of life, and the attainment of true happineſs; and logic, which unfolds the powers and directs the exerciſe of the intelligent and reaſoning faculty of the human mind.

PHILOSOPHY, *Practical*, is that which lays down the rules of a virtuous and happy life; and excites us to the practice thereof.

Practical philoſophy is properly ethics alone, or the method of leading a virtuous and happy life. Yet moſt authors divide it into two kinds, anſwerable to the two ſorts of human actions to be directed thereby; *viz.* 1. Logic, which governs the operations of the underſtanding. 2. Ethics, properly ſo called, which direct thoſe of the will.

PHILOSOPHY *of the Hindoos.* As far as regards metaphyſics and logic, it ſeems likely, from what little hath hitherto appeared, that the Hindoos have ſome very ancient and curious books expreſsly on thoſe branches of philoſophy, which would be valuable acquiſitions to the literature of Europe. Beſides regular treatiſes on theſe, as well as the other branches, moſt of their ancient and ſacred books diſcuſs ſcientific ſubjects, as well as religion and mythology. In the Veda itſelf, which may be called the Hindoo ſcriptures, this mixture is met with. One of the Vedas is aſſigned to a celeſtial phyſician; and one of its chapters is occupied with anatomy. (See VEDA.) And under the article *Purana* of this work may be ſeen how miſcellaneous are the contents of the ſacred poems, bearing that common denomination. The antiquity of the Hindoo books is a diſputable point; but there ſeems good reaſon to believe that ſome of their philoſophical ſyſtems appeared in nearly their preſent form, earlier than the date of thoſe European philoſophers whoſe names diſtinguiſh theories very ſimilar to thoſe of the Hindoos. There is hence a promiſe of proof that a great portion of the learning of Greece and Rome was derived directly from India, as well as their mythology, or popular religion. It is this circumſtance chiefly, perhaps, that will render the introduction of faithful tranſlations of the Hindoo books ſo curious and intereſting to the literati of Europe; for few are ſo ſanguine as to expect from ſuch a ſource *much* really uſeful to us, in our preſent ſtate of human intellect and ingenuity. We ſay *much*, in order to abate the indulgence of any unreaſonable ardour of expectancy, that muſt of courſe end in diſappointment: while to affirm, that *nothing* uſeful is to be thence looked for, might ſavour of unbecoming arrogance.

The Hindoos are prone to a *triple* arrangement wherever it can be effected, and we find their principal ſyſtems of philoſophy claſſed under three heads, namely, 1. *Nyaya;* 2. *Mimanſa;* and 3. *Sankya;* under each of which words we have offered a brief outline of thoſe ſeveral theories. They are aſcribed to Godama, Jaimini, and Kapila, of which philoſophers, ſome account is given under their reſpective names. The above three theories are divided each into two parts; and excluſive of the works aſſigned to the authors of the ſyſtems, all ſubſequent works are ſimilarly named, according to the ſchool under which the prevalent tenets, that they uphold, may have dictated their arrangement. The ſame may be ſaid of the commentaries on the original or divided works, and on their imitators or diſciples. Theſe commentaries are claſſed under the denomination of *upaderſena*, and have become ſo voluminous as to obſcure, rather than explain, the works of the original philoſophers, which are very ſuccinct. The three ſchools are, as we have ſeen, divided into ſix; and may be aptly compared to the principal ſchools of the weſt, and their authors with our ancient fathers of philoſophy. We offer in one view the names and titles of each, and their correſponding theories; premiſing that, of courſe, differences, as well as coincidences, of various ſorts will be found, as the works of the Hindoo founders come to be more known. It is to their leading features only that the ſimilitude is intended to be applied, and in theſe it is often very ſtriking.

1.	1. Nyaya,	Godama,	Peripatetic,	Ariſtotle.
	2. Vaiſiſhika,	Kanada,	Ionic,	Thales.
2.	1. Mimanſa,	Jaimini,	Platonic,	Socrates.
	2. Vedanta,	Vyaſa,		Plato.
3.	1. Sankya,	Kapila,	Italic,	Pythagoras.
	2. Patanjali,	Patanjala,	Stoic,	Zeno.

Each of the above words or names has furniſhed an article in this work, and the enquirer is referred thereto for farther information.

Although moſt of the works claſſed in India under theſe ſeveral heads are recognized as comparatively orthodox, yet ſuch a range is occaſionally taken by the diſciples of all the ſchools, as to ſubject them to a charge of hereſy from opponents of others, and from the rigid of all theological ſects. Another claſs is, however, generally ſtigmatized with the epithets of materialiſts, atheiſts, &c., and indeed there are alſo three principal ſchools of this deſcription, ſubdivided in like manner as above mentioned, into ſix, generally called the atheiſtical ſyſtems. "All full," ſay the orthodox, "of indeterminate phraſes, errors in ſenſe, confuſion between diſtinct qualities, incomprehenſible notions, opinions not duly weighed, tenets deſtructive of natural equality, containing a jumble of atheiſm and ethics; omitting what ought to be expreſſed, and expreſſing what ought to be omitted; abounding in falſe, idle, and impertinent propoſitions."

We cannot detail either the tenets or the titles of ſuch works or ſyſtems. As a ſpecimen we refer to the article NASTICK, the name of one of theſe ſchools, otherwiſe called Charvaka, from the name of its founder. See alſo under BOODH, JAINA, &c. articles thence referred to.

PHILOSOPHY, *Mental*, or the *Philoſophy of the Human Mind*, is that branch of ſcience which inveſtigates the laws of the human mind. Its object is to aſcertain the properties of the mind, the origin of its various modes of thought and feeling, the ways in which they operate upon each other, and the means by which they are to be cultivated or repreſſed.

Mental philoſophy is not uncommonly confounded with metaphyſics; and the abſurdities and fertile ſpeculations which have been claſſed under the latter, have been ſuppoſed by many to belong to the former. *Metaphyſics* (μετα τα φυσικα) comprehends all thoſe inveſtigations which have for their aim the properties, claſſification, and laws of ſuch objects of human thought as by ſenſation alone could not be brought under the notice of the mind; and it conſequently includes the philoſophy of the human mind; but it is obviouſly unjuſt to throw upon this branch of metaphyſics, the ſtigma which, if due to any, belongs to thoſe branches alone, which have no relation to our mental laws and operations. The ancient metaphyſics comprehended many objects which can ſcarcely be ſaid to lie within the ſphere of human knowledge, and which are rather to be conſidered as the reveries of imagination, than as the realities of intellect; but theſe the good ſenſe of the preſent day regards merely as objects of curioſity, notwithſtanding the efforts of the learned Harris and others to bring us back to all the philoſophical vagaries of antiquity. Excluding theſe, however, (with which the ſcience of metaphyſics is no more chargeable, than phyſical ſcience is with the vortices of Des Cartes,) we are diſpoſed to allow a high rank to a few only of thoſe objects of metaphyſical reſearch which do not juſtly claſs under the head of mental philoſophy. We regard them, in general, as only amuſing ſpeculations, which may ſerve to ſharpen the activity of the intellect; but we are no advocates for the young philoſopher ſpending his exertions upon them.

Whatever relates to the properties of the mind, to the operations of intellect and affection, is of high value in various points of view. The philoſophy of the mind, as Mr. Stewart juſtly remarks, abſtracted entirely from that eminence which belongs to it in conſequence of its practical applications, may claim a diſtinguiſhed rank among thoſe preparatory diſciplines which biſhop Berkeley has happily compared to "the crops which are raiſed, not for the ſake of the harveſt, but to be ploughed in as a dreſſing to the land."

The object of moral philoſophy is to ſhew men their duty, and the reaſons of it It teaches what regulation of the conduct and the affections is our duty, why it is our duty, and how it is to be acquired. It is ſufficient barely to ſtate theſe objects, to ſhew at once the ſubſerviency of mental to moral philoſophy. The foundations of the ſcience of morality can only be laid, with ſucceſs, on a judicious acquaintance with the principles of the mental conſtitution. We muſt know what are the affections in which moral excellence conſiſts, how they are to be formed and cultivated, and how oppoſing ones are to be repreſſed or exterminated. Even where morality reſpects the external conduct, the reaſons of it muſt be ſought, among other ſources, in our mental principles. How actions affect our own happineſs or that of others, can only be fully ſhewn by mental philoſophy, or by that experimental acquaintance with the phenomena of mind on which its laws are founded.

Nor leſs important is an acquaintance with the principles of our mental conſtitution to the buſineſs of ſelf-inſpection and ſelf-culture. "The philoſophy of the human mind, (ſays Mr. Belſham,) teaches man to know himſelf, and to improve, direct, and exert his intellectual faculties in a manner the moſt beneficial to himſelf and others. In particular, it impreſſes a juſt ſenſe of the dignity of our rational nature, and the great end of intellectual exiſtence; it directs to the beſt method of cultivating the mental powers, of preventing or correcting prejudice and error, and of enlarging the ſtock of uſeful knowledge. By analyzing the principles of action, and tracing the origin and progreſs of affection, habit, and character, it leads to the proper diſcipline of the heart, and ſupplies the moſt efficacious means of correcting all undue bias of ſelf-love, of reſiſting the motives to vice, of reſtraining the exorbitance of the paſſions, of cultivating virtuous principles, and of attaining that juſt and beautiful ſymmetry of the affections, that elevation of mind, and diſintereſtedneſs of character, which, when combined with vigour of intellect, and comprehenſion of views, conſtitute the true dignity and happineſs of man." Elements of the Philoſophy of the Mind, p. 2.

A ſound and comprehenſive acquaintance with the laws of our mental frame, is of incalculable utility in the buſineſs of education. It gives to thoſe who conduct it, correct views as to its objects. It ſhews the vaſt importance of early impreſſions, of early attention to the culture of habits and diſpoſitions. It points out the beſt means for forming thoſe characteriſtics of intellect and affection, which are eſſential to happineſs and uſefulneſs. On this point ſee INTELLECTUAL and MORAL *Education*; and alſo Mr. Stewart's Elements, Introd. part ii. § 1. The philoſophy of the human mind is to education, preciſely what medical ſcience is to the phyſician. A perſon who has ſtored up the maxims and recipes of former practitioners, and poſſeſſes an active diſcriminating mind, may do wonders without an acquaintance with the ſtructure and phyſiology of the human frame; but for one inſtance in which we find a perſon ignorant of medical ſcience judiciouſly employing means of cure judiciouſly choſen, we meet with thouſands in which the practice is unſteady, irregular, inconſiſtent, caſually perhaps beneficial, but more frequently injurious. And, at any rate, the moſt ſucceſsful of ſuch practitioners would certainly have been more regularly ſucceſsful, if they had poſſeſſed a ſound and extenſive acquaintance with the ſtructure and functions of the body, the nature of diſeaſes, the effects of certain ſubſtances upon the bodily ſyſtem, &c.

We might go on much farther in ſhewing the practical advantages of mental philoſophy; but we have already offered a few remarks on the ſubject in the laſt column of INTELLECTUAL *Education*, to which we refer our readers; and we ſhall only obſerve here, that an acquaintance with the principles of this important ſcience, enables us more correctly to appreciate the ineſtimable value of Chriſtianity, and the ſtrength of the evidences on which it is founded. It leads to the moſt intereſting concluſions reſpecting the worth of Chriſtian precepts, and the exalted nature of Chriſtian motives. It ſhews us how Chriſtianity "reconciles human nature to itſelf;" and it ſhews us that the truth of it reſts upon the well-known laws of the human mind. It directly farthers the cauſe of religion in general, by rendering more obvious the reaſons of the divine diſpenſations, and by the various diſplays of goodneſs and wiſdom which our mental phenomena preſent to us. It tends, beyond all other branches of philoſophical inveſtigation, "to correct, enlarge, and exalt our conceptions of the attributes and character of the Supreme Being, and to lay a foundation for the moſt rational and exalted piety."

We cannot even attempt to lay before our readers a complete ſyſtem of this important ſcience. However brief it might be made, if it were as comprehenſive as the ſubject requires, it would probably be conſidered as occupying a diſproportionate ſhare of our work. What we ſhall aim at is to give ſuch a view of the leading principles of our mental frame, as may aſſiſt to direct the thoughts of the inquirer into the right channel, and ſerve as a foundation for his own inveſtigations. In the ſtudy of mental philoſophy, our ſucceſs muſt ultimately depend upon the attentive examination of what paſſes within ourſelves; and it is only ſo far as the obſervations of others on the phenomena and laws of the mind are borne out by ſuch examination, that we can feel a reaſonable ſatisfaction in their correctneſs.

As to the proper conduct of our philoſophical enquiries, in inveſtigating the laws of the human mind, we have great ſatisfaction in referring to ſome of the ſtatements of Reid and Stewart. We regret to ſee, in various paſſages from the pen of the latter of theſe philoſophers, when ſpeaking of the principles of Hartley, a tone of cenſure, (ſometimes bordering on contempt,) which is clearly founded on miſapprehenſion. This we ſhall hereafter have occaſion to notice more ſpecifically. In ſeveral of Mr. Stewart's more general poſitions, we alſo widely differ from him. But the reader of this article will have opportunities of perceiving, that there are ſome extenſive and highly important portions of his Elements, to which we can yield an entire approbation. Among other things we cordially agree with him in his wiſh to ſeparate between important and well-aſcertained truths, and principles which reſt wholly on conjecture. "The metaphyſical opinions which we may happen to form reſpecting the nature either of body or of mind; and the efficient cauſes, by which their phenomena are produced, have no neceſſary connection with our inquiries concerning the laws, according to which theſe phenomena take place." Without pretending to aſcertain the bounds beyond which human intellect cannot paſs, it appears to us certain, that in the preſent ſtate of mental philoſophy, we can advance no farther with ſafety or practical utility, than the regiſtering and claſſification of phenomena, the deriving from them thoſe concluſions which may be regarded as general laws of the human mind, and the application of theſe laws to explain other phenomena, and to determine the probable reſult of the operation of our mental principles, in caſes where the previous circumſtances are known. The grand point in mental as well as in phyſical ſcience is, to obſerve correctly, to diſcriminate accurately, and to generalize with caution.

When the attention of the mind is directed to its own ſtates and operations, (whether theſe are directly intentional, ſemi-voluntary, or the reſult of habit or external impreſſion,) it is termed *reflection*. The capacity of reflection, on what paſſes within us, is ſeldom perceived very early; and agreeably to the obvious order of nature, it ought not to be predominant till the world without us has furniſhed abundant materials for our mental operations: but Dr. Reid is certainly miſtaken when he aſſerts (Intellectual Powers, eſſ. i. ch. 5.) that "the power of reflection upon the operations of their own minds *does not appear at all* in children." We have noticed it in a child of four or five years old, in ſome very deciſive caſes; and, in various other inſtances, in children under ten or twelve. We are no advocates for the premature or exceſſive culture of reflection; but the rudiments of the habit ſhould be early *begun*, with a view to moral culture; and no one can doubt that mental philoſophy can be ſucceſsfully purſued, only where the attention of the mind can be directed inward, and its own thought and feelings, and modes of thinking and feeling, made the ſubject of examination. Some at the commencement of their mental inveſtigations may find this a taſk of great difficulty; but the more it is attempted, the more eaſy it will become; and when the habit has been in any conſiderable degree acquired, it will in various ways reward itſelf. It is this difficulty which ſo generally operates to prevent the ſtudy of the human mind. Though in ſome reſpects the mental philoſopher has great advantage over the natural philoſopher, (requiring, for inſtance, no apparatus, no rare or expenſive ſubſtances to ſubmit to examination,) yet the inveſtigations of the former muſt, from the very nature of their objects, be attended with obſtacles which in no way affect the latter. The fleeting nature of our notions and feelings, and the extreme difficulty, in many caſes, of ſeparating the operations of thought from thoſe of language, conſtitute ſome of the leading cauſes which impede our ſucceſs in this department of ſcience; and theſe are made ſtill more efficacious, by the difficulty of avoiding, in our explanations of mental phenomena, illuſtrations derived from the objects of ſenſation. Nevertheleſs, the leading principles of the mind are not obſcure or difficult to be inveſtigated; and where theſe are once fully eſtabliſhed, and the inquirer is guided by them in his reſearches, he cannot but attain reſults which will prove of great practical utility; while at the ſame time he will find ſources of intereſt not ſurpaſſed by any which preſent themſelves to the phyſical philoſopher.

It might not be unattended with conſiderable benefit to lay before our readers a connected view of the leading ſyſtems which have been adopted reſpecting the operations of the mind; but it is not neceſſary for our object; nor will the limits we muſt ſubmit to permit it. Thoſe of our readers who are deſirous of ſeeing the opinions of the principal metaphyſicians, ancient and modern, on the ſubject of our mental faculties, ideas, &c. will find a great fund of valuable information in Dr. Reid's Eſſays on the Intellectual Powers, eſpecially in the ſecond.

While we thus refer to Dr. Reid, we think it neceſſary to ſtate that we cannot accord with the leading features of his philoſophy; and it is clear that he fell into the common error of regarding the hypotheſis of vibrations, as an eſſential part of the Hartleyan ſyſtem. We regard it as an incumbrance on the ſyſtem; and we are ſatisfied that no candid reader of the Obſervations on Man will ſay that Hartley in any degree inveſts it with the importance which he juſtly attaches to the doctrine of aſſociation. It is *this* which conſtitutes his ſyſtem; and it is *this* on which he reſts his Rule of Life: and however groundleſs the hypotheſis of vibrations may appear, or may really be, the grand law of aſſociation is in no way whatever affected.

Into the leading principles of the Hartleyan philoſophy, Dr. Reid ſeems ſcarcely to have entered. Indeed he was not likely to ſee their force; for they reſt upon a foundation diametrically oppoſite to what he regards as the grand peculiarity of his own philoſophical opinions,—that our perceptions neceſſarily imply the belief of the preſent exiſtence of the external objects of them, and that theſe are the *immediate* objects of perception. In endeavouring to overturn opinions from which abſurd concluſions have been unjuſtly drawn, Dr. Reid has been led to deny what appears to us the moſt obvious fact, (entirely independent of the theories of Locke and Hartley,) that there are in the mind objects of thought diſtinct from the external cauſes of their production. Numerous valuable obſervations are ſcattered in various parts of Dr. Reid's writings; and the advanced ſtudent of mental philoſophy may read them with pleaſure and profit; but as far as his opinions are founded upon the hypotheſis that there are not in the mind any objects of its operations diſtinct from thoſe acts or operations, we cannot heſitate in pronouncing them viſionary in the extreme. If we had to chooſe between two theories, the immaterial ſyſtem of Berkeley, and the non-ideal ſyſtem of Reid, we ſhould be compelled to adopt the former; for we could ſooner doubt the exiſtence of external cauſes of our ſenſations, than we could the exiſtence of our ideas. We are conſcious of thoughts and feelings, of notions and conceptions, the objects of our mental operations, of recollection, aſſociation, compariſon, reflection, &c.: and we could as ſoon doubt our own exiſtence as theirs. We admit that by the eſſential laws of the mind, if a human being have five ſenſes, and the power of locomotion, the conviction will neceſſarily be produced in his mind, (let philoſophy ſtruggle againſt it as it will,) that there are external objects cauſing (or occaſioning) his ſenſations. As conceptions, however, ſometimes have the vividneſs of ſenſations, and in diſordered ſtates of the ſyſtem are accompanied by the ſame belief, the poſſibility that all our notions of external objects are alike groundleſs might be admitted; but that we have ſuch conceptions and ſenſations is an unqueſtionable fact.

Mr. Stewart, in his Chapter on Perception, appears to be extremely embarraſſed between the leading principle of Dr. Reid, and the plain matter of fact. He virtually gives up that principle in various parts of his Elements; and he ſeems to heſitate reſpecting it where it unavoidably comes under review. Perhaps it is not unreaſonable to conjecture, that had he been leſs converſant with the inveſtigations of Condillac, he would have been more ſhackled by the reſtraints which his venerable and amiable inſtructor had thrown upon philoſophical enquiry, and more turned from the true principles of the mind, by the bias which the ſtrange opinion we have adverted to muſt neceſſarily have given to his reſearches. It was impoſſible for Dr. Reid to have received the doctrine of aſſociation, while he denied the exiſtence of intellectual objects of thought ſeparate from the acts or operations of the mind: and the influence of his principles, together with the unfortunate point of view from which Mr. Stewart conſidered the Hartleyan philoſophy, are ſufficient to account for the fact that this philoſopher regards ſome of the moſt profound and ſucceſsful inveſtigations of our mental principles, as little better than reveries. See life of Reid, and elſewhere.

Locke was not ſufficiently guarded in his modes of expreſſion, and perhaps was not ſufficiently preciſe in his notions reſpecting *ideas;* and he has given Dr. Reid ſome room for placing his opinions on a footing with the fantaſtic theory of Ariſtotle and his followers. We ſee, however, no adequate reaſon whatever to conclude that Locke believed in the hypotheſis of Ariſtotle as to the nature of *ſenſations* and *ideas,* or that he meant in any way to repreſent them as the ancient metaphyſician does his *ſenſible ſpecies, phantaſms,* and *intelligible ſpecies.* Dr. Reid does, indeed, ſay, (Eſſ. i. ch. 1.) that Mr. Locke "tells us, that he means the ſame thing by it (*idea*) as is *commonly* meant by *ſpecies* or *phantaſm,*" (which, however, would in no way prove his referring to the proper *Ariſtotelian* meaning of thoſe terms); but Locke ſays more than this; and though Dr. Reid's great candour of mind muſt have prevented his intentionally miſrepreſenting his meaning, yet our readers will agree with us in the opinion that he has done ſo moſt eſſentially, when we quote a paſſage (probably, indeed, the one referred to, and which Dr. Reid himſelf afterwards quotes) from the Introduction of his Eſſay, § 8. "I muſt here, in the entrance, beg pardon of my reader, for the frequent uſe of the word *idea,* which he will find in the following treatiſe. It being that term which, I think, ſerves beſt to ſtand for *whatſoever is the object of the underſtanding, when a man thinks,* I have uſed it to expreſs whatever is meant by *phantaſm, notion, ſpecies, or whatever it is which the mind can be employed about in thinking;* and I could not avoid frequently uſing it. I preſume (continues our great philoſopher) it will be eaſily granted me that there are ſuch ideas in men's minds: every one is conſcious of them in himſelf, and men's words and actions will ſatisfy him, that they are in others."—We cannot admit that Locke's principles as to the *nature* of our ideas, had any thing in common with thoſe of the Platoniſts, or of the Peripatetics. He may reſemble them in ſome of his terms and *illuſtrations;* and in uſing the latter he has expoſed himſelf to miſapprehenſion and cenſure (ſee Reid's Eſſ. ii. ch. 4.), and probably has contributed to make obſcurity more obſcure. But while Dr. Reid has ſucceſsfully combated the hypotheſis of Ariſtotle and his followers, he has left the grand ſtructure of Locke's philoſophy uninjured. This has its foundation in human nature; and what Dr. Reid has advanced to overturn its fundamental axiom, (which we have juſt ſtated,) appears to us to be directly in oppoſition to the plaineſt principles of common ſenſe. You think of a departed friend, and memory retraces a conception of his venerable form, as diſtinct as if his picture, as if he himſelf, were before you. You ſee him with the "mind's eye;" and you are not conſcious of any impreſſions from external objects, though thouſands of them have their images depicted upon the external organ of ſight. You hear, in imagination, the tones of friendſhip with which he gave you the counſels of wiſdom; you even hear the words in which he clothed them; and the ſounds from without do not at all affect the mind. You think of his virtues, of the diſplays of his tender affection; and as memory with rapid glance carries you from one ſcene of goodneſs to another, you feel the emotions of gratitude, of reſpect, of love. And yet theſe conceptions, theſe notions, theſe feelings, are (if Reid be right) without exiſtence; there are no ſuch things; there is nothing but the mind and its operations, and the external objects on which its operations are employed!—Whether or not the organs of thought be material, with which the ideal ſyſtem is in no way concerned, (but which, as the editor conceives, affords a ſtrong preſumption, that they are not material,) we cannot heſitate in maintaining, as a ſelf-evident poſition, that the *objects* of the *percipient* principle and its *operations* are perfectly diſtinct.

The great principle of Dr. Reid's philoſophy, is, in our apprehenſion, utterly untenable; it may, however, have contributed finally to exclude from mental philoſophy the phantoms of the ancients, which alone he appears to us to have been combating. The Platonic doctrine of ideas is to be regarded as a ſyſtem of philoſophy reſpecting rather the divine than the human mind. It does not appear to have been the object of its founder to explain the origin of ſenſations and ideas. According to Plato (ſee Reid's Eſſ. i. ch. 1.) ideas were "eternal immutable forms or models, according to which the Deity, of an eternal matter, made every ſpecies of things that exiſts."—"The mind of man, in order to its being fitted for the contemplation of theſe eternal ideas, muſt undergo a certain purification, and be weaned from ſenſible things. The eternal ideas are the only object of ſcience; becauſe the objects of ſenſe being in a perpetual flux, there can be no real knowledge with regard to them." The Alexandrian Platoniſts held that theſe ideas were not a principle diſtinct from the Deity, but the conceptions of things in the divine underſtanding.

Ariſtotle clearly had in view to explain the origin and nature of ideas and ſenſations. With the light we poſſeſs on the ſubject, his notions appear in ſome reſpects abſurd enough; but taking into account the nature of the philoſophy then in vogue, it muſt be admitted that they are at leaſt ingenious. Plato's theories are more like the reveries of a poetic imagination, and are purely metaphyſical: Ariſtotle attempts ſomething like mental philoſophy; for which ſee Phantasm.

It is eaſy to comprehend how a vigorous mind, like that of Ariſtotle, capable of forming diſtinct and vivid conceptions,

tions, and of making the objects of thought the ſubject of cloſe contemplation, might fall upon this hypotheſis. The laws of light and the nature of viſion being ſo little underſtood, it was a natural error to ſuppoſe, from the analogy of the other ſenſes, that the viſual organ was affected by ſomething coming off from the object, which produced an image or form of it in the mind; and as diſtinct images or conceptions of external objects can be reproduced without freſh ſenſations, it was equally natural for them to imagine that thoſe images were the original immaterial forms ſomewhat refined by the agency of the mind itſelf. Ariſtotle had, probably, no definite notion of *ideas* derived from any other ſource than the ſight. There are, in fact, very few who can form *conceptions* of any but *viſible* objects; and Ariſtotle, habituated to deep reflection on the objects of knowledge, and the proceſſes of his own mind, muſt have been leſs likely than others to form conceptions of ſound: and as he could have known nothing of the way in which the more refined ideas are formed, by aſſociation, from a variety of ſimple ideas, often derived from the ſenſations of two or more ſenſes, it was the moſt direct inference he could make, (as he ſuppoſed all ideas to have been derived from ſenſation,) that the moſt refined ideas were the forms or ſpecies ſpiritualized. Separate from the hypotheſis as to the way in which the organs of ſenſation are affected, and the manner in which ſenſations are refined, there is a great deal of ſubſtantial truth in his theory; and if Dr. Reid had been leſs bent upon overturning the ſceptical philoſophy, he might have been led, even by Ariſtotle's notions, to ſome important concluſions on the ſubject of ideas, which he has now, in oppoſition to his own principles of common ſenſe, utterly loſt ſight of. If we had only to chooſe from the non-ideal ſyſtem of Reid, the immaterial ſyſtem of Berkeley, and the ſpecies of Ariſtotle, we ſhould prefer the latter, as on the whole moſt agreeable to what we, and, we preſume, all men, feel and believe, as to what paſſes within us and without us.

While reflecting upon Dr. Reid's fundamental principle, which contributes ſo eſſentially to lead away the minds of his followers from perceiving the full extent and importance of the doctrine of aſſociation, we often feel diſpoſed to imagine that we do not ourſelves comprehend his hypotheſis. But view it in what light we will, we are compelled to come to the ſame concluſion, that when oppoſing the ideal ſyſtem of Locke, either his opinions are contrary to fact and common experience, or his ſtatements are founded on merely verbal diſtinctions. At any rate, what he ſays againſt Locke's ideal ſyſtem in no way affects our own; for what he terms *notions* and *conceptions* (Eſſ. ii. ch. 14, &c.) we regard as comprehending the whole round of the *ideas* of the underſtanding. And if his theory allows, (what we regard as an indiſputable fact,) that it is poſſible for the mind to form a *conception* (or, if we might be allowed, by way of illuſtration, to call it a *picture*) of ſomething which has no real exiſtence in nature,—to dwell upon this conception till it acquires a degree of vividneſs and ſtrength which ſhall make the mind, for the time, utterly unconſcious of the external objects which affect the organs of ſenſe,—and, in diſeaſed ſtates of the underſtanding, to believe it to be a ſenſation derived from an external object, and to think and act as if it were really ſuch,—then the warmeſt advocate of that theory muſt, one would ſuppoſe, farther admit, that it leaves the Berkeleyan theory unaffected in its leading poſitions, and that the dictates of common ſenſe and common philoſophy here agree, that when the mind is thinking it thinks about ſomething, and that that ſomething is diſtinct from the operation of thinking, and may have no archetype in the whole round of ſpiritual or material ſubſtance. And if that point is conceded, it neceſſarily follows, that (though much remains in Dr. Reid's works which is truly valuable) his peculiar fundamental principle has a merely verbal importance, or is altogether groundleſs.

Mr. Locke had the great merit of eſtabliſhing a poſition which lies at the foundation of mental and moral philoſophy, that *there are no innate principles in the mind.* Like the doctrine of inſtincts, that of innate ideas could not but fall before an enlightened yet cautious examination of any mental principles. We are ſo conſtituted by the great Author of our frame, that in the circumſtances in which mankind in general are placed, certain notions will be formed, and certain affections will ſpring up in the mind. If we are at once to reſt ſatisfied with the fact, there is an end to philoſophical inveſtigation; if we call them innate or inſtinctive, we do worſe; becauſe in the one caſe we are only in ignorance, in the other we cover our ignorance with a deluſive ſhow of knowledge. Whilſt, with philoſophical caution to examine into the origin of them, we may be led to important and juſt concluſions; but if we cannot ourſelves get to thoſe concluſions, we ought not to throw impediments in the way of our ſucceſſors in the walks of intellectual inquiry. We are, however, arrived at that period of mental progreſs, where theſe contented appeals to ignorance are deſervedly neglected. Since the time of Locke, no philoſopher, we believe, has ventured into the regions of darkneſs, to account for what his luminous principles at once explain; and in proportion as the doctrine of aſſociation is thoroughly underſtood in its full extent, will it be found unneceſſary to reſort to inſtinct, (in other words to an occult cauſe, occult in its nature and in its operations,) to account for our intellectual and moral phenomena.

We think it unneceſſary to enter at all into the conſideration of the hypotheſis of innate ideas. Locke's Eſſay is probably acceſſible to all our readers; and we refer them to his introductory chapters, if they have any doubts on the ſubject. On the hypotheſis of inſtincts we ſhall have occaſion to ſay a few words hereafter; but we are ſatisfied that no one who goes along with us in our leading poſitions reſpecting the theory of aſſociation, will reſort to a notion ſo deſtitute of all ſupport from the acknowledged principles of the mind. If the law of aſſociation does not yet account for all the phenomena once referred to inſtinct, it clearly and ſatisfactorily explains ſo much, and by analogy affords a clue to ſo much more, that it is, to ſay the leaſt, much more prudent to wait for farther light on the ſubject, than to put an end to inquiry, by maintaining that we have in any inſtance reached an ultimate *inſtinctive* principle, or mode of operation in the human mind.

Univerſal belief affords no infallible teſt of truth; but when it reſpects practical principles, it furniſhes to the religious philoſopher a preſumption in favour of thoſe principles, and will prevent him from too haſtily deciding againſt them. Such belief preſents a reaſonable ground for ſuppoſing, that they originate in the laws of our frame, under the influence of circumſtances common to all mankind; and where this is the caſe, the voice of nature may be juſtly regarded as the voice of God. And the ſame may be ſaid reſpecting the natural affections. We perceive with pleaſure that our ideas here coincide very much with thoſe of Mr. Stewart (Phil. Eſſ. p. lxviii.), and we earneſtly hope that that philoſopher will complete his propoſed inveſtigations.

But ſuch reaſoning cannot affect the Berkeleyan philoſopher. Indeed there are between him and the vulgar herd no common principles. All that he hears and ſees is ſolely the world of his own mind; and he muſt either be conſiſtent beyond, we ſuppoſe, poſſibility, or act utterly inconſiſtently with his own principles, if he uſe what we ſhould call his corporeal organs to increaſe his ſtore of ideas. If, however, he ſhould be guilty of ſuch inconſiſtency, as to think of this book as ſomething out of himſelf, marked with ſome material ſubſtance by a being like himſelf, ſo as to convey the ideas which another ſuch being has in his mind, we wiſh to ſuggeſt the following enquiries to him; and at any rate we ſuggeſt them for the ſatisfaction of thoſe who with ourſelves imagine that there are external objects, diſtinct from the mind itſelf, occaſioning its ſenſations.

In the firſt place, we wiſh to have a clear diſtinction preſerved between our inability to give a completely ſatisfactory reaſon for any opinion, and the abſolute groundleſsneſs of that opinion. Multitudes who believe in Chriſtianity might eaſily be puzzled by the acute ſceptic; and be unable to produce a correct reaſon for their belief though others could, and though in their own minds there were actually exiſting the rational grounds of ſuch a conviction. Next, in balancing between two inconſiſtent hypotheſes, we are to conſider not merely whether each will equally well account for one ſet of phenomena, but alſo whether there are any for which one will account and the other not. We do not deny that the mental philoſopher has not yet reached that complete analyſis of our internal principles, of our notions and feelings, as would enable him to point out, in all caſes, how each would be formed in the mind. He is not as yet able to ſhew in a completely unobjectionable manner, how the popular belief is produced; though we are of opinion that Condillac, in his Traité des Senſations, has afforded the means of making great progreſs towards it. But this does not prove the belief falſe. The opinion involves no abſurdity. It is not inconſiſtent with itſelf, or with any known phenomena. It accounts for all we know, at leaſt as well as the Berkeleyan hypotheſis. And, on the other hand, this hypotheſis is oppoſed by every ſenſation we experience from the touch, or from the other ſenſes, if it is accompanied with aſſociated ideas derived from the ſenſe of feeling; and if this be denied, it muſt be admitted to be utterly inconſiſtent with a phenomenon of vaſt extent; *viz.* that the exiſtence of external objects is doubted by none who are left to the dictates of plain good ſenſe, that it is expreſsly believed by all ſuch perſons, if they think at all on the ſubject, and that notions of external objects, *conſidered as ſuch*, are continually in the mind of every one.

The ſimple ſtate of the caſe is, that though it is *poſſible* that there may be no external world. occaſioning our ideas, &c., and though we cannot exactly explain the formation of the univerſal belief that there is; yet, on the other hand, the hypotheſis that there is, is perfectly accordant with all the known phenomena of the mind, and is neceſſary to account for one which the oppoſite hypotheſis can in no way acount for, and with which it is even directly inconſiſtent. If we can go no farther, we can at leaſt ſay that the human mind is ſo formed, that the belief in the exiſtence of external objects muſt ſpring up in it; that the practical belief in it cannot be deſtroyed without a derangement of the mental functions; and that even the ſpeculative belief in it will only give way to a mode of reaſoning, which introduced into real life would make human conduct full of abſurdity and danger. We muſt, however, again obſerve, that ſome progreſs has been made in ſhewing the ground of this belief; and that, admitting the exiſtence of external objects, it is not difficult to perceive how the principle of aſſociation muſt produce the belief, by combining the impreſſions produced on the mind through the organs of feelings, aided by the power of locomotion.

In what follows we ſhall therefore take for granted,

1. That there are external objects cauſing or occaſioning ſenſations.

2. That theſe objects do *not* ſend off from them immaterial forms, which, when conveyed into the mind, produce ſenſations, and are afterwards refined by our mental faculties into phantaſms, &c.: nevertheleſs,

3. That *there are objects of thought in the mind, diſtinct from the operations of the mind*, ſuch as conceptions, *e. g.* diſtinct from the operation of conception, and notions recollected, diſtinct from the act of recollection: and,

4. That none of theſe objects of thought are innate; but are all derived from ſenſation, or from reflection on the operations of our own minds.

The fourth reſts for its foundation on the leading principles of Locke's Eſſay. For proof of the ſecond, we refer to aſcertained facts connected with the ſtructure of the body, and the common principles of optics. The third we muſt leave to the reader's own conſciouſneſs. And the firſt we are contented to reſt upon univerſal belief, or, if the term be preferred, common ſenſe, in connection with the arguments juſt advanced on the ſubject.

I. *General View of the Faculties of the Mind.*—That, whatever it be, which thinks, and feels, and wills, is called *mind;* that part of the human being which thinks, and feels, and wills, is called the *human mind.*

We obſerve, without us and within us, numerous phenomena: the object of philoſophy is to deduce from them thoſe general laws, agreeably to which they are produced; and then to employ thoſe laws in the explanation of other phenomena. Mental philoſophy purſues the ſame method which has been ſo ſucceſsfully adopted in natural philoſophy; and as in phyſics, ſimilar phenomena are referred to the operation of ſome one cauſe or power, ſo in mental ſcience, thoſe phenomena which have all one common feature are referred to ſome faculty or property of the mind, by whoſe operation theſe phenomena are ſuppoſed to be produced. What is the nature of thoſe mental or phyſical powers, philoſophy does not profeſs to explain.

If we hold a luminous body before the eye, it produces ſome change in the ſtate of that organ, and this produces in the mind a feeling: this feeling is called a *ſenſation.* This name is alſo given to all thoſe other feelings which are produced in a ſimilar way, *viz.* owing to a change in the organs of ſenſe, whatever be the cauſe by which the change is produced. The general fact or law is, that ſenſations are produced by what affects the organs of ſenſe. Now to account for this fact, we infer that the mind is poſſeſſed of a power or capacity which we call *ſenſation*, or better, to avoid ambiguity, the *ſenſitive power.* This, then, is that power or capacity of the mind, by whoſe operation it receives ſenſations from things which affect the organs of ſenſe.

We know, as a matter of fact, that though ſenſations ceaſe ſoon after the exciting object is withdrawn, yet if they have been produced ſufficiently often or vividly, the cauſes of feeling, ſimilar in kind, remain in the mind; and thoſe ſimilar feelings can recur, when no change is produced in the organs of ſenſe. Theſe are called *ideas:* they are *the relics of ſenſations.* Such is the general law or fact. The operation, or act of retaining relics of ſenſations, may, with the ſtricteſt propriety, be termed *retention;* and to account for it, we infer that the mind poſſeſſes a power or capacity, which we may term the *retentive power.* This, then, is that power or capacity of the mind, by which it retains relics of ſenſations.

Again, it is an indiſputable fact, that theſe ideas, or relics of ſenſations, do not remain ſingle in the mind, but become connected with one another, ſo that the recurrence of one, or of its correſponding ſenſation, will bring on another; and that in certain caſes they become ſo blended together, that the parts can ſcarcely be diſtinguiſhed. Thus the word *orange*, either pronounced or thought of, will bring up the idea of the appearance of an orange. Again, the idea of the word *houſe* is accompanied by a certain feeling, which is altogether different from that which accompanies the idea of the word *ſhip*. If we think about it a little, we uſually have the idea of a particular houſe recalled: this is a *ſimple idea* (or *idea of ſenſation*, or *conception*,) *connected* with other ideas, but not *combined* with them; but, in general, if the word occurs without the mind dwelling upon it, we may perceive an indiſtinct feeling, which is compoſed of a variety of ſimple ideas, received from a variety of thoſe objects to which we give the name *houſe*. That the feeling is thus compoſed, we have a full right to aſſert, on an attentive conſideration of the cuſtomary proceſſes of the mind. Simple ideas may then be *connected* with other ideas; or they may blend and *coaleſce* with other ideas, ſo as to form new ones, which are called *compound* or *complex ideas*. The general fact is, that connections and compoſitions take place among our ideas; and when thus connected or compounded, we ſay that they are aſſociated together; and the connected or compounded group we call an *aſſociation*. To account for the formation of aſſociations, we infer that the mind poſſeſſes a power or capacity of connecting or combining ideas, which may be called the *aſſociative power*. This, then, is that power or capacity of the mind, by which it connects and compounds ideas.

Farther: it is obvious that without any external excitement of the nerves by which muſcular motion is produced, the mind can produce ſuch motion; in other words, that ſtate of the motory nerves by which muſcular motion is effected, can be produced by the mind. We do not here enquire how the mind learns to uſe its influence over the motory nerves; but ſtate the fact, that muſcular motion can be produced by the mind without external excitement. To account for this, we infer that the mind poſſeſſes a power or capacity of influencing the motory nerves ſo as to produce muſcular motion, which may be called the *motive power*.

There is no term appropriate to thoſe ſtates of mind which produce the changes in the motory nerves requiſite for muſcular motion; and we are therefore ſo far free from a difficulty which has accompanied us when ſpeaking of ſenſations and ideas. Theſe terms, as moſt commonly uſed, imply that the conſciouſneſs of the mind is excited: but it appears to us an almoſt indiſputable fact, that the mental organs, whatever they be, by whoſe action the conſciouſneſs is excited, are often in a ſtate of activity without ſuch excitement of the conſciouſneſs; in other words, that thoſe changes, which, when accompanied with conſciouſneſs, are termed ſenſations and ideas, may take place, and produce an effect in the mental ſyſtem, without exciting the conſcious or percipient principle. In order to enter into the conſideration of this fact, which in ſome points of view appears to us important, it will be neceſſary to conſider ſomewhat more explicitly in what manner we employ the term *mind*, and to introduce ſome leſs cuſtomary terms in order to avoid ambiguity.

In the philoſophical ſenſe of the term *mind*, it ſeems to belong excluſively to the conſcious or percipient principle, whatever that be; but in common language we certainly employ it differently: *e. g.* no one heſitates in ſaying, "ſuch a man has an extenſive ſtore of knowledge in his mind;" but no one ſuppoſes that at any one time a man perceives, that is, is conſcious of, all the parts of that knowledge. In the ſame manner, no one would heſitate in ſaying, "ſuch a perſon has a great fund of valuable reflections for the conduct of life ſtored up in his mind, which he can produce whenever circumſtances call for them;" but no one ſuppoſes that thoſe reflections are always in the view of his mind, that is, that he is always conſcious of them, that he always perceives them. All that can be meant in ſuch caſes is, that the cauſes of his ideas (that is, of his notions, conceptions, and feelings,) remain in the mind ready for excitement, when they produce ideas. Hence, then, the mind, in the common acceptation of the term, in which we uſe it, conſiſts of two parts; the conſcious or percipient principle, and the organized ſubſtance, which furniſhes to the former the objects of its conſciouſneſs or percipiency. What the conſcious or percipient principle is, is probably known to him only who formed it: we may believe conſciouſneſs or percipiency to be a property which is the neceſſary reſult of, or added to, a certain organized ſyſtem of matter; or we may believe it to be a property of ſome ſubſtance eſſentially different from matter; and we apprehend it is not of very much conſequence which opinion is adopted: but it ſeems indiſputable, that in the preſent ſtate of knowledge, we cannot obtain, on either ſide, more than a bare preponderance of probabilities. See on this ſubject the articles MATTER and SPIRIT.

That organized ſubſtance, which, without any farther medium, furniſhes to the conſcious or percipient principle the objects of conſciouſneſs or percipiency, may be called the *ſenſorium*. The parts of which the ſenſorium is compoſed, by whoſe changes, without any further medium, conſciouſneſs is excited, may be called the *mental organs*. By the mind we underſtand the whole together, the conſcious or percipient principle, together with the ſenſorium; leaving it undecided, whether conſciouſneſs is a property of organized matter, or belongs to a ſubſtance eſſentially different from matter; and alſo, whether the ſenſorium be or be not the medullary ſubſtance of the brain. (See SENSORIUM.) Hartley, as is well known, adopts the affirmative in the latter caſe; and he ſuppoſes that the changes of the ſenſorium which affect the conſciouſneſs, are vibrations of the medullary ſubſtance. We conſider this hypotheſis as a clog upon, at leaſt, the adoption of his grand ſyſtem of aſſociation; and we ſhould prefer the more general term *motions*, if we profeſſed to decide reſpecting the nature of the ſenſorium: as we do not, we ſhall employ the ſtill more general term *changes*, the term *affection* being already otherwiſe appropriated.

The changes in the ſenſorium or mental organs, which may excite the conſciouſneſs, may be called *ſenſorial changes*. Of theſe, ſome are produced by the impreſſion of external objects on the organs of ſenſe: theſe may be called *ſenſible changes*. Others, as we know by their effects, are producible without the preſence of external objects: theſe may be called *ideal changes*, and are the relics of ſenſible changes. A third claſs comprehends thoſe which are followed by muſcular motion, and may be termed *motory changes*. Senſorial changes of each of theſe claſſes may take place without exciting the conſciouſneſs, as we ſhall ſoon endeavour to ſhew. When ſenſible changes are accompanied with conſciouſneſs, they are called *ſenſations*; when ideal changes are accompanied with conſciouſneſs, they are called *ideas*: and as ſenſible and ideal changes are principally important to us when accompanied with conſciouſneſs, and it is ſeldom neceſſary to diſtinguiſh between thoſe which do and thoſe which do not excite it, we ſhall not uſually depart from the cuſtomary nomenclature. We have no term appropriated to denote motory changes accompanied with conſciouſneſs: this deficiency probably ariſes from the circumſtance, that muſcular action is ſo much an object of the ſenſes, that, by aſſociation, it is referred to the moving muſcle, and not to the intermediate fibrous motions and ſenſorial changes. Thus, while writing, all the motion ſeems to be in the fingers, and in the fingers alone, though even the minuteſt motion, except that which is produced by ſome external ſtimulus upon the motory nerve, neceſſarily ſuppoſes motory changes of the ſenſorium, and ſhould, ſcientifically ſpeaking, be referred to the ſenſorium, or mind.

To ſhew that ſenſorial changes are not neceſſarily accompanied with conſciouſneſs, we obſerve, that the diminution of conſciouſneſs can be traced in its various ſtages, from the ſtate of active attention, to caſes where we have no reaſon to believe that conſciouſneſs is excited, where yet we have good reaſon to believe that there were ſenſible changes, becauſe thoſe effects are produced which we know are produced by ſenſations, (that is, by ſenſible changes of which we are conſcious,) and, as far as we know, in no inſtance without ſenſible changes. The following facts will at leaſt illuſtrate this poſition, which we muſt leave to the reader's cloſe reflection on the procedures of his mind. Perſons much accuſtomed to employ notes in ſinging, ſometimes feel ſo deeply intereſted in the thoughts and feelings excited by the words they are ſinging, that though the notes continue to regulate their tones of voice, the ſenſible changes are altogether unnoticed by them, they do not excite the conſciouſneſs. Again, many who have been long accuſtomed to perform upon a muſical inſtrument, and are able to play with eaſe at firſt ſight, can, while playing, even a piece of muſic which they have not ſeen before, converſe and carry on a train of reaſoning, and yet play correctly. The appropriate ſenſible changes muſt in ſuch caſes be produced; for otherwiſe the proper motory changes which occaſion the motions of the fingers could not; but they are not accompanied with conſciouſneſs: as ſoon as they are, attention to the converſation or train of reaſoning is interrupted. In the ſame manner, perſons accuſtomed to read aloud, can continue to read aloud even what they have never read before, (provided the modes of expreſſion be not peculiar,) with correctneſs, at leaſt, and at the ſame time have their thoughts cloſely engaged on other ſubjects. The moment their attention is called to what they are reading, their own train of thought is broken. When we are walking along a road, eſpecially if it be familiar to us, our minds may be inſtantly occupied in reflection or converſation, ſo that the appearances of the road which direct our motions, ſhall not, in the ſlighteſt degree, excite the notice of the mind. That thoſe appearances do direct us, and, of courſe, produce ſenſible changes, though they do not excite the conſciouſneſs, is obvious; becauſe if we keep our ſight from them, by cloſing the eyes, by reading, &c. we are continually interrupted by a little trip or jar, unleſs the road is extremely ſmooth, or extremely familiar to us. In this laſt caſe, either the ſenſible changes produced by the impreſſions on the feet, direct the appropriate motory changes and conſequent muſcular motions; or, one motory change is followed, owing to long aſſociation, by its next ſucceſſive motory change, and ſo on.

We are fully aware that, in theſe ſtatements, we ſhall not meet with the concurrence of thoſe who adopt Mr. Stewart's theory on the ſubject, in his chapter on Attention; but it is, in opinion, abundantly more conſonant with the laws of the mind, and more borne out by the cloſeſt reflection on our mental proceſſes, to ſuppoſe that ſenſorial changes of different kinds may produce each other, without exciting the conſciouſneſs, than to imagine, with Mr. Stewart, that when the mind is moſt deeply engaged upon a train of thought, it may at the ſame time be continually paſſing to impreſſions produced by external objects on the organs of ſenſe, and actually *willing* the motions with which thoſe impreſſions have been long connected; and all this, confeſſedly, without our being able, in any degree, to retrace the change of attention, or the act of volition, in thoſe caſes where the connection between the external impreſſion and the muſcular motion is habitual, and the thoughts cloſely occupied upon the internal object of attention. It not unfrequently happens that perſons, under the influence of very ſtrong excitement of feeling, or deep engagement of thought, pace their chambers with rapid ſtep, utterly unobſervant of every external object, and for the time utterly unconſcious of every thing but the immediate object of thought and feeling; and yet they never run againſt the wall, but turn with as much correctneſs when they ought to turn, as if their attention were particularly directed to the objects around them. Now is it, we would aſk, in any way conceivable, that though the entrance of a perſon into the room, the loud ſounds of carriages paſſing, &c. would in no degree obtain their attention, the cuſtomary impreſſions from the walls, &c. ſhould every moment have a portion of their attention, which muſt on this ſuppoſition be *conſtantly* fluctuating to them from its immediate object, and all this without leaving the ſlighteſt trace in the memory. Innumerable impreſſions are inceſſantly produced on the corporeal organs of ſenſation, (beſides thoſe of ſight and hearing,) particularly on the organs of feeling, both from the action of external objects, and from the various perceptible motions of the bodily ſyſtem. Theſe we ſeldom notice, till ſome circumſtance or other particularly directs our attention to them. The moment this is the caſe, we have the appropriate ſenſations; for inſtance, thoſe produced by the preſſure of our feet on the ground, of our arm on the table, of our pen on the fingers, and of our clothes on various parts of the body, or by the muſcular motions attending reſpiration, the beating of the heart, the twinkling of the eye, &c. Now if Mr. Stewart's theory were juſt, theſe and every other impreſſion which might, at any one time, produce ſenſations, and which the mind really obſerves, when its notice is from any cauſe directed to them; all theſe muſt be every inſtant attracting its notice with inconceivable rapidity, and in an imperceptible degree, and this even when the mind is ſo completely abſorbed with its own contemplations, that a violent external impreſſion could not divert its attention from them. As ſoon as Mr. Stewart's hypotheſis is thus carried to its juſt extent, it loſes every appearance of rational foundation; and ſince it cannot be conſiſtently relinquiſhed, (as far as we can perceive,) ſo long as Dr. Reid's leading principle is retained, the abſurd concluſions to which it leads may be regarded as an additional proof that the principle itſelf is without foundation in the nature of the human mind. The fact appears to us to be, that the external impreſſions do produce ſenſible changes, juſt the ſame whether the attention of the mind is directed to them or not; that when the attention is fully occupied, if the ſenſible changes are not ſufficiently vivid to interrupt the train of thought, or are not cloſely connected with other ſenſorial changes, they produce no farther effect than a tendency to a more eaſy (if not more impreſſive) recurrence from ſimilar impreſſions; that, in ſhort, the mental ſyſtem is no farther affected by them; but that if other ſenſorial changes have been habitually connected with them, theſe will be produced by them, without the conſciouſneſs of the mind being excited to the proceſs. The reſult may be muſcular motion; and in this caſe, (and ſometimes by this only,) we have proof of the operation of the external impreſſion on the mental organs.

If the reader's own experience or obſervation do not furniſh him with ſatisfactory proof of our poſition, that ſenſorial changes may take place, (and if ſo, very often do take place,) without exciting conſciouſneſs, we are diſpoſed to think that the following fact, (ſtated by Dr. Percival, in his Moral and Literary Diſſertations, p. 110.) may be reſted upon as deciſive. "Several years ago, the counteſs of —— fell into an apoplexy about ſeven o'clock in the morning. Among other ſtimulating applications, I directed a feather, dipped in hartſhorn, to be very frequently introduced into her noſtrils. Her ladyſhip, when in health, was much addicted to the taking of ſnuff, and the preſent irritation of the olfactory nerves produced a junction of the fore-finger and thumb of the right hand, the elevation of them to the noſe, and the action of ſnuffing in the noſtrils. When the ſnuffing ceaſed, the hand and arm dropped down in a torpid ſtate. A freſh application of the ſtimulus renewed the ſucceſſive effort; and I was witneſs to their repetition, till the hartſhorn loſt its power of irritation, probably by deſtroying the ſenſibility of the olfactory nerves. The counteſs recovered from the fit about ſix o'clock in the evening; but though it was neither long nor ſevere, her memory never afterwards furniſhed the leaſt trace of conſciouſneſs during its continuance."

The gradual diminution of the conſciouſneſs of external impreſſions is perceptible on various occaſions. If we are obſerving an extenſive proſpect, a picture of the whole field of view is formed at once on the retina. We ſuppoſe it will generally be admitted, that whenever a viſual impreſſion is thus produced, the intermediate organs convey ſome notice of it to the mental organs. As a matter of fact, it is clear that till the attention is given to ſome particular parts, we perceive the whole field of view with more or leſs impreſſiveneſs, according as the parts are more or leſs diſtinctly and vividly delineated on the retina, and near the axis of viſion. By degrees the attention is drawn to ſome particular object, or part of the proſpect; and the conſciouſneſs of impreſſions on the external organ from the other parts is diminiſhed. If the mind is cloſely engaged in obſerving that object, it may be, and often is, utterly unconſcious of any other: if the attention to it leſſens, the other parts are perceived again; in other words, the mind again becomes conſcious of the ſenſible changes produced by the external impreſſions; and this conſciouſneſs is more or leſs diſtinct, in proportion to the degree in which the attention is left unengaged by any particular object, and to the circumſtances above ſtated. It requires ſome ſkill in the exerciſe of reflection to obſerve theſe, and ſimilar proceſſes of the mind. If the direction of the attention to them is attended with difficulty, the play of the mind is impeded, and the real ſtate of the caſe is leſs perceptible. To obſerve the operations of the mind ſucceſsfully, we muſt frequently obſerve them, till the direction of the attention to them becomes eaſy; and then we may often detect what is actually taking place, without any material interruption of it. What is wanting is facility and accuracy in obſerving what paſſes within us; and when early produced by mental and moral culture, the beſt foundation is laid for ſucceſs in the purſuit of mental ſcience. The following may be to many a more familiar caſe than what we have above adduced. Suppoſe any one in a room near a water-fall, a forge, or ſomething elſe producing a uniform ſound, or ſitting near a clock: if every thing beſides is quiet, and the mind in that muſing ſtate in which its own trains are leſs impreſſive than the impreſſions from external objects, the ſound is perceived, and more or leſs diſtinctly, according as the attention is directed to it; and it is eaſy to obſerve the variations in the degree of the mind's notice of it, from the ſtate of direct attention to that in which one can hardly tell whether it is noticed or not. We often may catch ourſelves at the very inſtant that the conſciouſneſs of the ſound is vaniſhing altogether: and that it does ſo, cannot be out of the experience of every reader. If his watch, at the moment of reading this, happens to be lying on his table, he now begins to hear its beat; and he continues to do ſo in a greater or leſs degree, till his attention being again engaged with ſome other object, the ſound loſes its impreſſiveneſs, and is altogether loſt from the view of the mind.

We are aware that the facts in the preceding paragraph, and others ſimilar to them, may to a certain degree be accounted for, by ſuppoſing that the mental organs ceaſe to be affected by external impreſſions, when the attention is given to any other object; that, in fact, the impreſſions on the retina, for inſtance, then only affect the ultimate organs of ſenſation, (*i. e.* produce ſenſible changes in the ſenſorium,) when the attention of the mind is not engaged on other objects. But it appears to us much more philoſophical to ſuppoſe, that the intermediate and mental organs of ſenſation are always affected in proportion to the degree in which the external organs are; and that the ſole cauſe of their not exciting the notice of the mind is, the greater degree in which it is given to ſome other object of thought or ſenſation. We cannot ſuppoſe that the mere diminution of attention to other objects, ſhould renew the progreſs of that change in the organs of ſenſation which begins in the external organ. It ſeems unreaſonable, in itſelf conſidered, to ſuppoſe that the attention of the mind to other objects ſhould ſtop the progreſs of the change which takes place in the organs of ſenſation, (beginning at the external organs,) before the mental organs are affected; or that this progreſs ſhould be renewed by the mere diminution of the attention to thoſe objects. And at any rate, if impreſſions on the external organs may, without exciting the conſciouſneſs, be followed by muſcular motion, not originating in the mere external ſtimulus, (as we ſee abundant reaſon to conclude,) then the point may be regarded as proved, that every affection of the external organ of ſenſation produces a correſponding change in the intermediate and ultimate organs, and that the degree of attention given by the mind to the ſenſible change, (the change in the ſenſorium or mental organs,) depends upon the comparative impreſſiveneſs of the change, ariſing from various cauſes, and particularly affected by the degree in which the attention is engroſſed by objects of thought, feeling, or perception, not related to the ſenſible change.

We have no wiſh to carry our opinions on this ſubject beyond the bounds of fact and experience; but we ſee reaſon to conclude that ideal changes alſo may take place without exciting the conſciouſneſs. Here the difficulties are greatly increaſed, becauſe we have no evidence of the exiſtence of any mental changes, of which we are not conſcious, except by their cauſes and conſequences. The following caſe, however, appears to us ſatisfactory on this point. Every one who can add up a column of figures, knows the nature of the mental operation, becauſe it is learnt after the memory has acquired conſiderable power. The ſum of two or three figures is firſt aſcertained; the ideal change of that ſum muſt, of courſe, be in the mind; and with that ſum is combined the next figure, and ſo on. Now, then, there is the act of adding a number, the ideal change of which is in the mind, to another number of which there is a ſenſible change, and there is the ideal change of the ſum, and ſo on, continually recurring; all this we perceive when we are adding up ſlowly. But perſons who are very familiar with ſuch additions, will tell the reſult, or final ſum, apparently without an effort, apparently without the intervention of the mind, or any conſciouſneſs of the operations and ideal changes which muſt have paſſed in the mind, before the reſult could have been obtained. It will not, unfrequently, be found, that perſons very much habituated to theſe operations, can add up much more correctly, while they leave themſelves unconſcious of the operations and ideal changes, than when they direct the attention in any way to them; and what appears to us to ſettle the point, as far as conſciouſneſs is concerned, the ſkilful accountant who, by conſtant exerciſe, has become familiar with all the poſſible combinations of ſmall numbers, can go through a ſeries of additions, (and in one inſtance which we have heard of, a complex ſeries, ſuch as the addition of the columns of pounds, ſhillings, and pence, at one operation,) and at the ſame time cloſely engage the attention upon ſome other object; for example, can dictate to an amanuenſis.

As to motory changes, the fact is ſo obvious, that muſcular actions, which muſt have had their origin in the mind, (as being regulated by impreſſions on the external organs of ſenſe,) go on in long ſucceſſion, and with frequent variation, while, at the ſame time, the attention is fully occupied by ſome object of thought, that we are ready to ſuppoſe that nothing but its oppoſition to a pre-formed hypotheſis could lead a perſon to imagine that, in ſuch caſes, the muſcular action excites the conſciouſneſs. Such an immenſe variety of muſcular actions are continually taking place, in caſes in which volition was once concerned, without, in any perceivable degree, exciting the notice of the mind, and this is ſo obvious a fact, and ſo ſatisfactorily accounted for by the Hartleyan philoſophy, that however plauſible the counter conſiderations of that really eminent philoſopher Dugald Stewart (ſee Elements, ch. ii.), we cannot ſuppoſe that his hypotheſis can gain admiſſion where the operations of the aſſociative power are thoroughly underſtood.

It ſeems to us not impoſſible that the whole of thoſe ſenſorial changes which are not modified or occaſioned by the re-action of the ſentient principle, *might* take place without *mind* in the uſual philoſophical ſenſe of the term. We do not, of courſe, mean, that there could be *ſenſations*, or *ideas*, or *voluntary motions* without mind; but that the correſponding ſenſorial changes (ſenſible, ideal, or motory,) might, in all other inſtances, except what we have juſt excluded, have been produced, and the *mechaniſm* of the mind, have, in ſome meaſure, gone on, without percipiency. And when we conſider the wonderful phenomena of life, growth, and re-production, which are brought about by the delicate material ſtructure of plants and animals, we feel no difficulty in allowing, that *thus far* the material part of the human ſyſtem is ſufficient to account for the phenomena, not of *thought*, but of the *immediate occaſions* of thought. The immediate *mechaniſm* of ſenſation, of ideas, of aſſociation, and of motion, we would refer to the ſenſorium; and we might ſuppoſe the ſenſorium to be material; but there is ſomething beyond this. The ſenſitive change is not a ſenſation; the ideal change is not an idea; theſe imply percipiency and thought; theſe imply *mind* in the ſtricteſt ſenſe; and the percipient principle is the mind itſelf. The motory change might be produced by its mechanical connection with different ſenſitive or ideal changes; but this is not volition; volition is a property of the *mind*.

We excepted the ſenſorial changes occaſioned or modified by the re-action of the percipient principle. As far as ſenſible changes merely are concerned, the exception is of little conſequence; for in *receiving* theſe, the mind has little to do. Exerciſe and attention may increaſe the ſuſceptibility and vigour of the external organs, and the ſenſible changes may conſequently become more lively and vigorous; and the effect of any ſenſible change upon the mental ſyſtem will, in a great degree, depend upon the attention which the mind gives to it; but we ſee no adequate room to doubt, that whenever the external organ is affected, a correſpondent change takes place in the ſenſorium, whether it affect the percipient principle or not, *i. e.* whether or not it become a ſenſation. The caſe, however, is different reſpecting ideal changes, and the aſſociations which take place among them. In the firſt place, were it not for the attention of the mind to the ſenſible changes, few of them, comparatively ſpeaking, would be retained; and then none of thoſe aſſociations could be formed, in which the mind, properly ſo called, has any ſhare, none ariſing from the perception of various relations, from intentional combinations, from acts of reaſoning, volition, &c.; all would be mere mechaniſm, exquiſite and perfect in its nature, yet ſtill nothing but mechaniſm.

We have ſometimes been inclined to conſider the ſenſitive, retentive, and aſſociative powers, "as the elementary powers of the mind, to the operation of which all *intellectual* phenomena may be referred" (ſee INTELLECTUAL *Education*, col. 2.); but farther reflection on the claſſification of our intellectual phenomena and their mental cauſes, induces us to extend the number of our intellectual powers. We ſtill ſee no reaſon to heſitate in ſuppoſing that thoſe elementary powers are ſufficient to account for all the phenomena of memory, conception, and fancy; and there cannot be a reaſonable doubt that the operations of the aſſociative power have great influence among our other intellectual phenomena; but we fully agree with Mr. Stewart, in the opinion which he has ſtated in different parts of his works, that it is injurious to the progreſs of mental ſcience to ſimplify mental principles too far. We are ſatisfied that he has not gone far enough; that under the fettering reſtraints of Reid's principles, he is contented to reſt with various extenſive claſſes of our mental phenomena as ultimate facts, where the operations of the aſſociative power afford an explanation equally clear and important; but the ſtudent of Hartley ſhould alſo ſtudy the writings of Mr. Stewart; in many, and theſe the moſt valuable parts, they are perfectly conſiſtent with Hartleyan principles; where his views are inconſiſtent with them, we have ſeldom ſeen reaſon to follow him, but there are caſes in which he furniſhes a ſalutary check upon the tendencies which the full adoption of thoſe principles can ſcarcely fail to give the ardent inquiring mind, unreſtrained by the caution of experience, and ſuppoſing them omnipotent becauſe their inadequacy has not been ſuggeſted by oppoſing ſyſtems, or by the actual application of them to the phenomena of thought. If the mentaliſt is ſo little able to think and judge for himſelf, that he muſt implicitly imbibe his philoſophy from another, we ſhould greatly prefer his adopting the ſyſtem of Hartley to that of the ſchool of Stewart; becauſe the former, though imperfect, and in ſome degree incorrect, is radically and extenſively true, and leads to the moſt important practical principles for the regulation of the affections and the conduct of life; but where there is the baſis of a ſound and independent underſtanding, to ſtudy the principles of an anti-Hartleyan, as Mr. Stewart at laſt compels us to call him, cannot fail to produce a greater approximation to the truth. As far as phenomena go, thoſe which he has detailed furniſh important materials for the Hartleyan to try his own philoſophy upon. His reaſonings, where they do not involve his firſt principles, it is impoſſible to examine without perceiving that they mark a highly cultured and refined underſtanding, under the guidance of that moral worth which never fails to clear away numerous miſts from the mind. Thoſe firſt principles can ſcarcely fail to appear to the unbiaſſed inquirer as inconſiſtent with human nature as with the Hartleyan doctrines. His invectives and groundleſs inſinuations againſt Hartley, will ſerve as an exerciſe of his diſciples' candour. His practical maxims for the conduct of the underſtanding in the ſearch after truth will often afford a valuable guidance in the proceſſes of philoſophical inveſtigation. And his happy talent of illuſtration, his ſimple elegance of ſtyle, his general perſpicuity of reaſoning and expreſſion, muſt excite in the mind of the Hartleyan the paſſing wiſh, "would he were one of us!" till he recollects that the intereſts of truth muſt eventually be moſt promoted by having ſuch an opponent.

Having made this digreſſion, we will go on ſomewhat farther. This article may be read by ſome who have hitherto paid but little attention to the ſubject. If they will allow us to give them the direction of ſome experience, we would recommend, firſt, the peruſal of this article as a kind of outline of the leading features of this moſt important branch of philoſophy. Next, or with it at the reſpective references, the 5th, 6th, and 7th chapters of Mr. Stewart's Elements. They may then proceed with great advantage to the ſtudy of Locke's Eſſay, and Hartley's Obſervations, leaving out of the latter, at their firſt peruſal of it, all the parts relating to the hypotheſis of vibrations, or taking Dr. Prieſtley's abridgment. They will then be prepared for the examination of any other works on mental philoſophy, to which their own taſte, or accidental circumſtances, may direct them. In Mr. Belſham's Elements they will find a very judicious ſummary of the principal topics of metaphyſical inquiry connected with the philoſophy of the mind, together with references to the principal writers who have diſcuſſed them; and we wiſh here to mention that there may be ſome paſſages in this article, principally, we believe, in the ſection on the *Claſſes of Connections*, which we have derived from that work without acknowledgment; to Hartley it is needleſs ſpecifically to acknowledge our obligations. Beſides the works which we have occaſionally referred to, with approbation, we muſt recommend to our readers Tucker's Light of Nature purſued. There are few works on abſtract ſcience ſo calculated to call into exerciſe the powers of inveſtigation, and to ſharpen the penetration of the underſtanding. The author is diffuſe, and not unfrequently far from preciſe in his modes of expreſſion; and it is not always eaſy to aſcertain his drift; but his manner, even in the moſt abſtruſe parts, is ſo lively, his illuſtrations ſo numerous and ſtriking, and yet ſo original and appropriate, and his obſervations in themſelves conſidered ſo ſtrongly marked by good ſenſe, that philoſophy is obliged to be continually on her guard, to prevent being carried on unawares to concluſions which, in her more ſober moments, ſhe muſt reject. In a variety of inſtances he has found the truth; and where he is leſs ſucceſsful, he ſchools his reader to activity, acuteneſs, and vigour of thought. Paley, in the Preface to his Moral Philoſophy, expreſſes his great obligations to him; and it is not too much to ſay, that that eminently uſeful writer owed a great deal, not only of his matter, but of the moſt attractive part of his manner, to him. In preparing this article, the writer of it has not been able to avail himſelf much of this Light of Nature purſued; but he wiſhes to acknowledge his obligations to that work for an important diſtinction in the acceptations of the term *mind*, which he had for ſome time been verging to, but had not reached, till he met with it there. Will the reader excuſe his ſtating the procedure of his mind on the ſubject? About ſix or ſeven years ago, he was engaged in ſome mental inveſtigations, which led him to attend to the fact that operations which would be univerſally conſidered as belonging to the mind, might go on without exciting the conſciouſneſs. It admitted of an eaſy explanation upon the hypotheſis of vibrations; but he wiſhed to found no opinion on that hypotheſis. He had occaſion to ſtate the fact under different aſpects; but could find no words but *ſenſations* and *ideas;* and to ſpeak of theſe as exiſting without conſciouſneſs, appeared a contradiction in terms. In the unguarded uſe of both by Prieſtley, Tucker, &c. and of the latter in one or two inſtances by Hartley, he had ſome juſtification; but he perceived it was inadequate. Regarding conſciouſneſs as the eſſential principle of mind, he felt great perplexity on the ſubject of theſe operations which he could not but believe to be juſtly referred to the mind. In examining Tucker for juſtification of an extended application of the terms *ideas* and *ſenſations*, he met with a diſtinction between the popular and philoſophic acceptation of the term *mind*, which gave a ſatisfactory modification to the reſults of his own inveſtigations. (See Light of Nature, ch. vii.) The appropriate term *mental organs* founded on this diſtinction he has alſo taken from Tucker, without going ſo far as that writer does in determining their nature.

If, in uſing the terms *ſenſorium* or *mental organs*, we ſhould be ſuppoſed, by any reader, to involve any unfounded hypotheſis, we have only to obſerve, that we adopt them ſolely to give ſome degree of preciſion to our notions on the ſubject; and that he may leave them out, if he will allow us to uſe the term *mind* in its looſer acceptation, and ſay that ſenſible changes are thoſe changes in the mind which, when they have the notice of the percipient principle, are termed *ſenſations*, and ſo on in the other caſes. We cannot allow that this phraſeology involves any *hypotheſis;* but is founded on an extraordinary, but in our apprehenſion well aſcertained, fact, in our mental conſtitution.

We were going, ſeveral paragraphs back, to obſerve that the characteriſtic phenomena of judgment, reaſoning, and reflection, do not appear to us capable of explanation by the laws of ſenſation, retention, and aſſociation; and theſe claſſes of mental operations cloſely connected, and in ſome caſes perhaps not diſtinguiſhable, we would arrange under the general head of *Underſtanding*, which, much as Hartley does, we would define the faculty of the human mind by which we contemplate ſenſations and ideas, conſidered as ſuch, and the various operations of the mind, diſcern the relations which exiſt among the objects of perception and thought, purſue truth, and aſſent to, or diſſent from, propoſitions.

With the views which we have ſtated in this 1ſt diviſion of the preſent article, we ſhall, in the ſubſequent diviſions, conſider the leading faculties of the mind in the following order.

II. *Senſitive Power.*
III. *Retentive Power.*
IV. *Aſſociative Power.*
V. *Motive Power.*
VI. *Memory.*
VII. *Imagination.*
VIII. *Underſtanding.*

I. *Of the Senſitive Power.*—The brain is a ſoft pulpy maſs, of a whitiſh colour on the inſide, occupying all the cavity of the ſkull. Minute differences are obſervable in the ſubſtance of the brain, in different parts of it; but it is unneceſſary to enter upon a ſtatement of them here. (See Brain, and its dependent articles.) The ſpinal marrow is the continuation of the loweſt part of the brain, which paſſes through the great opening of the ſkull down the hollow of the back bone. From the brain and ſpinal marrow proceed the nerves, which at firſt are fine fibres of the ſame ſubſtance with the brain; theſe fibres meet, and form ſoft white pulpy cords, which afterwards ſpread themſelves over various parts of the body, by ſplitting into innumerable and exceedingly minute branches. Anatomiſts count forty pair of nerves (for they come off in pairs though they afterwards ſeparate); of which nine or ten only come from the brain at the bottom of the ſkull, and the reſt from the ſpinal marrow. Thoſe from the brain are diſtributed to various parts of the head; thoſe from the ſpinal marrow are diſtributed over the trunk and extremities. See Nerves.

The external organs of ſenſe, the nerves, and the brain, in which, for brevity, we include the whole medullary ſubſtance, are the corporeal organs of ſenſation. All, as we are at preſent conſtituted, are neceſſary to ſenſation. If the external organ is deſtroyed, no ſenſation can be produced; where there are no nerves, there is no ſenſation; where the nervous branches are moſt numerous, there is moſt ſenſation; if the nerve be deſtroyed, ſenſation cannot be produced from thoſe parts to which the nerve belongs, which are farther from the brain than the injured parts. The brain is the ultimate organ of ſenſation of which we have any knowledge. All the nerves terminate in the brain. If the brain is compreſſed, ſenſation is ſuſpended. If the brain is conſiderably injured, ſenſation ceaſes.

There is, in like manner, conſiderable reaſon to ſuppoſe that the brain may be the immediate organ of ideas. If the brain is diſeaſed, many of the phenomena of thought are altogether changed. If the brain is compreſſed, thought is ſuſpended. If the brain is materially injured, ideas ceaſe.

So alſo the brain appears to be the primary organ of all motions which are not produced by the immediate action of external objects upon the muſcles. The muſcles are the immediate organs of motion. (See Muscle.) The muſcles conſiſt of fleſhy ſubſtances, and generally alſo of tendon. The tendons faſten the muſcles to the bones; and the fleſhy parts, by their contractions, produce the motions of the bones. Into the fleſhy parts of the muſcles, numerous nerves enter; they are diffuſed over their ſurface, and within their ſubſtance. Theſe nerves, as before-mentioned, terminate in the brain; they are the intermediate organs of voluntary motion between it and the muſcles. If a nerve be compreſſed or punctured, motion is produced in the muſcle over which that nerve is diſtributed. If a portion of that nerve be cut, or otherwiſe deſtroyed, voluntary motion can no longer be produced in that muſcle over which it was diſtributed. If the brain be touched with any inſtrument, or cauſtic be applied to it, the muſcular ſyſtem undergoes the moſt violent contortions. If the ſpinal marrow be compreſſed, the power of voluntary motion is ſuſpended in thoſe muſcles which receive their nerves from the back. If the brain is conſiderably injured, all power of voluntary motion ceaſes.

Some of our readers may hope that we are now going to give ſome hypotheſis on the nature of thoſe changes in the corporeal organs which occaſion or accompany ſenſation, idea, and voluntary motion. We have, however, none to give. If our object were different, we ſhould lay before them Hartley's hypotheſis of vibrations, with the arguments for and againſt it; but we cannot convince ourſelves that it has any thing to do with mental philoſophy. All that appears to us important, in the preſent ſtate of our knowledge reſpecting the connection between the mind and the body, we have already ſtated: no hypotheſis as to the phyſical occaſions of thought can, yet, really explain the operations of thought. If there muſt be ſome hypotheſis, connected with the doctrine of aſſociation, we recommend the reader to aſſume Hartley's hypotheſis, employing the term *vibrations* merely to denote the changes, whatever they be, in the ultimate material organs of the mind, which occaſion or accompany the various exerciſes of the percipient principle. We do not think he will gain much by it; but it will do leſs harm than by defining the nature of thoſe changes. On the hypotheſis of vibrations, the reader may conſult Reid and Belſham. The latter has given a luminous ſtatement of the arguments for and againſt it. We learn from Dr. Aikin's General Biography (Hartley), that Haller maintains that it is totally incompatible with the nature of the nerves and medullary ſubſtance. (See Haller's Elementa Phyſiologiæ, vol. iv. ſect. 8. art. Conjecturæ, § 4.) Reſpecting the part of the brain moſt intimately connected with the mental functions, ſeveral curious facts are ſtated in a paper by M. de la Peyronnie, ſubjoined to Jurain's French tranſlation of Hartley's firſt volume, (1755,) taken from the Memoirs of the French Academy of Sciences. The opinion of that author, founded on his facts, is, that the *corpus calloſum* is the ſeat of the ſoul. We have no opportunity of knowing what Dr. Ferriar may have urged againſt this opinion in the Mancheſter Tranſactions.

The *external Organs of Senſation* are uſually claſſed under five heads, ſight, hearing, feeling or touch, ſmell, and taſte. The ſenſe of feeling might probably be divided, with convenience, into two or three; becauſe the claſſes of ſenſations which are referred to this ſenſe differ conſiderably in themſelves, and in the external cauſes producing them. But the common arrangement is ſufficient for our purpoſe.

The preſent article, and the next following, have unexpectedly been conſigned to the writer of thoſe on Education. If he had foreſeen this circumſtance, he would have made references to this article from Intellectual and Moral *Education*. As it is, he has, in ſeveral parts of thoſe articles, introduced obſervations which would otherwiſe have had place here; and though it would be eaſy to reſtate them with conſiderable amplification, yet his limits being neceſſarily confined, he prefers referring to thoſe articles, for ſuch obſervations as may be neceſſary for his preſent purpoſe.

To perceive the influence of each ſenſe in forming our notions and feelings, it is neceſſary carefully to diſtinguiſh between the mere ſenſation, and thoſe ideas which are, by aſſociation, ſo connected with it, as to appear at firſt view a part of the ſenſation. When the ſenſation, produced by an external object, is ſo cloſely united with ideas derived from other ſenſes, or from the ſame ſenſe in different circumſtances, that the whole ſhall appear to be one feeling, apparently derived immediately from the external impreſſion, the whole together, the ſenſation and aſſociated complex idea, is called a *perception*. For farther illuſtration, ſee Intellectual *Education*, chap. ii. col. 3, 4. The change of ſenſations into perceptions, furniſhes ſome very important inſtances of the operation of the aſſociative power; and without an acquaintance with the influence of aſſociation in making ſenſations at once bring complex ideas into the view of the mind, it is impoſſible to underſtand the real nature of perception. It clearly was not underſtood by Dr. Reid;

nor indeed was it poſſible for him to enter into the diſtinction between ſenſation and perception, without calling in the agency of aſſociation; and as we have already hinted, he could not receive the doctrine of aſſociation, when his fundamental poſition rendered the exiſtence of this principle impoſſible. By long exerciſe, the operations of perception become ſo intimately united with ſenſations, that, in numerous caſes, the ſenſation is with great difficulty diſtinguiſhed from the aſſociated idea; and it is not to us at all ſurpriſing, that a man of ſuch cool and ſteady character of mind, ſhould not have been able to diſcriminate between the ſenſation and, in his caſe, the *unvarying* aſſociated ideas, ſince he had not acquired an inſight into the formation of ideas by aſſociation, and had even brought himſelf to deny the exiſtence of any *objects* of our mental operations ſeparate from the external objects of ſenſation. He ſaw that the Berkleyan hypotheſis was contradicted by the obvious dictates of common ſenſe, and being unaided by the principles of aſſociation, he had no reſource but to make the ſenſation introduce the belief of an external cauſe of it, by inſtinct, or a kind of inſpiration.

1. *Senſe of Feeling.*—When the mind has connected the complex ideas derived from the touch, with the viſible appearance of objects, the ſight is then indefinitely the moſt uſeful channel of knowledge reſpecting external objects; but in the earlieſt ſtages of the intellectual progreſs, the touch is the moſt uſeful; in fact, as man is formed, it is then abſolutely neceſſary to render the ſight productive of moſt of its preſent utility. The ſenſe of feeling differs from the other ſenſes, in belonging to every part of the body, external or internal, to which nerves are diſtributed. The term *touch* is moſt correctly limited to the ſenſibility which is diffuſed over the ſurface of the body. The touch exiſts with the moſt exquiſite degree of ſenſibility, at the extremities of the hands and in the lips. The ſenſe of touch is thus very commodiouſly diſpoſed, for the purpoſe of encompaſſing ſmaller bodies, and for adapting itſelf to the inequalities of larger ones.

The ſenſations acquired by the ſenſe of feeling, are thoſe of heat, hardneſs, ſolidity, roughneſs, dryneſs, motion, diſtance, figure, &c.; and all thoſe corporeal feelings which ariſe from a healthy or diſeaſed ſtate of the nerves, and of the part of the body to which they belong.

The pains of this ſenſe are more numerous and vivid than thoſe derived from any other ſenſe; and therefore the relics of them aſſociating and coaleſcing with one another, conſtitute the greateſt ſhare of our mental pains. On the other hand, its pleaſures being, in general, faint and rare, in compariſon with others, and particularly thoſe of the taſte, have but a ſmall ſhare among the rudiments of the mental pleaſures. The ſexual feelings of a corporeal nature, however, when under due regulation, do undoubtedly contribute, in more advanced periods, to the compoſition of ſome refined mental feelings; and for ſome very important remarks reſpecting the origin and influence of theſe deſires, we beg to refer to Hartley's 73d propoſition.

The touch is the original medium of our knowledge reſpecting the real qualities of ſubſtances, and indeed is the ſole medium by which we gain a knowledge of external objects as ſuch. It is by the touch, and originally by the touch alone, aided by the power of muſcular motion, that we diſtinguiſh our own bodies from other objects that ſurround us, and from the impreſſion which every one has, that the objects which affect the ſight, the hearing, &c. are external. When we touch a ſenſible part of our bodies, we have ſenſations conveyed to the mind through two nervous branches; when we touch any other body, we have only one ſenſation. For ſome intereſting and often ſatisfactory ſpeculations as to the influence of different ſenſes in forming our ideas reſpecting external objects, ſee Condillac's Traité des Senſations. Mr. Stewart appears to have been led by that work to ſome remarks at the cloſe of his chapter on Perception; and we do not heſitate in ſaying, that thoſe remarks entirely overthrow the fundamental principle of Dr. Reid's theory of perception, by which he imagined he had demoliſhed the viſionary hypotheſis of Berkeley. See PERCEPTION.

The notion that external objects give us the ſenſations of ſound, taſte, ſight, and ſmell, is ſo continually forced upon us by the ſenſations of touch, aided by the power of muſcular motion, that there probably was never found a perſon who doubted of the exiſtence of the external world as the cauſe of his ſenſations, except from the influence of philoſophical ſpeculation. Some very acute thinkers have, indeed, given up the belief of an external world as the cauſe of their ſenſations; but their opinion never did, nor never can, gain much ground; for it is inconſiſtent with the perceptions, which, by the conſtitution of our frame, are neceſſarily formed from continually recurring ſenſations. The philoſophic Berkeley, and a late writer, Mr. Drummond, are the chief ſupporters of this curious, but to ſay the leaſt, unimportant opinion. If it were allowable to leave every thing out of conſideration, but the occaſional vividneſs of our viſual conceptions, and the indiſputable fact that ſenſations are merely affections of the mind, it might be very difficult to reſiſt the acuteneſs of their reaſonings; but we are fully ſatisfied, that they would never have come to their curious concluſions, if their object had been to inveſtigate the ſources of that belief which we doubt not they had themſelves, except in the moments of abſtract ſpeculation; and if they had paid more attention to the influence of the ſenſe of feeling (aided, of courſe, by muſcular motion) in the formation of our perceptions. They would then have regarded it as infinitely more probable that this almoſt irreſiſtible conviction is a well-grounded one, than that every human being is almoſt every moment of his life labouring under a deluſion by the very conſtitution of his nature, for which no ſuppoſable end can be aſſigned, and which muſt therefore be inconſiſtent with the known attributes of the Supreme Being.

Some philoſophers have ſuppoſed, that it is owing to the exquiſite delicacy of feeling which exiſts in the hand, together with the exquiſite mechaniſm by which it is applied, that man poſſeſſes ſuch ſuperiority in knowledge over the lower claſſes of animals. It cannot be juſt to attribute to this cauſe alone his mental ſuperiority: but, indiſputably, as man is conſtituted, it is eſſential to the degree of ſuperiority now poſſeſſed; and we obſerve, that tribe of animals poſſeſſes the greateſt degree of what may be called human wiſdom, which has the ſenſe of touch moſt perfect; the flexible organ at the end of the elephant's trunk anſwering ſome of the purpoſes of the human fingers. See INTEGUMENTS.

2. *Senſe of Taſte.*—This ſenſe, and that of ſmell, are nearly allied to the ſenſe of feeling. They are, however, properly diſtinguiſhed from it, becauſe they have each a peculiar organ, and are each affected by peculiar properties of bodies. The chief organ of taſte is the tongue; and it is fitted for its office, by the numerous extremities of nerves which are lodged along its ſurface, and particularly at the top and ſides. Hartley conſiders this ſenſe as extending to the other parts of the mouth, and through the throat, and the other parts of the alimentary duct. Taken in this comprehenſive acceptation, the ſenſe of taſte con-

veys to the mind ſenſations not only of flavours, but of hunger and thirſt.

In order to produce thoſe ſenſations of taſte which are derived from the tongue, its nervous extremities muſt be moiſtened; and the action of eating generally produces the effuſion of a fluid from different parts of the mouth, which anſwers the purpoſe of exciting the taſte and aſſiſting the digeſtion.

The taſte undergoes ſome remarkable changes in paſſing from infancy to old age. Sweets generally grow leſs and leſs agreeable, and ſometimes even diſagreeable, and at laſt nauſeous. Aſtringent, acid, and ſpirituous liquors, which diſpleaſe at firſt, afterwards become highly grateful. Even bitter and acrid ſubſtances firſt loſe their offenſive qualities, and after a ſufficient repetition give a reliſh to our aliment. And many particular articles of food or medicine, become either extremely pleaſant or diſguſting, from aſſociations with faſhion, joy, hope of advantage, hunger, the pleaſures of cheerful converſation, &c. or with ſickneſs, vomitings, gripings, fear, ſorrow, &c. Theſe changes are partly in conſequence of the uſual effect of cuſtom on the organs of ſenſation, both external and internal, *viz.* to diminiſh the vividneſs of ſenſation; and partly owing to the influence of aſſociation. This operates, Hartley thinks, principally in the following method. The pleaſant and painful impreſſions which particular foods and medicines make upon the ſtomach, always either accompany the taſte, or follow it in a ſhort time; and by this means an aſſociation is formed, whereby the direct pleaſantneſs or nauſeouſneſs of the taſte is enhanced, if the impreſſions upon the tongue and ſtomach be of the ſame kind, or diminiſhed, and perhaps overpowered, and even converted into its oppoſite, if they be of different kinds. In like manner, a diſagreeable taſte, by being often mixed with a pleaſant one, may at laſt become pleaſant alone, and *vice verſâ*: hunger and ſatiety may alſo, by being joined with particular taſtes, contribute greatly to augment or abate their reliſh. It may alſo be obſerved here, that the deſire of particular foods or liquors, is often directly excited by their aſſociated circumſtances, and this, in ſome caſes, more than by their taſtes, or even when their taſtes are nearly, if not altogether, become indifferent; and it is very common for theſe circumſtances, particularly the ſight or ſmell of the food or liquor, to prevail againſt men's better judgments, directing them to forbear, and warning them of the miſchiefs likely to ariſe from ſelf-indulgence.

The pleaſures derived from taſte are very conſiderable; and the power of yielding pleaſurable ſenſations uſually accompanies the taſte through the whole of life. Hence it is reaſonable to infer, that its pleaſures conſtitute one grand ſource of the mental pleaſures, that is, of thoſe which can be felt without the direct intervention of ſenſation. They leave their relics in the mind; and theſe combine together, with other relics of pleaſurable ſenſations, and they form feelings which often connect themſelves with objects which have no immediate connection with the objects of taſte. To this ſource Hartley traces the principal origin of the ſocial pleaſures; and there cannot be a doubt, that the pleaſures of taſte are the chief original ſource of the filial affections. (See MORAL *Education*, col. 22, 23.) It appears that one end of the long continuance of the pleaſures of taſte, is to ſupply continual acceſſions to the mental pleaſures; but, without a doubt, the principal object is to make that a ſource of pleaſure which is neceſſary to ſelf-preſervation. The pains of taſte are much leſs numerous than thoſe of feeling. They are only ſuch as are neceſſary to prompt to avoid exceſſive abſtinence or gratification, and to prevent the employment of improper food. "The moſt common of theſe painful impreſſions is that from exceſs, and the conſequent indigeſtion. This excites and ſupports thoſe uneaſy ſtates, which attend upon melancholy, fear, and ſorrow."

3. *Senſe of Smell.*—This ſenſe is very nearly allied to that of taſte; and indeed many of thoſe pleaſurable ſenſations which are uſually referred to the taſte, (as being received during the act of eating and ſwallowing,) really belong to the ſmell. The external organ of ſmell is a membrane or ſkin, overſpread with nerves, which line the internal cavity of the noſtrils, and the ſurface and cavities of the bones which join the noſtrils. This is affected both by the odorous particles which proceed from external ſubſtances through the noſe, and by thoſe which come from the ſubſtances which are eaten; for there is a communication between the noſe and the back part of the mouth.

The pains of ſmell are obviouſly deſigned to aſſiſt us in the proper choice of food; and alſo to prompt us to avoid ſuch noxious vapours, as may render the air injurious to health and life. It appears alſo, that offenſive odours, in various circumſtances, contribute to generate the ſenſe of ſhame, decency, &c. The pleaſures of ſmell have a direct connection with thoſe of taſte: it is only neceſſary, therefore, to add to what has been ſaid reſpecting the latter, that the pleaſures of ſmell which ariſe from the various productions of nature, have a conſiderable ſhare in the formation and vividneſs of ſome of our mental pleaſures; and, in particular, of thoſe which ariſe from the view of rural objects and ſcenes, and from the repreſentations of them by poetry and painting.

4. *Senſe of Sight.*—The organ of ſight is a globular body, which contains within it tranſparent ſubſtances fitted to form on the back part of it, a picture of the object of ſight. The examination of an ox's eye will give a pretty accurate idea of the general ſtructure of the human eye. We ſee in front a horny tranſparent ſubſtance, called *cornea*. Next to this is a watery fluid, called *aqueous humour*, in which the *iris* floats like a delicate curtain, with an aperture in the middle, called the *pupil*. Behind the iris we find a ſolid body, with two ſurfaces of different convexities, called the *cryſtalline lens*. Next to this is the *vitreous humour*, a jelly-like tranſparent ſubſtance, which fills the ball of the eye. The *retina* conſiſts of exceedingly minute fibres from the optic nerve, which are ſpread over the whole of the back part of the inner ſurface of the eye. Behind the retina is a mucous ſubſtance, which in the human eye is of a dark colour, and ſerves to imbibe the rays of light which paſs through the retina, ſo as to prevent the confuſion which would ariſe from the reflection of them. The retina is the immediate organ of ſight. The rays of light proceeding from every viſible point of the object of ſight, enter the eye through the cornea, and paſs through the pupil: they are refracted by the three humours of the eye, ſo as to form upon the retina an exquiſitely beautiful and diſtinct, though minute, picture of the object. A tolerable idea of the formation of the picture may be obtained, by carefully cutting off the back coating of an ox's eye, and holding behind it a piece of paper to receive the picture of ſome luminous object. For a minute account of the ſtructure of this organ, ſee EYE.

What effect is produced upon the optic nerve by the formation of this picture upon the retina, is not certainly known: it is ſufficient for our preſent purpoſe, that, by means of the nerve, &c. the impreſſion, of whatever nature it be, is communicated to the mental organs, and produces in them thoſe effects, which, when they excite the conſciouſneſs, are called ſenſations.

The picture on the retina is inverted; and yet it does not appear that the viſual ſenſation conveys the notion of the object being inverted, even when unaided by the ideas derived from the touch. The firſt efforts of children to graſp, &c. afford no indication that the object appears to them inverted; and we are not aware that the rectification of this viſual impreſſion is among the leſſons which the blind have to learn when they have been reſtored to ſight. When the kitten playing before the mirror ſees her own image, and ſtrikes her paw againſt it, (before ſhe is wiſe enough to try, like Lee Boo, to look behind it,) ſhe aims as if ſhe perceived the image in the direct poſition: her image appears at the bottom of the glaſs, and, we will ſuppoſe, on the right ſide of it; and there ſhe ſtrikes; though in the picture on the retina it appears at the top, on the left. The efficacy of aſſociation to correct the influence of the inverted picture, by the ideas derived from the touch, we could in no way doubt; but, notwithſtanding the ſtatements of ſome optical and metaphyſical writers, we are ſatisfied that the mind does not ſee objects inverted, though the impreſſion upon the retina, if the immediate object of the mind, muſt, of itſelf, produce this notion. The nervous fibres of which the retina is compoſed, may change their relative poſition before they reach the brain; or the mental organs of touch and thoſe of ſight may have ſuch a relation, (of ſituation, if corporeal,) that the ſenſations of poſition in this reſpect ſhall correſpond. Whatever may be the real cauſe, however, the fact clearly is, that the inverted picture on the retina does not produce a ſenſation of the object as inverted; and that by the viſual impreſſions alone, the erect object is perceived as erect. The landſcape or portrait painter can, by long habit, ſeparate the viſual ſenſation from the perception, and ſee the objects of ſight as they would appear on an uniform ſurface; but we never heard that he was able to ſee them inverted, which he muſt ſometimes do, in the courſe of his abſtract attention to the viſual ſenſation, if, as appears to be commonly thought, the viſual impreſſion of itſelf, ſeparate from the ideas derived from the touch, conveyed to the mind the notion of objects as being in an inverted poſition. Even the profound Hartley has paſſed over this circumſtance without adequate conſideration.

If the ſenſation produced by the object of ſight be conſidered unblended with the relics of other ſenſations, we find that it is merely what can be communicated by a minute picture on the retina. The ſenſation of colour can be thus communicated, and this is the only ſenſation which can be conſidered as appropriate to the ſight. The ſenſation of figure can be communicated, but only of figure in two directions, length and breadth; for the picture on the retina can have only thoſe two dimenſions. The ſenſation of magnitude can alſo be thus communicated, but not of real magnitude; for a ſenſation of real magnitude cannot be conveyed by a picture which is almoſt indefinitely ſmaller than the real object. To uſe the illuſtration of Adam Smith: "If you ſhut one eye, and hold immediately before the other a ſmall circle of plain glaſs, of not more than half an inch in diameter, you may ſee through that circle the moſt extenſive proſpects, lawns, and woods, and arms of the ſea, and diſtant mountains. You are apt to imagine that the viſible picture, which you thus ſee, is immenſely great and extenſive; but it can be no greater than the viſible circle through which you ſee it. If, while you are looking through the circle, you could conceive a fairy hand and a fairy pencil to come between your eye and the glaſs, that pencil might delineate upon that little glaſs, the outline of all thoſe extenſive lawns, and woods, and arms of the ſea, and diſtant mountains, in the dimenſions in which they are ſeen by the eye." Again, it is obvious, that however large or however ſmall the field of view, the picture occupies an equal extent upon the retina. Similar obſervations might be made with reſpect to diſtance. The organ of ſight can convey only that ſenſation of diſtance which may be produced by a minute picture on the retina; that is, nothing but the ſenſation of the diſtances of the different parts of the picture, which may bear no proportion to the real diſtances, and can only be in two directions. Similar things may be ſaid of motion, that is, change of poſition. The viſual ſenſation of motion is merely that produced by the motion of different parts of the picture on the retina.

The fact is, that not the objects themſelves, but the picture formed upon the retina, is the immediate object of the ſight. Without the ſenſe of touch it is probable that the picture would never have conveyed ideas of real figure, magnitude, motion, or poſition; ſtill more, that it would never have conveyed the idea, that external objects produced the picture. Of colour it does convey ſenſations which do not receive correction from the touch, and which, can be acquired by the ſight alone. Perſons completely blind have been known to diſtinguiſh objects of one colour from thoſe of another, but this is by the feel of the ſurfaces of thoſe objects. If they have never at all poſſeſſed ſight, though they may ſpeak of colours, and diſtinguiſh coloured objects, and even have a remote idea of the cauſes of our ſenſations of colours, yet they can have no ſenſations, nor conſequently ideas of colours. Mr. Locke mentions a blind man, who ſaid, that he imagined the colour of ſcarlet reſembled the ſound of a trumpet.

The limits here ſtated of the direct power of the ſenſe of ſight, may appear ſtrange to thoſe who have not been accuſtomed to diſtinguiſh between the ſenſation, and the perception of which the ſenſation forms a part. We ſeem to have an immediate ſenſation, by means of the ſight, of the real ſituation and magnitudes, &c. of objects; but what has been before ſtated is an indiſputable fact. The caſe is, the compound ideas formed from the ſenſations of touch, in connection with certain viſual ſenſations, are ſo early formed, and ſo early connected with thoſe viſual ſenſations, that we have no recollection of the ſimple ideas of ſenſation, or of the formation of the compound ideas: indeed, as active agents, we have no concern in the formation of our perceptions. There are, however, numerous circumſtances which prove the point; the moſt ſatiſfactory are thoſe attending the obtaining of the ſight, at a period when recollection can regiſter the ſenſations. One ſuch caſe fell under the obſervation of the able Cheſelden, and we ſhall ſtate ſome of the principal circumſtances of it. Mr. Cheſelden couched a youth of thirteen years of age. When he was allowed to uſe his ſight, all objects appeared to him alike to touch his eyes, as the things which he felt touched his ſkin. He conſidered ſolid bodies as planes differently coloured; and when he had learned to diſtinguiſh ſolids by their appearances, he was greatly ſurpriſed, when examining the pictures of ſolids, to find all the parts plane and ſmooth like the reſt; he aſked which of his ſenſes deceived him, his ſight or his feeling? Being ſhewn a miniature of his father, which was painted on a watch caſe, he at once perceived that it was a repreſentation of his father, but expreſſed great ſurpriſe that ſo large a countenance could be contained in ſo ſmall a ſpace, it appeared to him as impoſſible as for a pint to contain a hogſhead. Mr. Ware publiſhed, in the Philoſophical Tranſactions of 1800, a caſe which ſeemed to militate greatly againſt Mr. Cheſelden's concluſions: Mr. Ware's patient from the firſt had ideas of diſtance and form. But Mr. Ware himſelf furniſhes a ſolution of this difficulty; for we find, from his paper, that his patient had always been able to diſtinguiſh light and vivid colours from ſhade.

Senſations of colours are, in the early parts of life, very vivid, and aſſiſt conſiderably in the formation of our mental pleaſures; but the other ſenſations derived from this ſenſe are principally important to us, as being by aſſociation the ſigns of the ideas derived from the touch; and, from their diſtinctneſs, well calculated to ſerve as the connecting bond of union, and to bring thoſe ideas again into the view of the mind. The viſual ſenſations, of themſelves conſidered, are ſeldom the objects of reflection; we ſeldom even think of them; and while we appear to give to the viſible appearances of objects our minuteſt attention, we are, in fact, attending only to the tangible qualities of which the viſible appearance is the ſign. Were it not, therefore, for aſſociation, the ſight would be of little more uſe to us than a beautiful picture of objects with which we have no concern. But conſider its value in connection with aſſociation; and it muſt be regarded as the moſt perfect and the moſt permanently valuable of all the ſenſes. The information obtained by the touch is acquired ſlowly; and the ſenſations muſt be continually repeated, in order to acquire information reſpecting new objects; but the ſight takes in a vaſt variety of objects, and, almoſt at a glance, can diſtinguiſh moſt that is neceſſary to be known reſpecting them. Its ſenſations recall the paſt impreſſions derived from the touch; and at once ſuggeſt the ſize, the ſhape, the diſtance, of their various objects. "If a man," ſays Reid, "were by feeling to find out the figure of the peak of Teneriffe, or even of St. Peter's at Rome, it would be the work of a life time." Beſides, its diſcovery reaches farther than the touch could carry us; it enables us to range through the vault of heaven, and determine the motions of the heavenly luminaries. It traces in the countenance the workings of the mind; it diſplays the paſſions and affections of the ſoul. With aſſociation it is every thing. Without it, it would be uſeleſs as the bright fleeting viſions of ſleep.

5. *Senſe of Hearing.*—The ſenſe of ſight is affected by rays of light proceeding from the different objects to the retina. The ſenſe of feeling is affected by the contact of its various objects with the body, or by the vigorous or unſound ſtate of the parts of the body. The ſenſe of taſte is affected by certain particles of ſubſtances which are diſſolved by the ſaliva, and thus brought into contact with the organs of taſte. The ſenſe of ſmell is affected by particles which various ſubſtances are continually ſending into the air, and which impreſs the membrane which lines the cavity and bones of the noſe. The ſenſe of hearing is affected by the pulſations or vibrations of the air, which are cauſed by its own expanſion, or by the vibrations of ſounding bodies. Theſe pulſations, or vibrations in the air, are called ſounds, as are alſo the ſenſations which they produce. The organ of hearing is much more complicated, and much leſs underſtood, than that of ſight. We ſhall here give a very general account of it, and refer thoſe who wiſh for further information to the article EAR. The external ear collects and modifies ſounds; and by a long channel communicates them to the internal ear. This conſiſts, in the firſt place, of what is called the drum of the ear, which is a ſmall cavity, cloſed towards the opening of the ear by a delicate membrane. In the drum are three or four very ſmall bones, furniſhed with muſcles and joints. From the drum are ſeveral openings, one of which is to the mouth; the others communicate into different receſſes of the ear. One of theſe leads into the labyrinth, which conſiſts, firſt, of a ſmall irregular cavity, next of three ſemicircular canals, and laſtly, of a winding ſpiral canal, not unlike ſome ſea-ſhells. All theſe parts of the cavity are lined with a very delicate membrane, and filled with a watery fluid, which conveys to the portions of the nerve in contact with it, the vibrations received from the membrane which ſeparates the labyrinth from the drum of the ear. The vibrations of the air act upon the drum, and thus ſet in motion the ſeries of ſmall bones in the cavity of the drum: theſe communicate the vibrations to the membrane which ſeparates the drum from the labyrinth; and this, as before-mentioned, produces vibrations in the watery fluid, in the ſeveral parts of the labyrinth, and conveys to the nervous branches, which line the labyrinth, the vibrations originally produced on the drum. The mechaniſm is complicated, but what we underſtand muſt increaſe our reverential admiration of the ſkill which produced it.

There are colours which of themſelves, without aſſociated ideas, are agreeable to the ſight; and it is reaſonable to believe that there are ſounds which of themſelves, without aſſociated ideas, are agreeable to the ear. This is authorized alſo by direct experience. All moderate and tolerably uniform ſounds pleaſe young children; and during the whole life, various combined and ſimple ſounds give pleaſure to the mind without any reference to the aſſociated ideas. Hence it appears that the pleaſures of hearing aid conſiderably in the formation; or at leaſt in the increaſe of the mental pleaſures: indeed, in connection with thoſe of ſight they conſtitute nearly the whole of the pleaſures of ſublimity and beauty.

It is a well known fact, that the ideas left by the ſenſations of ſight are the moſt vivid and diſtinct of any: next to theſe are thoſe produced by the ſenſation of hearing. Few can form a diſtinct, certainly not a vivid, conception of the feel of any ſubſtance which has preſented ſenſations through the medium of the touch, and not many more can of a taſte, or of a ſmell, though thinking of particular taſte produces conſiderable effuſion of the ſaliva. Of objects of the ſight we are able to form conceptions, which often approach in vividneſs and diſtinctneſs to the original ſenſations, and which ſometimes overpower thoſe actually preſent in the mind, ſo as in many caſes to lead to the belief of a real object, and conſequently to lead to the belief of apparitions, &c. Few, we believe, poſſeſs the power of forming conceptions of ſounds nearly equal in vividneſs and diſtinctneſs with the original ſenſation; but they are frequently perceptible. After we have heard muſic, or converſed much with a perſon, trains of audible ideas frequently paſs in the mind. So, when we are thinking or reading ſlowly and carefully, we can generally trace the relics of the audible impreſſions of the words ſuggeſted by the thoughts or the ſight of the letters; that is, we have faint conceptions of the ſounds of theſe words.

The neceſſity of hearing to man, conſidered as a ſocial being, is obvious; its importance to him, conſidered as a being whoſe pleaſures and pains are by degrees to be purely mental, is not inferior. The means of knowledge are greatly diminiſhed by the loſs of ſight, but the loſs of ſight only impedes the progreſs of the mind from ſenſation to thought and feeling. Thoſe who have never heard have much greater diſadvantages to undergo. Their deficiencies can never be fully ſupplied. Words, as Hartley ſuggeſts, are highly important, and even neceſſary to the full improvement of intellect, and the enlargement of the affections; and, therefore, the ear is of much more importance to us, as ſpiritual beings, than the eye.

General Obſervations reſpecting the Senſitive Power.—We ſhall conclude this diviſion of our article with a few general remarks on ſenſation, on moſt of which we ſhall not enlarge, as we have already anticipated them in INTELLECTUAL and MORAL *Education*.

1. Senſations are the rudiments or elements of all our ideas, that is, of all our thoughts and feelings, excepting the ideas of conſciouſneſs. See INTELLECTUAL *Education*, col. 2.

2. Conſidering man as an intellectual being, the correctneſs and extent of his perceptions are of the firſt moment: theſe are, in fact, the materials of all knowledge reſpecting external objects; and in the early ſtages of mental culture are the only objects of the underſtanding. See INTELLECTUAL *Education*, col. 3, and alſo col. 4, 5.

3. Senſations are to be conſidered not only as the original materials for the various operations of intellect, but as the ſources of all the mental pleaſures and pains. See MORAL *Education*, col. 21.

4. Conſidering man as a being of feeling and affection, it is requiſite, during the early part of life, to keep the inlets of ſenſations in a fit ſtate for receiving them, and not to check the pleaſures of ſenſation, or to impoſe its pains, except where an enlightened regard to the welfare of the individual requires it. See MORAL *Education*, col. 22.

5. The grand law of ſenſible pleaſures and pains is, that by frequent repetition they loſe their vividneſs. This is a law to which may be traced various important facts connected with the moral culture. (See MORAL *Education*, col. 51. *On the Conſcience*, § 11.) Whatever be the peculiar mode by which impreſſions from the objects of ſenſe are tranſmitted through the nerves to the brain, it appears decidedly probable, that the difference between pleaſurable and painful ſenſations conſiſts, as far as reſpects the ſenſations themſelves, in degree only: that pain has the ſame cauſe as pleaſure, except that it acts more intenſely. "All pleaſure," as Hartley remarks, "appears to paſs into pain by increaſing its cauſe, impreſſion, duration, ſenſibility of the organ, upon which it is impreſſed, &c.: thus an agreeable warmth may be made to paſs into a troubleſome or burning heat, by increaſe or continuance; and the ſame thing holds, with reſpect to friction, light, and ſound." Hence, ſince repetition diminiſhes the vividneſs of the ſenſation, (provided there be no increaſe in the exciting cauſe, or in the ſenſibility of the organ, &c.) great pain will, by repetition, gradually ſubſide into pain leſs intenſe; pains may be converted by repetition into pleaſures; and pleaſures may be converted into indifferent ſenſations. This progreſs may be obſerved in the effects of ſpirituous liquors, or any other ſtimuli which ſtrongly affect the organs of taſte. There is, probably, no caſe in which the taſte of ſpirituous liquors would originally be otherwiſe than diſagreeable. By degrees the repeated uſe of them bring the ſenſations which they occaſion within the limit of pleaſure. Even then a conſiderable increaſe of the quantity taken would heighten the ſenſations to the limit of pain: but ſuppoſe the pleaſurable portion continued without increaſe, the repeated uſe of it diminiſhes the vividneſs of the pleaſure, till at laſt the ſenſation produced is completely indifferent. We here adduce the fact merely as illuſtrative of the general principle.

6. We have already ſtated, that the original ſenſible pleaſures derived from the taſte and ſmell are very numerous, and far exceed the pains: that the original ſenſible pleaſures derived from the ſight and the hearing are alſo numerous, while the original ſenſible pains are few: and that the original ſenſible pleaſures derived from the ſenſe of feeling are leſs intenſe than the pains derived from that ſenſe, which are more numerous and vivid than all the other ſenſible pains united. From this account we ſhould be led to infer, that the pains of ſenſation are very far exceeded by the pleaſures of ſenſation. This will be ſtill more evident when we recollect that the pleaſurable ſenſations are thoſe of conſtant occurrence; the painful ſenſations much more rare. In the early part of life, moſt ſenſations that are not painful are pleaſurable; and the pleaſurable ones are continually recurring. The eye and the ear ſeem to convey ſcarcely any thing but pleaſurable ſenſations to the infant mind: the taſte and ſmell are continually pouring in their pleaſures, ſeldom mixed with pain: the feeling, when the body is healthy, "when life is felt in every limb," is alſo continually adding to the ſtock of pleaſurable ſenſations thoſe derived from the glow of health, and the active motions of childhood. To balance all this, there are, in ſome few caſes, frequent pains of body; but more frequently the pains ariſing from ill health are of rare recurrence, and the artificial ſenſible pains are ſtill leſs frequently received. Such is the matter of fact: and if we conſider the cauſe of the pleaſures and pains of ſenſation as differing only in degree, we ſhall readily admit, that, on the whole, the pleaſures far exceed the pains: for the ſenſible pains being produced by an exceſſive action of the organs of ſenſation, common impreſſions will not produce them; and ſhould they become very frequent, they will, agreeably to the grand law of ſenſation already ſtated, gradually diminiſh in vividneſs, and at laſt come within the limit of pleaſure.

III. *Of the Retentive Power.*—Whatever be the effect produced on the mental organs by the impreſſions on the organs of ſenſe, that effect can be renewed, though in general with diminiſhed vigour, without a repetition of the ſenſible impreſſions. In other words, ſenſible changes produce a tendency to ſimilar changes, which can be repeated without the repetition of the external impreſſions, and may thus be called *ideal changes*. Leſs generally, ſenſations leave relics behind them, which can be perceived without the agency of the external organs of ſenſation, and which are called *ideas*. The power or capacity of the mind, by which tendencies to ideal changes are retained, may be called the *retentive power*.

That tendencies to a repetition of ſenſorial changes are thus formed, that ideas are thus retained, might be referred to the operation of the ſenſitive power, and in the human being they certainly depend upon the ſame organic cauſes, whatever thoſe be. But in many animals it is decidedly probable, that ſenſations leave no relics behind them: and in man there are, with equal probability, numerous impreſſions from external objects which leave no relics behind them; though we feel conſtrained to add from conſtant experience, that in many inſtances, where ſenſations have left no ideas ſufficiently determinate to be recalled by voluntary recollection, or preſented again to the mind by aſſociation, a recurrence of the ſenſations afford decided proof that they have left relics behind them, for we at once perceive that we have experienced them before. This we apprehend, however, is only where the ſenſible changes have in the firſt inſtance obtained ſome degreee of attention. We are not aware of any ſatisfactory proof that they leave any relics behind them where they have not excited the conſciouſneſs. On the whole, it appears probable that ſenſible changes, and even ſenſations, may be produced without leaving relics behind them. And it is certain that theſe relics of ſenſations may re-appear, without impreſſions from external objects. Hence it appears preferable to conſider the receiving of ſenſations, and the retaining of ideas, as two ſeparate though intimately connected operations, and as implying two ſeparate powers or capacities of the mind. This is not done by Hartley, who appears to refer both to ſenſation; and it has ſubjected him to ſome unfounded animadverſions of the great northern philoſopher. Speaking of the phenomena of memory as not to be entirely explained by the laws of aſſociation, Mr. Stewart ſays, " The aſſociation of ideas connects our various thoughts with each other, ſo as to preſent them to the mind in a certain order; but it preſuppoſes a faculty of retaining the knowledge we acquire." Of this Hartley was perfectly aware; and he has accordingly a diſtinct propoſition (p. 8.) on the production of ideas.

Without the retentive power, it is obvious that man would be a being of mere ſenſation, little if at all ſuperior to the loweſt orders of the animal creation, and inferior to many of them. The retentive power provides materials for the agency of the aſſociative power. Without the former, the latter could not be called into exerciſe; and without the aſſociative power, the relics of ſenſation, (the effects of the retentive power,) would be of no utility. The operations of the retentive power can ſcarcely, however, be ſeparated from thoſe of the aſſociative power; and theſe together conſtitute the compound faculty called memory, for ſome account of which we refer our readers to a ſubſequent part of this article. We introduce the ſubject here, merely in reference to the generation of ideas.

We have ſaid that the receiving ſenſations, and the retaining the relics of them, probably depend upon the ſame organic cauſes, whatever they be. In ſome inſtances ſenſible changes perceptibly continue after the ſenſible objects are removed. Two or three facts, which every one muſt have noticed or may notice, will illuſtrate this principle. If a piece of ſtick be burnt at one end, and the lighted end be turned quickly round in a circle, the luminous point will appear to the eye as a complete luminous circle; the changes of the optic organs continuing, till the image of the luminous point returns to any given point of the retina. Again, the ſenſible changes produced by ſound, perceptibly continue after the external cauſe ceaſes. If a ſounding body be ſtruck very rapidly with a ſtick, we do not perceive any interval; and, as Hartley well obſerves, the moſt ſimple ſounds which we hear, being reflected from the neighbouring bodies, conſiſt of a number of ſounds ſucceeding each other at different diſtances of time, according to the diſtances of the reflecting bodies, though, owing to the effect of each on the auditory organs continuing ſome little time after the actual impreſſion on the external organ, the ſounds appear to be exactly ſynchronous. The ſenſible changes produced by the other ſenſes, alſo continue ſome time after the impreſſions which have been made upon them. If a hard body be preſſed upon the palm of the hand, it is not eaſy to diſtinguiſh for a few ſeconds, whether it remains or is removed. And taſtes continue to be perceived, long after the ſapid ſubſtance is removed. This laſt circumſtance may, however, be accounted for on the ſuppoſition that the ſapid part of the ſubſtance is not removed; which, without doubt, is often the fact.

This play of the organs (which, however, is perhaps rather to be referred to the external than to the mental organs,) give riſe, in the caſe of viſion, to a number of very ſingular and intereſting phenomena, by ſome philoſophers called *ocular ſpectra*. A conſiderable variety of them are ſtated by Dr. R. Darwin of Shrewſbury, at the end of the ſecond part of Darwin's Zoonomia. We ſhall ſelect a few of the moſt ſtriking.

Place about half an inch ſquare of white paper on a black hat, and looking ſteadily on the centre of it for a minute, remove your eyes to a ſheet of white paper; after a ſecond or two, a dark ſquare will appear on the white paper, which will be ſeen for ſome time. A ſimilar dark ſquare will be ſeen in the cloſed eye, if light be admitted through the eyelids. So after looking at any luminous body, of a ſmall apparent ſize, as the ſun, for inſtance, for a ſhort time, ſo as not much to fatigue the eyes, this part of the retina becomes leſs ſenſible to ſmaller portions of light: hence when the eyes are turned upon any leſs luminous parts of the ſky, a dark ſpot is ſeen reſembling the ſhape of the luminous body. To the ſame cauſe Dr. R. Darwin aſcribes thoſe dark-coloured floating ſpots, which are eaſily perceptible when the eyes are a little weakened by fatigue, and during illneſſes attended with great debility. He ſays, that as theſe ſpectra are moſt eaſily diſcernible when our eyes are weakened by fatigue, it has frequently happened that people of delicate conſtitutions have been much alarmed at them, fearing a beginning decay of their ſight, and thence have fallen into the hands of ignorant oculiſts. They are not, however, he obſerves, the preludes to any diſeaſe; and it is only from our habitual inattention to them, that we do not perceive them on all objects every hour of our lives. As the nerves of very weak people, he continues, loſe their ſenſibility by a ſmall duration of exertion, it frequently happens that ſick people, in the extreme debility of fevers, are perpetually employed in picking ſomething off from the bed clothes, owing to their miſtaking the cauſe of theſe dark ſpots. An Italian artiſt, a man of ſtrong abilities, relates, that having paſſed the whole night on a diſtant mountain, with ſome companions and a conjuror, and performed many ceremonies to raiſe the devil, on their return in the morning to Rome, looking up when the ſun began to riſe, they ſaw numerous devils run on the tops of the houſes as they paſſed along. So much were the ſpectra of their weakened eyes magnified by fear, and made ſubſervient to the purpoſes of fraud or ſuperſtition.

Again; make with ink on white paper a black ſpot, about half an inch in diameter, with a tail about an inch in length, ſo as to reſemble a tadpole. Look ſteadily at this ſpot for about a minute; and on moving the eye a little, the figure of a tadpole will be ſeen on the white part of the paper, which figure will appear whiter or more luminous than any other part of the paper. This Dr. R. Darwin brings as one proof, that when the retina has been ſubjected to a leſs excitement, it is more eaſily brought into action by being ſubjected to a greater. A ſurface appears black, in conſequence of its abſorbing all the rays of light; that part of the retina, therefore, which is unemployed while looking at the ſpot, is afterwards more ſenſible to the light than the other parts, and is capable of being brought into action by the red rays, which penetrate the eye-lids. A familiar fact will equally well illuſtrate the principle. If, when the light is pretty ſtrong, we look ſteadily for a ſhort time at a window, the wood or lead-work of which is dark coloured, on turning the ſight immediately afterwards to a white wall, we have a diſtinct figure of the window with the panes dark and the wood-work luminous. Upon the ſame principle Dr. R. Darwin accounts for the following circumſtance. A writer in the Berlin Memoires obſerves, that when he held a book, ſo that the ſun ſhone upon his half cloſed eye-lids, the black letters which he had long inſpected became red. There is a ſimilar ſtory told by Voltaire of a duke of Tuſcany, who was playing at dice with a general of a foreign army; and believing that he ſaw red ſpots on the dice, apprehended that ſome dreadful events were about to take place, and retired in confuſion. The obſerver, after looking for a minute on the black ſpots of a die, a die, in a bright day, and careleſsly cloſing his eyes, would ſee red ſpots correſponding to the black ſpots on the die; and if they were intenſe from the fatigue or weakneſs of the optic organ, thoſe appearances would continue, and on looking on the die would be ſuppoſed to be upon it, juſt as perſons in a very weak ſtate (as has been already ſtated) often ſee black ſpots, which they refer to the bed-clothes.

We have ſtated, that the capacities of ſenſation and retention probably depend upon the ſame organic cauſes, whatever they may be. Dr. Darwin, in his Zoonomia, repreſents ideas as the animal motions or configurations of the organs of ſenſe. (Sect. iii. 4. 1.) The more advanced ſtudent of mental philoſophy, may derive much uſeful information from the peruſal of that ſingular work; but we know no writer on the ſubject whoſe views can be received with more doubt and heſitation than Darwin's. He generalizes with extreme rapidity; and often ſeems to be much more deſirous to urge every thing that can be advanced with any plauſibility in ſupport of his ſtrange hypotheſes, than to try them by the touchſtone of fact and experience. His peculiarities of nomenclature are extremely perplexing, and in various caſes very injudicious; and the number of them is ſo great, that they often interfere with the ſtatement of the triteſt obſervations. We meet with remarks, which preſent a novel and impoſing appearance, and we very frequently find, when we have taken the pains to interpret them into common language, that their novelty and importance conſiſted merely in their Darwinian dreſs. But what we moſt object to, is, that his nomenclature is ſo completely founded upon his theories, that when he is ſtating acknowledged truths, his expreſſions convey a meaning beyond them, and the whole import of them, according to his uſe of the terms employed, derives an apparent credibility from the correctneſs of them according to their uſual acceptation.

Dr. Darwin employs the term *idea*, ſo as to include the mental changes produced by impreſſions on the external organs of ſenſe, and alſo thoſe which can be reproduced without the intervention of external impreſſions; in other words, as including ſenſations and ideas. And of both he maintains, that they are contractions, motions, or configurations of the fibres, which conſtitute the immediate organ of ſenſe. (Sect. ii. 2. 7.) It requires little acquaintance with the principles of mental philoſophy, to furniſh a ſatisfactory anſwer to all the arguments he adduces for his unaccountable theory; and as it is extremely improbable, that any one will be inclined to adopt it without more proof than its author has been able to collect, we do not think it neceſſary to enter into any minute conſideration of it. It is not only clogged with difficulties, which at once outweigh every preſumption in its favour, but it has no advantage of any kind to recommend it. It accounts for no phenomena, which do not admit of an eaſy and, in general, preferable ſolution without it. We are not, however, prepared to maintain, that, in caſe of vivid conceptions, thoſe mental changes, which take place without external impreſſions, are never attended with changes in the external organs, correſponding to thoſe by which the original ſenſible changes were produced; in other words, that conceptions, *i. e.* vivid ideas of ſenſation, are never attended with changes in the external organs correſponding to thoſe, by which the original ſenſations were produced. When we have ſtrong viſual conceptions, it *appears* as though we ſaw with our bodily eyes, juſt as if ſenſations were produced by external objects. If we were not aware of the efficacy of aſſociation, in the acquired power of referring ſenſations to the part of the body from which they were derived, we ſhould conſider it as a fact decidedly proved by the feelings of which we are conſcious, that when with the mind's eye we ſee an abſent friend, there is a correſponding picture formed upon the retina, by the re-action of the changes in the mental organs. The effort to form ſuch conceptions is, we think, diſtinctly felt in the eyes; and the writer of theſe remarks obſerves in his own caſe, that the effort is principally perceived in that eye, which he knows from experience to have the greateſt viſual power. We refer to this circumſtance, however, merely as a curious fact. It does not appear, admitting that the perception of which we are ſpeaking is not the reſult of aſſociation, that it enables us to account better for even the greater diſtinctneſs of our viſual conceptions; for if the external organ be thus affected, it muſt be in conſequence of the very conceptions for which it might be ſuppoſed to account. If any viſual ideal changes, *i. e.* viſual conceptions, are attended with correſponding affections of the retina, the effect on the ſentient principle is to be attributed to the former, not to the latter; all that could reaſonably be admitted, is, that in conſequence of the affection of the external organ, the conception might be rendered more vivid, ſo as to approach nearer to the ſtate of the original ſenſation. But we need not reſort to this opinion, to account for the diſtinctneſs and vividneſs of our viſual conceptions. It is a general and well known principle, that when the retentive power is vigorous, *diſtinct and vivid ſenſations produce, by ſufficient repetition, diſtinct and vivid ideas.*

Still, when we recollect the general influence of ſtates of mind upon the nervous ſyſtem, and the known fact that certain ſenſorial changes do affect particular nerves, ſo as to produce muſcular motion, and farther take into account the feeling to which we have already referred, of which we preſume others alſo are conſcious, we are inclined to think it probable, that conceptions, or vivid ideas of ſenſation, may be attended with affections of the external organs of ſenſation, ſimilar to thoſe which furniſhed the materials for thoſe conceptions. Hartley's opinion, prop. 59, that an impreſſion made upon one eye alone by a ſingle object, may propagate itſelf to the other, and there raiſe up an image almoſt equal in vividneſs to itſelf, and that, conſequently, when we ſee with one eye only, we may have pictures in both eyes, conſiderably correſponds to this hypotheſis. But whatever be the fact, we do not perceive that it affords any adequate ground for the ſuppoſition, that ideas cannot exiſt without affections of the external organs, from which the original ſenſations were derived; nor the ſhadow of a reaſon for the Darwinian hypotheſis, that ſuch affections are the ideas themſelves. Their effects on the mind muſt be produced in the common ſeat of ſenſible, ideal, and motory changes.

Though we do not think it in any way neceſſary to enter into any particular examination of this fundamental metaphyſical poſition of the Zoonomia, we wiſh to notice one ſtatement which Darwin has adduced in ſupport of it; ſince, if correct, it would furniſh a very ſingular phenomenon, connected with the exerciſe of the retentive power. He ſays, (ſect. iii. 4. 4.) that “where the organ of ſenſe is totally deſtroyed, the ideas which were received by that ſenſe ſeem to periſh along with it, as well as the power of perception.” If this be ſo, (and it muſt, if his hypotheſis be true,) we muſt indeed be merely creatures of ſenſe, and can never expect to attain refinement of intellectual ideas, or of affections. But what are his proofs? A gentleman, who had been totally deaf for nearly 30 years, had forgotten the pronunciation of words, and, “what is much to the point,” he always, in his dreams, imagined that people converſed with him by ſigns or writing, and never that he heard any one ſpeak to him. "From hence it appears," adds the amuſing theoriſt, "that with the perceptions of ſounds he has alſo loſt the ideas of them; though the organs of ſpeech ſtill retain ſomewhat of their uſual habits of articulation." We preſume that our readers will not think Darwin's hypotheſis required to account for this deaf man's dreams; but to make them give ſupport to the hypotheſis, it ſhould have been added, that this was always the caſe from the firſt moment of his total loſs of hearing; and to afford any proof of it, it ſhould farther have been ſhewn, that from that period he never had any recollections (we do not mean diſtinct conceptions, but ſimple recollections, diſtinct or indiſtinct) of ſounds articulate or inarticulate. Reſpecting the ideas of ſight, Darwin adduces the following ſtatement. "I have had the opportunity of converſing with two men, who had been ſome years blind: one of them had a complete gutta ſerena, and the other had loſt the whole ſubſtance of his eyes. They both told me that they did not remember to have ever dreamt of viſible objects, ſince the total loſs of their ſight." Upon ſuch facts as theſe the author builds his hypotheſis. Did he aſcertain that theſe men, with the total loſs of ſight, loſt at once all their viſual conceptions? Did the well-known voices of their domeſtic relatives ceaſe to recall their viſible appearance? Did they at once forget the features which they had long viewed with delight? Theſe might gradually fade from their memories; and by degrees they might be unable to picture to their minds objects with which their affections were moſt cloſely aſſociated. But we ſee no room whatever to ſuppoſe that this was the immediate effect; and unleſs it were, the theory which their *dreams* are adduced to ſupport muſt be pronounced "baſeleſs as the fabric of a viſion."

If we appealed to the common experience of thoſe who have loſt their ſight from ordinary cauſes, we ſhould doubtleſs be told by the diſciples of Darwin, (if ſuch there be,) that their caſes were not in point, as their immediate organs of viſion might not be entirely deſtroyed; and though we ſhould not heſitate to predict the reply of thoſe whoſe caſes are clearly in point, we have no facts to ſtate, and leave the matter, therefore, to the reader's obſervation, with one farther remark. It is indiſputable that our ideas of ſolidity, and of real figure and diſtance, are principally derived from the ſenſe of touch: is there any reaſon whatever to imagine, that when a man has both his arms ſhot off, he at once loſes all thoſe notions of ſolidity, figure, &c. with which the organs of touch have ſupplied him, and which aſſociation alone enables the ſight to communicate? Does he ceaſe to perceive at once, that thoſe objects, which his unaided ſight would repreſent merely as a beautiful picture on a ſurface, are in reality ſolid bodies at various diſtances from the eye, becauſe he has loſt the organs by which he derived the ideas, now ſo firmly connected with the viſual impreſſion, as apparently to make a part of the ſenſation of ſight?

Though ſomewhat out of place here, we muſt add, that the ideas we have advanced reſpecting the poſſibility of ſenſorial change, (ſenſible, ideal, and motory,) proceeding without exciting the notice of the mind, derive confirmation from the ſtatements of Darwin on the catenation of motions (ſect. xvii. 2.); and we particularly wiſh to refer our readers to his ingenious (and, in general, juſt) remarks on the progreſs of ſuch catenations, in the caſe of a perſon learning muſic. The principles on which they are founded may be ſeen in Hartley's 21ſt propoſition; but Darwin has given a more detailed view of the progreſs of the tranſition from voluntary to automatic actions, and at the ſame time has introduced ſeveral remarks, which illuſtrate ſome peculiar procedures of the mind, claſſing under the operations of memory.

IV. *Of the Aſſociative Power.*—This principle, if not the ſole cauſe of all our mental phenomena, except the original production of ſenſorial changes and tendencies to them, has ſome effect in the origin and modification of all of them. It is owing to this important principle that ſenſations become the ſigns of thoughts and feelings, by which means man becomes a ſocial being; that the whole mental furniture of perceptions, notions, affections, paſſions, ſentiments, emotions, &c. is formed from the ſimple relics of ſenſation; that man, from mere ſenſation, riſes to intellect; that he becomes capable of reflection, and of action. In ſhort, whatever mental operation we attend to, except at the very earlieſt period of mental culture, we find aſſociation the cauſe of its production, or intimately concerned in it.

The fact of the connection which exiſts between many of our ſenſorial changes had long been known; but it had generally been referred to the memory. Mr. Locke appears to have been the firſt who employed the principle of aſſociation to account for aberrations of judgment and feeling, and for cuſtomary connections of ideas; but he does not ſeem to have been at all aware that all our ideas, except thoſe of conſciouſneſs, and thoſe which are produced by mere repetitions of uncompounded ſenſible changes, *i. e.* ideas of ſenſation, or ſimple ideas, are, in reality, formed by the influence of the ſame principle, either alone, or under the guidance of the underſtanding; that all our affections, and our mental pleaſures and pains, are nothing more than the relics of ſenſation, variouſly combined by aſſociation. It ſeems that Mr. Gay, a clergyman in the weſt of England, was the firſt who endeavoured to ſhew the poſſibility of deducing all our paſſions and affections from aſſociation: but his remarks on this ſubject, as Dr. Prieſtley obſerves, amount to little more than conjecture. Theſe, however, led Dr. Hartley to direct his thoughts to it, and by a union of great talents, and of ſolid acquirements in moral ſcience, in natural philoſophy, and in a profeſſional knowledge of the human frame, with a mind unobſcured by ſelfiſh tendencies, he was enabled to bring into one extenſive ſyſtem the progreſs of the mind from its firſt rudiments of ſenſation, through the maze of complex ideas and affections, to ſhew how man riſes from ſenſation to intellect. As Dr. Hartley expected, his work remained for a conſiderable time almoſt unnoticed. Tucker (A. Search) was obviouſly acquainted with it, and owed much to it; though he ſeldom ſpeaks of Hartley but to laugh at him, in reference to his hypotheſis of vibrations: and about the time when he began his Light of Nature, the firſt volume of the Obſervations, as we have already ſtated, was tranſlated into French; but it does not ſeem to have attracted the notice of the French metaphyſicians, either at the time or ſince. Dr. Prieſtley had the merit of bringing Hartley's ſyſtem forward to the public attention; and the celebrity which he had acquired among different claſſes of the philoſophic world was favourable to his object. About thirty years after the publication of the original work, he publiſhed an abridgment of it; in which he left out the deductions from the principal theory reſpecting the rule of life, the truth of Chriſtianity, &c. (in ſome reſpects, we think, very unfortunately), and as much as he could of the hypotheſis of vibrations. Since that time the ſyſtem of Hartley has been rapidly gaining ground in South Britain; and it is now, probably, pretty generally adopted by thoſe who think cloſely on the ſubject. In North Britain, owing partly to theological and metaphyſical prepoſſeſſions, and not leſs, perhaps, to Dr. Prieſtley's rough and unjuſtifiably ſevere attack upon three of the Scotch philoſophers,

ſophers, whoſe mental and moral character ranked high among their countrymen, the principles of Hartley have made but little progreſs. The philoſophical ſyſtems of Scotland have been ſomewhat modified by it; but thoſe who rank the higheſt ſeem little inclined to admit it in its full extent. However, the writings of Dugald Stewart ſhew that he has done ſomething towards clearing the way, and the lectures of the profeſſor of moral philoſophy at Glaſgow muſt do more; and we ſee reaſon to hope, that when the preſent generation has paſſed away, the true principles of mental ſcience will gain a firm hold there, as well as in South Britain. We earneſtly wiſh for the extenſive adoption of the Hartleyan ſyſtem; becauſe, while it ſatisfactorily explains a vaſt variety of the moſt important mental phenomena, it furniſhes the beſt guide in the moral and mental culture of the mind. The value of the Obſervations on Man will in ſome meaſure be perceived from thoſe portions, or abſtracts of it, which we have introduced into this article; and we ſhall think ourſelves happy, if we ſhall have ſucceeded in making the way ſmoother for a judicious acquaintance with that profound and invaluable work, for ſuch of our readers as have not previouſly paid much attention to the ſubject. We hope that the philoſopher juſt referred to will excuſe this public notice of him. The writer of this article had the great benefit of attending his claſs about fourteen years ago; and he feels grateful to him for the advantages he enjoyed there, both for the acquiſition of valuable mental and moral knowledge, and for the aid and encouragement afforded by that liberal and enlightened profeſſor, in the free exerciſe of the underſtanding on ſome of the moſt important objects of its attention. Unfettered by any ſyſtem, though, probably, not altogether free from the influence of early biaſſes towards the Scottiſh philoſophy, he ſhewed his ſtudents by example, as well as by precept, and the exerciſe of their intellectual powers, in what way they ought to purſue philoſophical truth; and if ever they ſaw reaſon to differ from him, they never failed to admire his candour, and to reſpect his ſound and diſcriminating judgment.

We have already ſtated, that the aſſociative power has two grand modes of operation, *connection* and *compoſition*. It is not eaſy to keep theſe diſtinct; but in many caſes it is practicable, and often tends to preciſion in our reflections and reaſonings. In what we ſhall advance reſpecting the operations of this power, we ſhall keep this diſtinction ſomewhat in view. We ſhall ſtate, firſt, the claſſes of connections which exiſt among our ſenſorial changes; and, ſecondly, ſome of the principal laws of connections; we ſhall then proceed to detail ſome of the leading facts relative to compoſitions, and the formations of our compound notions and feelings. It might be the moſt regular method to begin with compoſitions; becauſe connections are formed not only among ſimple ſenſorial changes, but among thoſe alſo which are compounded; in other words, not only among ſenſations, ſimple ideas and ſingle muſcular actions, but alſo among thoſe which have been blended together into complex ſtates: and we ſhall ſometimes have occaſion, in what we ſtate relative to connections, to ſuppoſe ſuch compoſitions actually formed. On the other hand, connections are much more obvious, and more eaſily comprehended, than compoſitions; and a ſtatement of ſome facts reſpecting the former will lead to an eaſier acquaintance with the latter.

“ That one thought is ſuggeſted to the mind by another,” ſays the elegant and philoſophic Stewart, “ and that the ſight of an external object often recalls former occurrences, and revives former feelings, are facts which are perfectly familiar, even to thoſe who are leaſt diſpoſed to ſpeculate concerning the principles of their nature. In paſſing along a road which we have formerly travelled in the company of a friend, the particulars of the converſation in which we were then engaged, are frequently ſuggeſted to us by the objects we meet with. In ſuch a ſcene, we recollect that ſuch a particular ſubject was ſtarted; and in paſſing the different houſes, and plantations, and rivers, the arguments we were diſcuſſing when we laſt ſaw them, recur ſpontaneouſly to the memory. The connection which is formed in the mind between the words of a language, and the ideas they denote; the connection which is formed between different words of a diſcourſe which we have committed to memory; and the connection between the different notes of a piece of muſic in the mind of a muſician; are all obvious inſtances of the ſame general law of our nature. The influence of ſenſible objects in reviving former thoughts and former feelings, is more particularly remarkable. After time has, in ſome degree, reconciled us to the loſs of a friend; how wonderfully are we affected the firſt time we enter the houſe where he lived. Every thing we ſee, the apartment where he ſtudied, the chair upon which he ſat, recall to us the happineſs we enjoyed together; and we ſhould feel it a ſort of violation of that reſpect which we owe to his memory, to engage in any light or indifferent diſcourſe when ſuch objects are before us.” So, again, every one muſt have noticed the connections which exiſt between our thoughts or ſenſations and muſcular actions. A performer looks at the notes of his book, and the appropriate motions of his hands and fingers follow with immediate ſucceſſion. While we are writing, the thoughts we wiſh to communicate ſuggeſt the appropriate words, and theſe, with an almoſt inſtantaneous ſucceſſion of motions, are written on the paper before us. We are perhaps more ſtruck with this in writing ſhort hand than long; the characters appear as the repreſentatives of our thoughts, almoſt without knowing how they are made.

All theſe facts are obviouſly nothing elſe than caſes of thoſe connections which are formed, by the operation of the aſſociative power, among our ſenſorial changes; in other words among our ſenſible, ideal, and motory changes; in other words, again, but leſs generally, among our ſenſations, ideas, and motory changes. We ſhould, in ſome reſpects, prefer, in what follows, employing the terms *ſenſible changes* and *ideal changes*, rather than the terms *ſenſations* and *ideas;* becauſe theſe imply conſciouſneſs, which we have before ſtated is not neceſſarily excited by the operations of the ſenſitive and aſſociative powers: we ſhall, however, content ourſelves with requeſting the reader to bear in mind, that whatever may be ſaid reſpecting connections among ſenſations and ideas, might be ſtated more generally reſpecting connections among ſenſible and ideal changes. Whatever the ſenſorium be, or whatever be thoſe changes of it which excite the conſciouſneſs, it is, we conceive, among thoſe changes that connections and compoſitions take place.

1. *Claſſes of Connections.—Firſt:* a *ſenſation* may be aſſociated with other *ſenſations*, with *ideas*, and with *motory changes*.

A *ſenſation*, after having been aſſociated a ſufficient number of times with another *ſenſation*, will, when impreſſed alone, excite the ſimple idea correſponding with that other ſenſation. Thus the names, ſmells, taſtes, &c. of external objects, ſuggeſt the idea of their viſible appearance; and the ſight of them ſuggeſts their names, &c. In the ſame manner, a word half pronounced excites the idea of the whole word ; the mention of the letters *a*, *b*, ſuggeſts the idea of *c*, *d*, &c. ; the ſight of part of an object ſuggeſts the idea of the whole ; and the ſight of one object, recalls the viſual idea of other objects which have been uniformly or very frequently ſeen with it. Innumerable other inſtances might be given with little trouble ; but we ſhall mention only one other, which may aſſiſt ſome of our readers in accounting for certain caſes of apparitions. L. was one day haſtily paſſing by a room in which a very excellent friend had uſually ſat, in a particular chair, and in a particular part of the room. His thoughts at the time were employed on ſome object which did not excite deep attention ; and the ſight of the chair raiſed in his mind a vivid viſual idea of his friend as ſitting in that chair. The friend had been dead ſome weeks, and L. involuntarily came back for another viſion, but without effect. Such viſual ideas and ſimilar ideas derived from the other ſenſes, particularly the hearing, are by Dugald Stewart called conceptions ; and where they are vivid and eaſily excited, they frequently lead thoſe who are inattentive to their ſenſations, to ſuppoſe that they actually ſaw and heard, at a particular time, what they did not ſee or hear.

Senſations become connected with *ideas*, ſo that the repetition of the ſenſation will excite the connected idea. Of this caſe of connections, the following will ſerve as examples. Words aſſociated with ideas will readily excite them, even when very complex ; the words *hero*, *philoſopher*, *juſtice*, *benevolence*, *truth*, and the like, whether written or pronounced, immediately call up with preciſion the correſponding idea. The hearing of a particular national tune, is ſaid to overpower the Swiſs ſoldier in a foreign land with melancholy and deſpair ; and it is therefore forbidden in the armies in which they ſerve. The ſound recalls various heartfelt recollections ; the idea of the tranquillity and freedom of their country, of the home from which they are torn, and to which they may never return. What trains of intereſting thought and feeling are uſually called up in the mind by the ſight of the ſcenes of early pleaſure, where paſſed thoſe years when novelty gave charms to every ſenſation, every employment of the faculty, when hope preſented no proſpects but what were decked in "fancy's fairy froſtwork," and preſent joys precluded all regret for the paſt.

Senſations may be connected with *muſcular action*, that is, with thoſe ſenſorial changes which are followed by muſcular action ; ſo that the ſenſation will excite the muſcular action, without the intervention of that ſtate of mind which is called will. A perſon automically, that is, without any volition, turns his head towards another who calls him by his name. When the hand of another is rapidly moved towards the eye, we ſhut the eye without thinking about it, or even being conſcious of it. When copying from any book, if a perſon is very familiar with the employment, the appropriate motion of the fingers immediately follows the impreſſion produced by the appearance of the word. In the ſame manner the viſible impreſſion derived from muſical notes regulates the motions of the performer. "While I am walking through that grove before my window," ſays Darwin, "I do not run againſt the trees or the branches, though my thoughts are completely engaged on ſome other objects :" the ſenſible impreſſions produced by the objects around, excite in the ſenſorium the appropriate connected motory changes, and theſe the action of certain muſcles.

Secondly : ideas may be connected with *ſenſations*, with *ideas*, and with *motory changes*.

An *idea* aſſociated a ſufficient number of times with a *ſenſation*, will excite the ſimple idea belonging to that ſenſation. Thus the ideas, whether ſimple or complex, which have been ſufficiently aſſociated with names, excite the ideas of their reſpective names. Hence it is that we find ourſelves continually thinking in words ; that is, the trains of ideas which paſs in our minds, are accompanied with their correſponding expreſſions, when thoſe expreſſions are familiar to us : and it may be remarked, that the habit of thinking in words, is one which contributes greatly to accuracy and facility of thought, and therefore one which the young reaſoner will do well to cultivate. Thoſe who are habituated to reaſoning, find their trains of reaſoning ſo generally clothed in words, and words ſo neceſſary to their intellectual operations, that the words are what they moſt attend to ; and ſome have even gone ſo far as to ſuppoſe, that *general* reaſoning is concerned merely about words, and not about ideas. They ſeem to lie under a ſimilar error, with thoſe who imagine that the viſible appearance of objects is all we attend to, when we ſpeak of magnitude, ſhape, &c. ; whereas the fact is, that the viſible appearance is nothing more than a ſymbol, which ſerves to introduce the connected complex idea into the mind, and to keep its parts connected : and this is the grand end of words in general reaſoning. We are conſcious while we are thinking, of employing the relics of audible ſenſations ; we ſeem to have faint ſenſations of ſound paſſing in the ſenſorium ; but it appears probable that thoſe who have long loſt the uſe of their hearing, and have generally employed ſight as the inlet of knowledge, have a train of viſual, inſtead of audible conceptions. All, however, which we particularly wiſh to have noticed here, is, that theſe things afford inſtances of the connections of ideas with ſenſations, ſo that the idea introduces the ſimple idea belonging to that ſenſation.

Next, an *idea* aſſociated with an *idea*, whether notion or feeling, will excite that idea. Thus the idea of benevolence will excite that of merit ; of courage, that of honour ; of great talents, that of reſpect ; of cruelty, that of horror ; of meanneſs, that of contempt.

Again, an *idea* aſſociated with a *motory change*, will excite that motory change, and its conſequent muſcular action. Thus, the deſire to perform a particular action will produce the correſponding voluntary motion of the limbs ; joy produces a pleaſing caſt of countenance ; fear excites trembling ; and horror, diſtortion. In the ſame manner when we are employed in committing our thoughts to writing, the idea of the words which we intend to commit to paper, if the character be not peculiar, or novel, will immediately ſuggeſt and be followed by the appropriate motions of the fingers, and this without the intervention of volition, ſometimes without even the conſciouſneſs of the motory changes, or of the muſcular actions produced by them. So alſo in ſpeaking, unleſs ſome difficult pronunciation occur, the muſcular actions requiſite for the formation of the ſounds follow immediately the conception of the words, without the intervention of the will.

Thirdly : motory changes, and their correſponding muſcular actions, may be connected with *ſenſations*, with *ideas*, and with other *motory changes*, and their correſpondent muſcular actions.

Muſcular actions may be aſſociated with *ſenſations ;* that is, when muſcular actions have been ſufficiently long aſſociated with ſenſations, the repetitions of the muſcular action alone will excite the ſimple idea belonging to that ſenſation. Thus, the action of dancing will bring to mind the conception of the muſic with which it has been often accompanied. Again, children often accuſtom themſelves to particular motions of the limbs, while committing to memory, or while repeating what they have learnt; and thoſe muſcular actions in many inſtances become neceſſary to their correct, and ready recollection, and even to their recollection at all. Addiſon, ſays Miſs Edgeworth, repreſents with much humour the caſe of a poor man, who had the habit of twirling a bit of thread round his finger; the thread was accidentally broken, and the orator ſtood mute.

So again, *muſcular actions* may be aſſociated with *ideas;* that is, when muſcular actions have been ſufficiently long aſſociated with ideas, thoſe muſcular actions will excite thoſe ideas, whether notions or feelings; thus dancing will introduce cheerfulneſs into the mind. So particular muſcular actions have, from habitual connection, a tendency to excite certain trains of thought or ſtates of mind: thoſe who have been accuſtomed to one poſture while ſtudying, find it difficult to ſtudy ſo well in other poſtures; and perſons who, while engaged in deep meditation, have been accuſtomed to any little motions of body, find the continuance of thoſe motions requiſite for the continuance of their abſtraction of mind. It is upon this principle, that certain poſtures of body have a tendency to produce thoſe feelings which all ſhould have when addreſſing the Supreme Being. The caſes, however, in which muſcular action introduces ideas, either ſimple or compound, are much leſs numerous than thoſe in which ſenſations and ideas introduce muſcular actions. In fact it is not the uſual order of aſſociation; and beſides, it is ſometimes very difficult to ſay what effect is produced by the muſcular action itſelf, and what by the ſenſations which generally accompany muſcular action. In the next caſe the point is clearer.

Muſcular actions become connected with other *muſcular actions*, that is, the motory changes which produce the one, with thoſe which produce the other; ſo that the former may introduce the latter without the intervention of the will. If different muſcular actions are produced together, they are called *ſynchronous;* if one immediately follows the other they are called *ſucceſſive;* and the aſſociation is, in like manner, termed ſynchronous or ſucceſſive. The motions of the hands when a perſon is playing upon the piano-forte, the motions of the hands in weaving and in ſpinning, and various other muſcular actions which will readily ſuggeſt themſelves to the reader, may be ſtated as inſtances of *ſynchronous* aſſociations of muſcular actions. The motions of the organs of ſpeech, in reading or ſpeaking, of the feet in walking, and of the fingers in writing, are inſtances of ſucceſſive aſſociations of muſcular actions.

Theſe nine caſes of the aſſociation of ſenſorial changes are comprehended by Hartley in the following general theorem: "If any ſenſation A, idea B, or muſcular motion C, be aſſociated for a ſufficient number of times with another ſenſation D, idea E, or muſcular action F, it will at laſt excite, *d*, the ſimple idea belonging to the ſenſation D, the very idea E, or the very muſcular action F." The ſenſation itſelf cannot of courſe be re-excited, becauſe that depends upon the preſence of the object of the ſenſe; but ſometimes, as in the inſtance already ſtated, the ſimple idea belonging to a ſenſation is ſo vivid, that it equals, if not ſurpaſſes, the original ſenſation; that is, any ſenſible change, and its ſimple ideal change, are the ſame in kind, differing only in vividneſs, and ſometimes equal in that reſpect. It may alſo be well to obſerve here, that when Hartley and his diſciples ſpeak of muſcular actions clinging together, they obviouſly mean, that the motory changes of the ſenſorium become connected together, and not, as ſome writers ſeem to have ſuppoſed, and indeed as their words imply, that the motions of muſcles are connected without any intervention of the mind, taking the term in the popular ſenſe. It is true the Hartleyan ſuppoſes that volition has nothing to do in the aſſociation when complete, though originally perhaps concerned in the formation of it; and alſo that the aſſociation may go on without even exciting the conciouſneſs; but we know of none who ſuppoſe that the mental organs, (the mind in the popular ſenſe,) are leſs concerned in the connections among muſcular actions, than in thoſe among ſenſations and ideas. All the ſenſorial changes may and do become connected together; and, as we apprehend, the one may produce the other, and ſo on, without the conciouſneſs being excited; but no external impreſſion, which does not act by ſtimulating or impelling the moving muſcle, can produce muſcular action without the action of the mental organs; and in like manner, no muſcular action can produce another muſcular action, (except what may be termed mere phyſical motion, ſuch as might be produced by any foreign body mechanically acting upon the muſcular ſyſtem,) without the action of the mental organs. The whole of the connection is mental, and we think if this idea be kept in view, and employed in the explanation of the Hartleyan phraſeology reſpecting connections among muſcular actions, that it will remove ſome of the difficulties which are felt reſpecting this part of the Hartleyan ſyſtem, and ſhew that the objections which have been urged againſt it, aroſe from an incomplete idea of it.

2. *Laws of Connections.*—We now proceed to our ſecond object, *viz.* to point out and illuſtrate ſome of the leading laws of that claſs of aſſociations which we term connections; premiſing that many of the obſervations which follow are, as the reader will readily perceive, equally applicable to that claſs which we term compoſitions. Theſe laws regard, 1. The ſtrength of connections; 2. The diſunion of connections; 3. The formation of connections by means of immediate links, which we may call the law of transference; and 4. Habitual biaſes to particular kinds of connections.

(1) *The Strength of Connections.*—The ſtrength and durability of connections, depend partly upon the degree of attention with which the connected ſenſorial changes have been attended, and partly upon the frequency with which they have recurred in connection: leſs generally, partly upon the vividneſs of the connected ideas, and partly upon the frequency with which the connected ideas, or muſcular actions, have recurred in connection. We may adduce, as an illuſtration of the former cauſe of ſtrength and durability, that circumſtances of a light and trivial nature, which have occurred while our minds were occupied with ſubjects of great intereſt, form no connection with the concurring train of ideas, even if the attention were, for a time, drawn off by the former. For inſtance, ſuppoſe we were attending to an intereſting diſcourſe, if our attention were for a moment called off by the coughing of a perſon near us, the train of thought ſuggeſted by the ſermon would form no connection with the cauſe of the interruption, and it would paſs in the mind without the idea of the interruption being produced. But ſuppoſing a poor man to have fallen down in a fit of apoplexy, the circumſtance would ſtrongly intereſt our ſympathy and excite our attention; many feelings would be brought into active exerciſe; and the ideas which were at that time in the view of the mind, would probably ever after preſent with them thoſe of the ſcene which ſo ſtrongly affected us. Hence the importance, that thoſe who have the care of education, ſhould ſeize the happy moments when circumſtances have peculiarly intereſted the mind, to connect with them thoſe related acts of prudence, benevolence, and piety, which, ſo introduced, may have a laſting effect in regulating the diſpoſition; but which brought in a form leſs intereſting, would have no permanent bond of union,

and would ſoon be obliterated. Hence, too, the importance of inſtilling into the mind thoſe principles which are deſigned to have a conſtant operation among the thoughts and feelings and actions of life, in ſuch a form that they ſhall become connected with thoſe thoughts and feelings which have already a firm hold in the mind; and thus be brought into view, and excited into action much more frequently and uniformly.

The effect of frequent recurrence, in producing ſtrength and durability of aſſociation, may be beſt explained by the aſſociations which take place between words and their correſponding ideas. Theſe connections are not, in general, attended with any particular cauſe of aſſociation, except frequency of recurrence, and therefore they are the moſt unexceptionable inſtances. Now, other things being equal, we find that thoſe words which are moſt frequently called up in the mind, in connection with the ideas to which they belong, have a cloſer connection with thoſe ideas; that is, the idea ſuggeſts the word and the word ſuggeſts the idea, with greater certainty, and the aſſociation is more permanent. The following remarks of Dr. Percival will illuſtrate this general principle. "Slight paralytic affections of the organs of ſpeech, ſometimes occur without any correſponding diſorder of the other parts of the body. Hence the effort to ſpeak ſucceeds the volition of the mind ſlowly and imperfectly, and words are uttered with faltering and heſitation. Theſe are facts of common notoriety: but I have never ſeen it remarked, that in theſe local palſies, the pronunciation of proper names is attended with peculiar difficulty; and that the recollection of them becomes very obſcure, or is entirely obliterated; while the recollection of perſons, places, and things, remains unchanged. This confirms the theory of aſſociations, and at the ſame time admits of an eaſy ſolution by it. For as words are arbitrary marks, and owe their connection with what they import to eſtabliſhed uſage, the ſtrength of this connection will be exactly proportioned to the frequency of their recurrence, and this recurrence muſt be more frequent with general than with ſpecific terms."

Beſides theſe two univerſally operating cauſes of the ſtrength and durability of aſſociations, it is proper to obſerve, that they depend alſo upon the prediſpoſition of the mind, the habitual bias of thought and feeling, and the prevailing caſt of the aſſociations already formed. This may in part be reſolved into the firſt cauſe,—the degree of vividneſs of the connected ideas; but in part it muſt be conſidered as ſeparate. Where there are aſſociations of a contrary tendency, the production of the new aſſociation implies the deſtruction of the old one, and this is one reaſon why perſons who have paſſed the prime of life, feel it ſo exceedingly difficult to acquire new aſſociations diſſimilar from thoſe already formed. Hence it is that all thoſe improper biaſes of thought and feeling which oppoſe the beſt regulation of thought and feeling, ſhould be carefully ſhunned; all thoſe aſſociations carefully prevented, which lead the mind away from God and duty, or which ſimply check the reception of thoſe which accord with the dictates of religion. They do more than directly injure by their own exiſtence; they injure alſo, and this in no ſmall degree, by preventing the formation of thoſe aſſociations which directly prompt to the courſe which duty points out.

An acquaintance with theſe principles leads us to the direct method of confirming aſſociations which are eſſential to our well being; ſuppoſe, for inſtance, the connection of a regard to the will of God, with the conduct: we ſhould endeavour to connect as much as poſſible thoſe pleaſurable feelings which have a tendency to ſtrengthen the links of union; we ſhould cultivate the connection by frequently, and, indeed, continually bringing it into action; and we ſhould carefully cultivate thoſe related ſtates of mind which have a tendency to foſter and ſtrengthen the connection. To avoid weakening it, we ſhould be careful not to introduce any contrary trains of ideas; for inſtance, we ſhould never connect feelings of ridicule with any thing connected with religion, and ſhould carefully avoid thoſe breaks in the aſſociation which will follow neglect in its cultivation. And it is a moſt ſatisfactory idea, that if vicious aſſociations may be formed ſo ſtrong as to lie beyond the power of the individual to annihilate them, virtuous aſſociations may alſo be formed ſo vigorous and permanent as to bid defiance to time and to temptation. Theſe ſhall ſurvive the wreck of nature, and ſhall adorn the mental fabric, when this world, and all its ſorrows and enjoyments, ſhall be no more.

(2) *The Diſunion of Connections.*—As connections are neceſſarily formed, and frequently without any volition on the part of the individual, by the before mentioned circumſtances, it is another very important law of the aſſociative power, that theſe connections are not indeſtructible. We obſerve, then, that an aſſociation may be deſtroyed, either by the formation of other contrary aſſociations, or by the repetition of it being in ſome way or other prevented. We have already given one inſtance of this principle, in Mor. *Ed.* col. 49, to which we refer our readers: and as in that caſe, ſo in numerous others where an aſſociation unfortunately exiſts in the mind unfavourable to the formation or exerciſe of good diſpoſitions, it may be weakened, (gradually, indeed, but certainly weakened,) and at laſt deſtroyed by the ſteady culture of oppoſite aſſociations. That conduct to which pious benevolence prompts, may acquire ſo attractive an appearance, that ideas of difficulty, of pain, of ridicule, which may have been attached to it, and which may have impeded its exerciſe, will gradually give way to thoſe which the divine approbation affords, of preſent peace and future happineſs. But there is not always time for this ſlow procedure. It may be neceſſary for individual happineſs, that the baneful aſſociation ſhould be deſtroyed without one repetition of it to confirm its power. To the general culture of oppoſite aſſociations, muſt then be added, a ſteady careful prevention of the introduction of the connected ideas. Situations muſt be avoided, words diſuſed, company ſhunned, which have a known tendency to introduce a train of thoughts leading to the firſt link of the chain which we wiſh for ever ſeparated.

When we hold it out as a grand law of aſſociation, that connections may be diſunited by forming oppoſing aſſociations, and by preventing their repetition, we would by no means repreſent it as in general an eaſy, or as in all caſes a practicable taſk. When aſſociations have been long formed, and often repeated, particularly where they accord with the general bias of the mind, they often bid defiance to the moſt ſtrenuous exertions of the individual. If he could for a long time prevent their repetition, and ſucceſsfully cultivate oppoſing ones, the moſt inveterate aſſociations would by degrees looſen their power; but when aſſociations have been ſtrengthened for a long period of time, by being frequently brought into play, and connected with other active aſſociations, and at the ſame time accord with the prevailing diſpoſition of the mind, the prevention of their repetition, and the culture of oppoſing aſſociations, are ſcarcely practicable. Theſe things may be viewed in various lights; ſome gratifying to the mind; ſome which muſt urge every thoughtful perſon to ſhun the formation and culture of thoſe aſſociations which he muſt ſome time or other wiſh to break. While they teach us to be aſſiduouſly careful to prevent all ſuch, they alſo ſhew us that thoſe which we muſt wiſh to cheriſh may, as well as others of a contrary character, become invincible; and while they direct thoſe who have the care of the young, carefully to cultivate thoſe tendencies to feeling and action, which may ſerve as a check upon improper aſſociations,—while they direct them carefully to prevent thoſe which may acquire a deſpotic rule in the mind to the deſtruction of peace and virtue,—they alſo diminiſh the anxiety which we are ſometimes prone to feel, when we find ourſelves unable to mould them exactly to that ſtandard of thought and feeling which we wiſh.

Numerous are the aſſociations, particularly of a ſpeculative nature, which yield to the influence of time and change of circumſtances. In many inſtances, the deſtruction of the aſſociation depends upon the efforts of the individual, but in the greater number it is occaſioned without his direct efforts, by the increaſe of his knowledge, by circumſtances preventing the recurrence of the aſſociation, or by the formation of contrary aſſociations upon more ſolid grounds. But that they *may* be broken, ſhould never be allowed as a reaſon for the formation of improper aſſociations; for the difficulty is frequently great, in many inſtances inſuperable, except by ſuch diſcipline, ſuch peculiar concurrences of circumſtances, as fall not to the lot of every individual. The aſſociation between certain motives and that ſtate of mind which we call volitions formed in early life, and ſtrengthened by frequent repetition, is frequently found ſo indiſſoluble, that it leads the unhappy individual to act againſt his better judgment, and the deſtruction of his corporeal, and even of his mental energies, produced by his conduct, prevents thoſe exertions for his releaſe which he wiſhes to make, but has not the power to attempt. In every mind, more or leſs, circumſtances generate deſires and paſſions, theſe generate volition, and volition produces action. How few are there, who have attained the power of voluntarily ſeparating paſſion and volition, or rendering them leſs connected, or of repreſſing thoſe paſſions which were previouſly invariably connected with the circumſtances which gave them origin. In all men the train of thought is partly involuntary: how few are there, who are capable of directing their aſſociations into one channel by the exertion of volition, and employing them in one definite way; of deſtroying improper aſſociations, and of forming new ones, actuated by a view to the claims of duty, and to their improvement in wiſdom and virtue. How frequently do we ſee others, and ſelf-knowledge will ſhew us repeated inſtances which come home to our own boſoms, in ſituations where they act againſt their better judgment;—a ſituation which is ſo forcibly deſcribed by the Apoſtle, "For that which I do I allow not; for what I would, that I do not; but what I hate, that I do." This we can eaſily account for upon the principles of aſſociation. He who is in ſuch a ſituation, may be convinced that certain actions are wrong; that they will infallibly injure his future happineſs; that they muſt embitter his preſent enjoyment: but his conviction comes too late. The object which promiſes the gratification of ſome or other of his powerful principles of action, preſents itſelf to his mind; it ſtrongly prompts his deſires and paſſions; the aſſociation between theſe and volition is perhaps of very long ſtanding, confirmed by repeated exerciſe, not counteracted, or but weakly, by any contrary aſſociations, or by any exertion of the individual; it cannot be overcome but with extreme difficulty; the mind ſinks under the trial; and the commiſſion of the action tends to ſtrengthen the aſſociation, to render the mind ſtill more the ſlave of vice and miſery. The picture unhappily is not too highly drawn; and though the habit may not be ſo deeply fraught with miſery, few are thoſe who can ſay that they have not one confirmed habit, which they would wiſh to change, or at leaſt to weaken. And to thoſe who have made the attempt to deſtroy any habitual connection between external impreſſions and deſire, or between deſire and volition, the difficulties cannot have appeared trifling.

(3) *The Law of Transference.*—We now proceed to ſtate and to explain that important law of aſſociation, agreeably to which aſſociations are formed by means of intermediate links. We muſt here requeſt our readers to bear in mind, that we uſe the word idea in the wide ſenſe in which it is employed by Hartley, to denote every internal feeling except ſenſation, whether ſimple or compound, whether or not accompanied with pleaſure or pain. The law to which we have referred may be thus ſtated. One idea may become connected with a ſecond, by means of their mutual connection with a third; and, where it is not neceſſary to attend to this third or intermediate idea, the more the connection between the firſt and ſecond is confirmed, the leſs will the third be perceptible; ſo that when the aſſociation becomes completely fixed, the intermediate idea is often loſt entirely from the view of the mind. The abſence of the intermediate idea is often ſo complete, that its ever having been preſent can only be diſcovered by tracing the progreſs of the connection between the extremes: and in certain caſes, where the aſſociation has been long in a perfect ſtate, the difficulty may become ſo great, that we are inclined to admit the ſuppoſition of an intermediate link, only becauſe we can trace it in other ſimilar caſes, and perhaps in the very ſame connections in other individuals, whoſe habits are leſs fixed. This law, or mode of operation of the aſſociative power, meets us at almoſt every ſtep of our reflection at what paſſes within us. It may be termed the law of transference, and we ſhall ſtate it again in another form. Let A, B, and C, repreſent three ideas, ſimple or compound, pleaſurable, painful or indifferent. If A is connected with B, and B with C, A may be transferred to C, (through their mutual connection with B,) and be recalled by it, without B being preſent in the mind.

This is an exceedingly important and conſtantly operating law of aſſociation. It is thus that numerous, almoſt innumerable phenomena are produced, which at firſt ſight appear inexplicable, upon any known principles, and which therefore are referred to inſtinct; that is, they are ſuppoſed to reſult neceſſarily from the conformation of the mind, without the operation of any acknowledged faculty of the mind. Such are the belief in what is called ſelf-evident truths; the pleaſures derived from objects which do not affect the mind by direct ſenſations, diſintereſted affections, &c. Whenever we meet with the word inſtinct applied to the human mind, we are to conſider it ſimply as an appeal to ignorance; and though it ſeems often to be held out as the ſolution of a difficulty, it is, in fact, nothing more than ſaying, the feeling, or whatever elſe it be, ſprings up we know not how, we know nothing of its origin, progreſs, or exerciſe. The term inſtinct explains nothing; and though it is conveniently uſed with reſpect to the minds of brutes, of which we can learn nothing with certainty, yet when applied to the human mind, reſpecting whoſe operations we may often gain correct ideas, it is worſe than ſaying nothing, for it ſtops inveſtigation, by a pretence of knowledge. It is true we cannot trace many links in the chain of cauſe and effect: but as far as the great Creator has furniſhed us with powers, we need not be afraid to employ them, while their employment is conducted with judgment and caution. We do not ſay that all thoſe feelings which we are apt to call inſtinctive, can, in the preſent ſtate of our knowledge, be completely analyzed and traced to their origin; but while ſo many can, (ſo many too which in no reſpect differ from thoſe which we cannot account for, except in the opportunity which we have of accounting for them,) we have a full and fair right to expect, that as attention to mental ſcience increaſes, theſe difficulties will diminiſh, and that by degrees the whole of our mental furniture, except ideas of conſciouſneſs, will be traced, as we can trace a great part of it, to ſenſations, retained by the retentive power, and combined and variouſly modified by the aſſociative power. We have no objection to the term *natural* feelings, &c. rightly explained. We underſtand by it thoſe feelings, &c. which in all caſes, where there is not ſomething peculiar in the individual, will ſpring up in the mind, in conſequence of the influence of generally occurring circumſtances, upon the powers with which the great Former of the mind hath endowed it. For inſtance, the parental feelings, the filial feelings, &c. are natural feelings: in all caſes where there is not ſomething wrong in the individual, theſe feelings will ſpring up in his mind in conſequence of the influence of generally occurring circumſtances upon the powers with which the mind is endued. So alſo, a great variety of other feelings, which, with the ſtricteſt propriety, may in this ſenſe be termed natural. Some objection, however, lies againſt another word often uſed in a ſimilar way. Such feelings are ſaid to be *implanted*. If the word be underſtood to mean nothing more than what ſome do mean when they uſe it, that the feelings, &c. ſpring up in the mind with the ſame certainty as though they had made a part of the original ſtructure of the mind, all is well. But if it be underſtood to mean, that theſe feelings do form a part of the original ſtructure, then it implies the ſame cutting of the Gordian knot, the ſame appeal to ignorance, which is implied in the uſe of the word *inſtinctive*. If, however, we can reſtrict its ſignification, we may uſe it without injury. Let it mean no more, than that the feelings, &c. to which it is applied, are the neceſſary reſults from thoſe powers which the Supreme Being has implanted in us; in fact, let it have the ſame general meaning as *natural*, with rather more force, denoting the *neceſſity* of their ariſing from the powers which are given us; and we ſhall not be giving way to thoſe erroneous views which we muſt unlearn before we can acquire truth.

We need not go far for inſtances which will explain the law of transference. Suppoſe a perſon acquiring another language, the French, for inſtance. He learns the meaning of a French word by means of the correſponding Engliſh word: by degrees, as the French word becomes familiar to him, it is underſtood without the Engliſh word being thought of. Here the ſignification, (that is, the idea connected with the word,) may be called A, the Engliſh word B, and the French word C; by frequent connection between A and C, by means of B, A is transferred to C, *i. e.* the ſignification is transferred to the French word, ſo that B, the Engliſh word, is no longer wanting to form the link of union. When a young perſon has acquired ſome facility in conſtruing French, he generally reads his French work in Engliſh; but when he has acquired a pretty complete knowledge of the language, he reads it in French, that is, he underſtands it without the intervention of the correſponding Engliſh words. Thoſe who are converſant with ſhort hand, can read it without thinking of the long hand; yet they learnt the former through the medium of the long-hand words. Thoſe who have long learnt to read, and who read much to themſelves, ſeldom think of the ſound of the words when they are reading in this manner. When we are pretty familiar with a ſubject, a ſingle glance of the eye over a page of a clear printed book, will convey to us an idea of its contents, when perhaps not a ſingle word has particularly attracted our attention, when certainly there has not been time for the mind to think of the ſound of the words. We do not recommend this habit of reading for young perſons, but ſimply ſtate a fact which is very uſeful and convenient to the mind when it has gone through ſufficient diſcipline of accuracy, &c. Now it is obvious, that in almoſt all caſes, perſons learn to underſtand written words through the medium of ſpoken words. One more inſtance, and we have done with mere illuſtration. Thoſe who are familiar with writing never think of the printed word, unleſs any particular circumſtance call it to the mind. Yet there are few inſtances in which the written word is not connected with the ſpoken word, by means of the before learnt printed letters or word.

We now proceed to ſhew the application of this law, in explaining certain phenomena of belief, and the origin of the diſintereſted affections. We are not now to attempt the explanation of the formation of the complex feeling which we call belief, nor of thoſe complex ſtates of mind which we call affections; but ſuppoſing them formed to explain ſome facts reſpecting them, that is, to ſhew how theſe facts accord with the general law of aſſociation which we have been ſtating. Belief is transferable from the ſteps of the reaſoning to the reſult of that reaſoning. Suppoſe a propoſition depends for its truth upon a great number of other propoſitions, if as we go along every ſtep is believed to be true, and every connection of one ſtep with another appears to be a juſt one, the feeling of belief is ſucceſſively transferred from one ſtep to another, till at laſt we come to the reſult, the propoſition which we wiſh to prove, and the feeling will be connected with this, and will remain with it, when all the ſteps by which its truth was ſhewn are entirely loſt from the view of the mind. Every one admits this; and every one who has gone through the proceſs knows it to be ſo. There are almoſt innumerable inſtances in which we find the feeling of belief connected with ideas, without our being able at once to ſay, or even to ſay at all, how we acquired the connection. In this inſtance ſome philoſophers refer to certain inſtinctive principles, by which we are neceſſarily led to believe, without any further reaſon than that our mental conſtitution compels. But, we repeat it, we need not reſort to ſuch hypotheſes; they do great injury by checking the reſearches of the intellects, and, in ſome caſes, by leading people to ſuppoſe opinions well founded, which have no further ground than an almoſt accidental, or, at any rate, unjuſt transfer of belief, by means of what was itſelf perhaps entitled to no belief. There are certain reſults of reflection and obſervation which we call experience, and it is generally wiſe to truſt to them. But before a man yields to his experience, in oppoſition to the clear evidence of others, or to well founded and well connected reaſonings, he ſhould conſider what experience is, and on what ground he has connected belief with it. He will find that belief is not a neceſſary attendant upon his experience, but that it has been connected with it by means of intermediate links, which might themſelves have no ſatisfactory claim to belief. For inſtance, if a man has not obſerved accurately, or has not a correct judgment, his experience may not be worth any thing, nor entitled to any belief. Now, in many caſes it is almoſt impoſſible to recall the intermediate links, in order to prove to ourſelves the correctneſs of our experience, and yet we muſt act upon it; this ſhews the importance of cultivating in early life thoſe habits of cool judgment and accurate obſervation, which ſhall give us a full right to believe, and to act upon our belief in the reſults of reflection and obſervation. But ſome truths, it may be thought, have a neceſſary connection with belief. We admit that there are truths which are ſo accordant with all the grounds of belief, that they inſtantaneouſly excite the belief of thoſe who have had the opportunity of knowing thoſe grounds; but no further. You immediately believe, that $2 \times 2 = 4$; and you would think that man deſtitute of common ſenſe, who denied it, or who did not immediately admit it. Yet we are well convinced that the belief is formed gradually in conſequence of a number of external impreſſions; or, to ſtate it more familiarly, by frequently counting in the early part of childhood. We perhaps have not the power of diſcovering the exact ſteps by which we have ourſelves proceeded to the belief of this truth, but we can obſerve them in others, and we can trace them in ourſelves, in ſimilar circumſtances. Belief in ſuch truths is often formed through the medium of parental authority, or that of inſtructors, and it is probable that, in many inſtances, children know no more why $12 \times 12 = 144$, than that they find it ſo in their multiplication tables; but even where it has been formed by trials of the truth, thoſe trials are generally forgotten, and the truth alone is remembered. We ſhould gladly enlarge more on theſe points, but what has been already ſaid will probably anſwer the two purpoſes which we have in view, to ſhew the operation of aſſociation in transferring belief; and in leading to the inference that belief ought not to be regarded as a *proof* of truth; and yet, that the being unable to point out all the grounds of belief, is not of itſelf any reaſon why that belief ſhould be given up.

A few remarks on the oppoſite opinions which have been entertained reſpecting the diſintereſtedneſs of the human mind, will be found in MORAL *Education*, col. 27, 28. It is only by reference to the operations of the aſſociative power, that the real ſtate of the caſe can be thoroughly underſtood or explained; and we regard the explanation which the theory of aſſociation affords, of the origin of affections, and their progreſs from their ſelfiſh character towards diſintereſtedneſs, as intitling it to the higheſt rank among the diſcoveries of philoſophy,—whether we conſider the immenſe variety of mental phenomena for which this principle accounts, or the vaſt importance of its application to moral culture.

When an affection has arrived at its moſt complete ſtate, in which it has no farther end than its own immediate object (that is, when the object is deſired for its own ſake), the affection may be termed diſintereſted; but as this term has already a more confined application, and it would thus be applied not only to the worthy but to the baneful affections, (ſo that we ſhould be compelled to ſpeak of diſintereſted cruelty, diſintereſted avarice, &c.) we ſhall, for want of a better appellation, term thoſe affections which are in their ultimate ſtate, *ultimate affections*. Premiſing this, we ſhall endeavour to explain the progreſs of an affection, from the ſtate in which the object of it is a mean, to that in which the object of it becomes the ſole end, that is, in which it is an ultimate affection.

The moſt ſimple inſtance is the love of money. Money is firſt an object of pleaſurable feeling, merely as a means of procuring other things which are regarded as objects of deſire. For a moment we may ſometimes think of it, as having ſome intrinſic value independently of its utility as a means; but we may ſatisfy ourſelves that this is not the caſe, by obſerving how little it is an object of intereſt to children who have not heard much about it, or ſeen it employed, or employed it themſelves. A child is perhaps pleaſed with a piece of money as a plaything, but nothing farther; and children ſometimes advance conſiderably far in life before they feel its value. E, a boy ſeven years old, was preſented by his father with half a crown, as a reward for a very ſucceſsful and perſevering effort: he was delighted with the approbation which was ſhewn him; and as far as the money was a mark of that approbation it pleaſed him; but obviouſly nothing farther. In ſmall families, children generally learn the value of money early: and we therefore mention the preceding circumſtance as an illuſtration of what we have juſt ſaid, that originally it is merely deſired as a mean. As perſons advance in life, money is continually found to be the means of a great number and variety of the ſources of preſent enjoyments; hence pleaſurable feelings are continually connected with it, and it becomes more and more an object of deſire. In this ſtage of the progreſs of the love of money, it is deſired as the means of procuring certain pleaſurable feelings, without reference to the objects by which thoſe pleaſurable feelings are directly produced; and even in this ſtate of it we find an inſtance of the law of transference: the pleaſurable feelings reſulting from the objects procured, or to be procured, by money, are aſſociated with the money itſelf, without reference to thoſe objects. To revert to one of the modes in which the law was propoſed; the pleaſurable feelings which purchaſable objects produce, the idea of thoſe objects, and the idea of money, are the three ſets of ideas. Money procures the object; the object the pleaſurable feeling: hence the pleaſurable feeling becomes connected, by means of the intermediate links, with money; and hence money becomes an object of deſire, without any reference to the means of gratification which it procures. Here, to uſe the other ſtatement, the pleaſurable feelings may be repreſented by A; the objects which produce them, by B; and the money which procures thoſe objects, by C: by frequent connection between A and C, by means of B, A is transferred to C; that is, the pleaſurable feelings are transferred to the idea of money, and conſequently to money itſelf, and are called up by it without any reference to B, the objects by which thoſe pleaſurable feelings were originally excited. The law of transference may, in this inſtance, and in many others, be carried one ſtep farther. In the ſtate to which we have advanced, money is deſired on account of the pleaſurable feelings with which it is connected; but by degrees the deſire is transferred from thoſe pleaſurable feelings to money itſelf; and money is loved for itſelf, without any reference to thoſe pleaſurable feelings. This is ſo important a fact in our mental conſtitution, that we deem no apology neceſſary for endeavouring ſo much at length to point out its application. In this laſt ſtage of the affection, A is the deſire excited by B, the pleaſurable feeling excited by C, the idea of money; by means of B, A, the deſire, is transferred to C, the idea of money; and thus money comes to be deſired for itſelf without any reference to the pleaſurable feelings which it is the means of procuring. In this ſtate the deſire of money is become an ultimate affection; it is no longer deſired as a means, but as an end; it is deſired on its own account. Some remarks on the peculiarities and checks of this affection, will be found in a ſubſequent part of our article.

Illuſtrations of a ſimilar kind might be offered, reſpecting the filial, the fraternal, and even the parental affections; and it might be ſhewn that they are only gradually diſintereſted; but that, at the ſame time, the natural tendency is to diſintereſtedneſs, and that it is only where diſintereſtedneſs is oppoſed by the culture of wrong affections, affections which, when in their ultimate ſtate, are ever ſelfiſh, and by neglect of thoſe which are in all their ſtages worthy, and which haſten the moral progreſs almoſt indefinitely, that the mind ſtops at partial diſintereſtedneſs, or ſinks into confirmed ſelfiſhneſs. We have already, however, in MORAL *Education*, col. 9, &c. and 28, &c. given an outline of the origin and progreſs of the filial affections, and of the formation of diſintereſted benevolence ; and we would requeſt our readers, before they proceed, to peruſe our remarks on the latter point, as affording decided illuſtration and explanation of the law of transference, by which *means become ends*. With the ſame view we ſhall here add, that the deſire of doing good may itſelf be ſometimes loſt from the view of the mind, in attention to the means of doing it. Some of our readers, probably, take an active intereſt in the welfare of inſtitutions for the benefit of the poor and afflicted. Theſe inſtitutions were planned by benevolence, and benevolence ſtill prompts the ſupport of them. It is the deſire of doing good which has led to the frequently returning exertions which are made to keep them in vigour ; but we have no doubt that the welfare of one or other of theſe inſtitutions will often be found to be an object of the mind, without reference to the good it does. The mind rejoices in its ſucceſs, without thinking of the benefit which will reſult from it. As ſoon as the attention is directed to its beneficial effects, the mind dwells upon them as the ultimate ſource of its ſatisfaction ; but they were not immediately in its view. Whether or not we have been ſucceſsful in leading our readers to feel the force of the aſſertion by this illuſtration, we are confident of the fact, that the means of doing good very often themſelves become ends ; and that the deſire of their ſucceſsful furtherance, which was originally felt for them, merely on account of the good known or imagined to reſult from them, is at laſt felt without reference to that good ; though, on the other hand, it would by degrees, though perhaps not very ſoon, decay, if it were ſatisfactorily proved, that the means of the hoped-for-good were, and muſt be, wholly inefficacious.

But there would be no end to illuſtrations of this law if we were to trace it out in all its operations. We are continually loving things becauſe ——, and afterwards loving them for themſelves alone. It extends to the love of duty in general, without any reference to particular branches of it. All the pleaſurable feelings which theſe produce, and all the tendencies and diſpoſitions to the practice of them, by degrees become connected with the idea of duty in general, which is a fact derived from the ideas of particular branches of duty. Hence duty in general becomes an object of deſire and exertion, becauſe parts of it are deſired and purſued on their own account ; and this haſtens the progreſs of a diſintereſted love of duty in general. But leaving this out of the queſtion, a great variety of conſiderations make it an object of choice ; and if it be purſued as a means to obtain the object in view with ſufficient ſteadineſs, and for a ſufficient length of time, by degrees it is purſued as an end, and duty is then loved for itſelf.

In oppoſition to theſe views, as to the progreſs of the affections towards diſintereſtedneſs, it may be urged that children are often more diſintereſted than perſons who have had ſome experience in life. Our ideas on this point we have already had occaſion to ſtate ; and we wiſh to refer the reader to them. See MORAL *Education*, col. 43.

No one can, with juſtice, think leſs highly of the exertions of diſintereſtedneſs, becauſe it can be ſhewn to ariſe from a meaner origin. Ought we not rather to admire the height which has been gained by a ſteady uſe of the general means of worth, and by a right employment of the diſcipline of Providence ? Is his conduct leſs lovely, who has gone through the trial, and brought from it diſintereſtedneſs which prompts to efforts of the nobleſt kind for the good of others ? The opinion that the mind is originally diſintereſted, may be pleaſing in ſome points of view ; but in others it is the contrary : it diminiſhes the value of the character where it exiſts, for conſtitutional diſintereſtedneſs could have no more merit than the poſſeſſion of good ſight ; and it damps the efforts of the mind to acquire diſintereſtedneſs. Thoſe who find themſelves deficient, who diſcover feelings which diſintereſtedneſs cannot approve, have, on the principles which we have been aiming to illuſtrate, the beſt encouragement in their endeavours to transfer their affections from ſelf. Theſe principles lead, too, humbly and gratefully to acquieſce in every means which Providence may appoint to diſcipline the mind, and to purify it from all that can debaſe. In ſhort, they point the view to the higheſt excellence, and direct to the means of attaining it.

(4) *Habitual Biaſſes.*—We now proceed to the laſt of thoſe laws of aſſociation which we propoſed to notice ; and in what we ſhall advance on the ſubject, we ſhall make a free uſe of Mr. Stewart's Elements.

The leading feature of the operations of the aſſociative power is, that when two or more ideas are preſented to the mind together, or in cloſe ſucceſſion, they become connected with one another, or blended together ; ſo that the one, when recalled to the view of the mind, is accompanied with the other. But we muſt not limit its exerciſe to this operation : it not only connects ideas, when they are thus preſented together to the mind, but is the cauſe of the introduction of ideas with one another, which have never before been preſented together to the mind. An object, which has never before been preſented to the mind, may excite numerous ideas or trains of ideas ; while another may continually occur, without exciting a ſingle idea. And the ſame object will affect different perſons differently, ſo that in the mind of one it will excite trains of thought, while in another it will only produce a momentary impreſſion ; and in different perſons, too, the ſame object will excite different trains of thought ; and in the ſame perſon, at different times, different effects will be produced. Now all this depends upon the habitual or accidental biaſſes to particular kinds of connections, produced either by the original tendencies of the mental conſtitution, or, more uſually, by the particular culture of the individual's mind, owing to direct inſtruction, or to the effect of circumſtances, operating without any intention either on his part or on that of others.

The earlieſt bond of union between objects of thought is their being preſented to the mind together, or in cloſe ſucceſſion, through the medium of ſenſation. This is owing to the objects of ſenſation being connected in time or place ; or, in other words, owing to the relation of contiguity in time and place exiſting between theſe objects. This cauſe of connection among our ideas is what neceſſarily has the earlieſt efficacy in forming thoſe connections ; becauſe it does not preſuppoſe, as every other does, the exiſtence of other ideas in the mind, or the exerciſe of attention to other relations which exiſt among them. Children aſſociate ideas almoſt entirely by this bond of union : perſons of uncultivated minds, in the ſame manner, uſually have their ideas connected by the ſame bond of union ; contiguity of time and place of the objects of ſenſation producing impreſſions on the mind at the ſame time, or in cloſe ſucceſſion : and more or leſs it is a connecting link, or cauſe of connection, in every one, in every period of life.

We might, *à priori*, calculate upon its high importance in the mental ſtructure ; and as a matter of fact, it is the foundation of all experience and philoſophy, and, at the ſame time, the ſource of numerous prejudices. It is the ſource of numerous prejudices, by leading us to expect continued conjunction in time or place, where the conjunction was only occaſional; and thus to ſuppoſe a real and permanent connection between objects, which had only accidental and temporary connection. Hence unenlightened experience of the paſt will fill the mind, in numberleſs inſtances, with vain expectations, or with groundleſs alarms, concerning the future: hence the regard which is paid to unlucky days, to unlucky colours, to the influence of the planets, &c.; apprehenſions which render human life, to many, a continual ſeries of abſurd terrors. But this principle of connection among our ideas is alſo the foundation of all experience and philoſophy; for the grand object of philoſophy is the knowledge of thoſe laws which regulate the ſucceſſion of events; ſo that from the paſt we may be enabled to anticipate the probable courſe of the future, and to regulate our conduct accordingly: and, therefore, it is of the firſt importance that the connections of time and place ſhould have a ſtrong power over the mind. Experience is of a more limited nature, but has the ſame object, to anticipate the probable courſe of events, ſo as to make the paſt ſubſervient to the conduct of the future; and by rendering contiguity, in time, one of the ſtrongeſt principles of connection in our minds, the wiſe author of our frame has conjoined in our thoughts the ſame events which we find conjoined in our experience, and has thus accommodated, without any effort on our part, the order of our ideas to that ſcene in which we are deſtined to act.

Upon the connections eſtabliſhed by this principle all other connections are founded. Some of the moſt ſtriking are thoſe which ariſe from the relations of ſimilarity, of contrariety, of cauſe and effect, of means and end, of premiſes and concluſion.

Next to the relation of contiguity in time and place, that of ſimilarity is moſt univerſally operative. It does not depend upon an active exertion of intellect, but ariſes ſpontaneouſly from the mental conſtitution. Similarity implies partial identity of ſenſation; and hence an object, when firſt preſented to the mind, frequently recalls the idea of that which has ſome parts of its component ſenſations the ſame. Thus, when we ſee a face which conſiderably intereſts us, we are often led to recollect the face of ſome other perſon, in conſequence of the impreſſions from each agreeing in ſome particulars. In the ſame manner, when the circumſtances of one event are in ſome reſpects the ſame with the circumſtances of another, which had before fallen under our notice, ſo far there is a recurrence of the ſame impreſſions, and that, by the more general law of aſſociation, recalls the remaining circumſtances.

This cauſe of connection among our ideas, like that of contiguity of time or place, is of the greateſt importance, and at the ſame time liable to be greatly miſuſed. Without it, the experience of the paſt would be of no utility to us; for the ſame ſet of circumſtances never occurs twice. If there be ſufficient ſimilarity to recall the paſt, it now anſwers the purpoſe of exciting the expectation of what occurred in ſimilar circumſtances, that is, of bringing the experience of the paſt to bear upon the preſent. But as ſimilarity is only partial ſameneſs, if it be not accompanied with ſome diſcrimination, conſequences will be expected that will never happen, and concluſions, which will miſlead, will be formed without any juſt foundation.

Ideas are connected together, not only in conſequence of their ſimilarity, that is, ſameneſs in ſome of their component parts, but frequently alſo from ſimilarity in the ſounds expreſſing them. It is upon this circumſtance that the art of punning is founded; an art which may be innocent in itſelf conſidered, but which, when made much an object, leads from ſenſe to ſound, and prevents us from carefully examining the arguments and differences of things, on which alone reaſoning can be founded. So much indeed is a habit of punning at variance with habits of thought and ſober reflection, that the whole current of thought will ſometimes be diverted from its proper channel, by ſome word, in which the thought is expreſſed, recalling, by ſimilarity of ſound, ſome other which calls up its own train of thought. A good pun may ſometimes be conſidered as an exerciſe of the judgment; but more uſually it is merely an exerciſe of the aſſociative power, in this particular principle of connection, ſimilarity in ſound; and, therefore, it would be wiſe in young perſons to check the deſire to obtain an acquiſition, which is of little value, becauſe almoſt every one may acquire it, and which muſt check the culture of other more valuable principles of aſſociation.

Another fertile principle of connection is contrariety, which connects together ideas which are totally, or in many reſpects, oppoſite to each other. This, however, is more the reſult of attention and habit, than thoſe of contiguity in time or place, and ſimilarity. Some perſons are particularly diſpoſed to it, others have little tendency to it. It frequently appears to ariſe from the natural tendency of the mind to change from one ſet of feelings, which are in ſome way or other diſpleaſing, to others which may be pleaſing; and very often ſerves to illuſtrate reaſoning, but particularly to give intereſt and force to a deſcription of natural ſcenery, or a delineation of character.

The other principles of connection which we mentioned are more refined, and are the reſult of culture. A perſon who has been more accuſtomed to philoſophize, or to reaſon, than to follow the airy flights of wit or poetic fancy, connects his ideas by the principles of cauſe and effect, of means and end, of premiſes and concluſion. When a phenomenon is ſtated to his mind, it almoſt involuntarily brings forward ideas, which ſerve to account for the phenomenon: we do not mean that the mind invariably brings forward the right ideas, but ſimply thoſe which anſwer the wants of the individual, by ſerving to account to him for the phenomenon. In like manner, when an end is propoſed, the train of thought is concerned about the means, which are often ſuggeſted, though the object itſelf was never before in the view of the mind. All theſe relations doubtleſs produce their effect by minute and almoſt imperceptible ſameneſſes in the particular object now in the view of the mind, and ſome one which before has been, and which has been connected, by ſome cauſe or other, with the cauſe or means by which it was produced, or to be produced; but it is convenient to ſpeak of them as diſtinct from the more obvious relations, becauſe they imply different culture of the mind, and lead to ſuch widely different effects. Now any one of theſe connecting principles may, by habit, be ſtrengthened to ſuch a degree, as to give us a command over all the different ideas in our mind, which have the given relation to each other; ſo that when any one in the claſs occurs to us, we have almoſt a certainty that it will ſuggeſt the reſt. As this appears to be an indiſputable fact reſpecting the influence of aſſociation, we may ſtate it in the following general form:—When an idea is preſented to the mind, either by ſenſation or aſſociation, bearing certain relations, either in itſelf or in its effects on the mind, with another idea already in the mind, the latter is recalled by the former, and becomes connected with it; and the aſſociation, thus produced, is ſubject to the ſame laws with thoſe which are formed, owing to the contiguity in the times of the reception of the aſſociated ideas.

3. *Reſpecting the* COMPOSITION *of Ideas.*—Another grand law, or mode of operation, of the aſſociative power, is

that by which ſimple ideas are formed into compound or complex ideas; in other words, more generally, by which ſimple ſenſorial changes are combined and blended together. In the conſideration of this moſt important and extenſive principle, we ſhall derive moſt of our ſtatements from thoſe of Hartley; diveſting them, however, of thoſe peculiarities of expreſſion, which depend for their correctneſs upon the truth of the poſitions that the medullary ſubſtance of the brain is the ſenſorium, and that ſenſorial changes are *vibrations* of the medullary ſubſtance.

In order to explain this law of aſſociation, it is neceſſary to take a view of the modes in which ſimple ideas, or ideas of ſenſation, may be aſſociated.

Caſe 1.—Let the ſenſation A be often aſſociated with each of the ſenſations B, C, D, &c.; that is, at certain times with B, at certain other times with C, and ſo on: it is evident, from what has been before ſtated, that A, when produced alone, will raiſe *a*, *b*, *c*, *d*, &c. (the ſimple ideas of ſenſation correſponding reſpectively with A, B, C, D, &c.) altogether; and conſequently will aſſociate them together. If *a*, *b*, *c*, *d*, &c. are diſtinct in all their parts, then, in the firſt inſtance, they will be merely *connected*, ſo as to make a *group*, which may be repreſented by $a + b + c + d$, &c.; but if they are not diſtinct in their parts, they more or leſs run into each other, ſo as to form a complex *cluſter*, which may be repreſented by *a b c d*, &c. Now the more frequently the group $a + b + c + d$ occurs in connection, the more cloſely the ſingle ideas are united; and unleſs any one has a peculiar degree of vividneſs, they will by degrees appear to the mind as one idea; and unleſs the notice of the mind is particularly directed to the circumſtance that it is compoſed of parts, it appears as much a ſingle idea, as originally each of the parts would have done, if the attention had been directed to them ſingly. And, in like manner, the more the cluſter *abcd* occurs in combination, the more completely the parts coaleſce, ſo that by degrees they form a complex idea, the parts of which are ſcarcely diſtinguiſhable.

Caſe 2.—If the ſenſations A, B, C, D, &c. be aſſociated together, according to various combinations of twos, or even of threes, fours, &c., then A will raiſe up $b + c + d$, &c.; alſo B will raiſe up $a + c + d$, &c.; and compound or complex ideas will be formed of thoſe combinations, preciſely as was before ſtated in the caſe of ſenſations, each ſingly aſſociated with another ſenſation. It may happen indeed, in both caſes, that A may raiſe a particular idea, as *b*, preferably to any of the reſt, in conſequence of its being more frequently aſſociated with *b*, or of the greater novelty of the impreſſion of the correſponding ſenſation B rendering it more vivid, or of ſome peculiar tendency in the ſenſorium to excite *b*, or of ſome other cauſe; and in like manner that B may raiſe *c* or *d* preferably to the reſt. However, all this will at laſt be over-ruled by the recurrence of the aſſociations, ſo that by degrees any one of the ſenſations will excite the ideas of the reſt at the ſame inſtant and therefore aſſociate them together.

Caſe 3.—Let A, B, C, &c. repreſent ſucceſſive ſenſations, occurring in contiguous, ſucceſſive inſtances; A will raiſe *b*, *c*, *d*, &c.; B will raiſe *c*, *d*, &c: and though the ideas do not riſe preciſely in the ſame inſtant, yet they come nearer and nearer together than the ſenſations did in their original impreſſion; ſo that theſe ideas are at laſt aſſociated ſynchronouſly, as they were from the firſt ſucceſſively.

Caſe 4.—All compound impreſſions, $A + B + C + D$, &c., or A B C D, &c., (according as they are received by different organs, or the ſame,) after ſufficient repetition, leave behind their compound ideas $a + b + c + d$, &c., or *a b c d*, &c., which recur every now and then by means of thoſe ſenſations or ideas, with which the whole compound, or any one or more of the parts A, B, C, D, &c. have been aſſociated. Now in theſe recurrences of compound ideas, the parts are farther aſſociated and more intimately united to one another, agreeably to what has been already obſerved, ſo as to form a compound or complex idea, which will appear to the mind as one ſingle idea. As the ſame cauſes produce the recurrence of the compound ideas, in whatever way the union was firſt produced, the ſame remarks may be made under each of the caſes as have been under this and the firſt caſe, reſpecting the cauſes and effects of ſuch occurrence.

On the whole it is evident, that the ſimple ideas of ſenſation muſt run into cluſters and combinations by aſſociation; and that each of theſe will, at laſt, coaleſce into one compound or complex idea. It appears alſo from obſervation, that many of our mental or intellectual ideas, (that is thoſe in which no particular idea of ſenſation is perceptible,) ſuch as thoſe which belong to the heads of beauty, honour, moral qualities, &c., are, in fact, thus compoſed of parts which by degrees coaleſce into one complex idea. And as this coaleſcence of ſimple into complex ideas is thus evinced both by the principles of aſſociation and by obſervation, ſo it may be illuſtrated and farther confirmed, by the ſimilar coaleſcence of letters into ſyllables and words, in which aſſociation is likewiſe a chief inſtrument.

If the number of ſimple ideas which compoſe the complex one be very great, it may happen that the complex idea ſhall not appear to bear any relation to its component parts, nor to the external ſenſes by which the original ſenſations were received. The reaſon of this is, that each ſingle idea is overpowered by the ſum of all the reſt, as ſoon as they are all intimately united together. Thus in very compound medicines, the ſeveral taſtes and flavours of the ſeparate ingredients are loſt and overpowered by the complex one of the whole maſs; ſo that it has a taſte of its own, which appears to be ſimple and original. Thus alſo white appears, and is vulgarly thought to be, the ſimpleſt of all colours, while yet it really ariſes from a certain mixture of the ſeven primary colours in their due ſhades and proportions. And, to reſume the illuſtration above-mentioned, to one unacquainted with the arts of reading and writing, it would not appear probable, that the great variety of complex ſounds in language, are to be analyſed into a few ſimple ſounds. One may hope, therefore, that by purſuing and perfecting the doctrine of aſſociation, we may ſome time or other be enabled to analyſe all the vaſt variety of complex ideas, which paſs under the names of ideas of reflection, (excepting thoſe of conſciouſneſs,) abſtract ideas, deſires, affections, &c. into their ſimple component parts, that is, into the ſimple ideas of ſenſation of which they are formed. The complex ideas here ſpoken of, are generally excited by words or viſible objects; but they are alſo connected with other external impreſſions, and depend on them as ſymbols. In whatever way we conſider them, the trains of them which are preſented to the mind ſeem to depend upon the then preſent ſtate of the body, the external impreſſions, and the remaining influence of prior impreſſions and aſſociations, taken together.

As ſimple ideas of ſenſation run into complex ones by aſſociation, ſo complex ideas run into complex combinations, which Hartley terms *decomplex ideas*. But here the varieties of the aſſociations, which increaſe with the complexity, hinder particular ones from being ſo cloſe and permanent between the complex parts of decomplex ideas, as between the ſimple parts of complex ones.

The ſimple ideas of ſenſation are not all equally and uniformly concerned in forming complex and decomplex ideas; but, on the contrary, ſome occur much oftener than others: and the ſame holds good of complex ideas, conſidered as the component parts of decomplex ideas. And innumerable combinations never occur at all in real life, and conſequently are never aſſociated into complex or decomplex ideas. Juſt as in language, ſome letters, and combinations of letters, occur much more frequently than others; and ſome combinations never occur at all. Farther, as perſons, who ſpeak the ſame language, have, nevertheleſs, a different uſe and extent of words, ſo though mankind in all ages and nations agree, in general, in their complex and decomplex ideas, yet there are many particular differences in them, and theſe differences are greater or leſs, according to the difference or reſemblance, in age, conſtitution, education, profeſſion, country, period, &c., that is, in their impreſſions and aſſociations.

When ſenſations and ideas, with their moſt common combinations, have been often preſented to the mind, a train of them of conſiderable length, may, by once occurring, produce ſuch a tendency to recurrence, that they may recur, without the previous cauſe, in nearly the ſame order and proportion as in this ſingle occurrence. For ſince each of the particular ſenſations and ideas is familiar, little more will be wanting for their recurrency than a few connecting links; and even theſe may, in ſome inſtances, be ſupplied by former ſimilar inſtances. Theſe conſiderations, when duly unfolded, ſeem to explain the chief phenomena of memory; and it will be eaſily ſeen from them, that the memory of adults, and of proficients in any ſcience, ought to be much more ready and certain, than that of children and novices, as it is found to be in fact.

As many words have complex ideas annexed to them, ſo ſentences, which are collections of words, have collections of complex ideas, that is, have decomplex ideas annexed to them. And it happens in moſt caſes, that the decomplex idea belonging to any ſentence, is not compounded merely of the complex ideas belonging to the words of it, but that there are alſo many variations, ſome oppoſitions, and numberleſs additions. Thus propoſitions, in particular, excite, as ſoon as heard, the feelings of aſſent or diſſent; which conſiſt chiefly of additional complex ideas not included in the terms of the propoſition. And it would be of the greateſt uſe, both in the ſciences and in common life, thoroughly to analyze this matter, to ſhew in what manner and by what ſteps, that is, by what impreſſions and aſſociations, our aſſent and diſſent, both in ſcientific and moral ſubjects, are formed.

4. *Reſpecting the* VIVIDNESS *of complex ideas, and the mental pleaſures and pains in general* —It is reaſonable to ſuppoſe, that ſome ideas may be as vivid as any ſenſation excited by the direct action of objects upon the external organs of ſenſe. For complex ideas may conſiſt of ſo many parts, and theſe may ſo alter and exalt one another, that the ſenſorial change, whatever that be, may be as great as can be produced by any ſingle external impreſſion. And we know as a matter of fact, that mental pains are ſometimes ſo acute, as to counterbalance, and even altogether remove the attention from, the moſt excruciating pains, which are merely thoſe of ſenſation. This proceſs may be aſſiſted and accelerated by the mixture of vivid ſenſations among the ideas, by the ſenſibility of the mental organs, by a prediſpoſition to a particular claſs of ideas, &c.

It is on theſe principles, in connection with the general operation of the aſſociative power, that we are enabled to account for the exiſtence of intellectual or mental pleaſures and pains, that is, thoſe in which no particular ſenſible pleaſure or pain is perceptible, which form a diſtinct and moſt important claſs of feelings. The relics of ſenſible pleaſures and pains, that is, of pleaſurable or painful ſenſations, unite and coaleſce in the ſame manner as other ideas; and variouſly connected and blended together, they conſtitute the whole of thoſe internal feelings, which we term paſſions, affections, emotions, &c.

In almoſt every ſtep of our inveſtigations in mental philoſophy, we are perplexed by the ſcantineſs of language, and ſtill more by the want of preciſion with which the words we poſſeſs are employed. It is much more eaſy to point out faults than to correct them; but it appears to us likely to promote the object in one department, if the two claſſes of ideas, the relics of ſenſations, *viz.* thoſe which are pleaſurable, and thoſe which are indifferent, or, more properly, which belong to the underſtanding, were denominated, the latter *notions* and the former *feelings*. Popular language would, in great meaſure, bear us out in this appropriation; but at leaſt in the commencement of our ſtatements we were obliged to employ the word feelings in a more general ſenſe, *viz.* for every ſenſorial change accompanied with conſciouſneſs, becauſe we have no other word in the language comprehending ideas and ſenſations: henceforwards, however, we wiſh to appropriate the word *feelings* to thoſe complex ideas, which are either pleaſurable or painful, ſo as to correſpond with Hartley's denomination "intellectual pleaſures and pains," including, as he does, the affections and paſſions. We muſt however remark, that we decidedly prefer the term *mental* to *intellectual*, when ſpeaking of the feelings. The underſtanding is uſually oppoſed to the feelings; but mental is properly oppoſed to corporal; and though the bodily pleaſures or pains, that is, thoſe of ſenſation, are in reality pleaſures and pains of the mind, yet having the external organs as their ſources, there is an obvious ground of diſtinction between them and the feelings, in which ſenſation has no immediate ſhare. To theſe feelings the term *ſenſations* is too often applied. Senſations may properly enough be termed feelings; but the term *ſenſations* ſhould be confined to thoſe feelings which are produced independent of the aſſociative power, by affections of the organs of ſenſe.

It appears from what has been already ſtated, that the mental pleaſures and pains may be equal to, or greater or leſs than, the ſenſible ones, according as each perſon unites more or fewer, more vivid or more languid ideas, in the formation of the mental pleaſures or pains.

It is of the utmoſt conſequence to religion and morality, that the mental feelings ſhould be analyzed into their ſimple component parts, by reverſing the ſteps which concur to form them. For thus we may learn how to cheriſh and improve good ones, and to check and root out ſuch as are miſchievous and immoral; and how to ſuit our manner of life, in ſome tolerable meaſure, to our intellectual and religious wants. And as this holds good in reſpect of perſons of all ages, ſo it is particularly true and worthy of conſideration in reſpect of children and youth. The word is indeed ſufficiently ſtocked with general precepts for this purpoſe, founded on experience; and whoſoever will follow theſe faithfully, may expect good general ſucceſs. The doctrine of aſſociation, however, when traced up to the firſt rudiments of underſtanding and affection, unfolds ſuch a ſcene as cannot fail both to inſtruct and alarm all thoſe who have any degree of intereſted concern for themſelves, or benevolent concern for others.

Our original bodily ſtructure, and the impreſſions and aſſociations which affect us in paſſing through life, are ſo

much

much alike, and yet not the ſame, that there muſt be both a great general reſemblance among mankind in reſpect of their mental pleaſures and pains, and alſo many particular differences.

Some degree of ſpirituality, that is, that ſtate of mind in which the pleaſures and pains are not ſenſible, is the neceſſary conſequence of paſſing through life; and the ſenſible pleaſures and pains muſt be transferred by aſſociation more and more every day, upon things which of themſelves afford neither pleaſure nor pain.

Let the letters *a*, *b*, *c*, *d*, *e*, &c. repreſent the ſenſible pleaſures, and *x*, *y*, and *z*, the ſenſible pains, ſuppoſing them to be only three in number; and let us ſuppoſe all theſe, both pleaſures and pains, to be equal to each other in degree. If now the ideas of theſe ſenſible pleaſures and pains be aſſociated together, according to all the poſſible varieties, in order to form mental pleaſures and pains, it is plain that pleaſure muſt prevail in all the combinations of ſeven or more letters; and alſo that when the ſeveral parts of theſe complex pleaſures are ſufficiently blended by aſſociation, the pains which enter into their compoſition will no longer be diſtinguiſhed ſeparately, but the reſulting mixed and complex pleaſures will appear to be pure and ſimple ones, equal in quantity to the exceſs of pleaſure above pain, in each combination. Thus aſſociation would convert a ſtate, in which pleaſure and pain are both perceived by turns, into one in which pure pleaſure would alone be perceived; at leaſt would cauſe the beings, who were under its influence to an indefinite degree, to approach to this laſt ſtate nearer than by any definite difference. Now, though the circumſtances of mankind are not the ſame with thoſe here ſuppoſed, yet they bear a great reſemblance to them, during that part of our exiſtence which is expoſed to our obſervation: for our ſenſible pleaſures are far more numerous than our ſenſible pains; and though the pains are in general greater than the pleaſures, yet the ſum total of the latter is probably greater than that of the former; whence the remainder, after the deſtruction of the pains by the oppoſite and equal pleaſures, will be pure pleaſure.

The mental pleaſures and pains are as real as the ſenſible ones; being, in fact, nothing but the ſenſible pleaſures and pains variouſly mixed and blended together. They are alſo all equally of a factitious and acquired nature; and we muſt, therefore, eſtimate all of them equally, by their magnitude, permanency, and tendency to produce others.

The ſenſible pleaſures and pains have a greater tendency to deſtroy the body than the mental ones; for they are of a particular local nature, and ſo affect the organs which convey them: and the deſtruction of any one conſiderable part of the body is the deſtruction of the whole, from the ſympathy of the parts. On the other hand, the mental pleaſures and pains, being collected from all quarters, do not much injure any organ particularly, but rather bring on an equable gradual decay of the ſyſtem. This, however, is upon the ſuppoſition that they are not exceſſive; for exceſſive deſires or emotions, even if of a refined nature, have a direct tendency to injure the mental ſyſtem generally, and eſpecially to bring on that derangement of it, which is cloſely related to inſanity, even if it do not bear the name.

Theſe principles afford ſome pleaſing preſumptions; ſuch as, that we have a power of ſuiting our frame of mind to our circumſtances, of correcting what is amiſs, and improving what is right; that our ultimate happineſs appears to be of a ſpiritual, not corporeal nature; and, therefore, that death may not ſtop our progreſs, but forward us in the purſuit of our true end; that aſſociation tends to make us all ultimately ſimilar; ſo that if one be happy, all muſt: and, laſtly, that aſſociation may alſo be ſhewn, by a direct argument, as well as by this indirect one, to contribute to introduce pure ultimate ſpiritual happineſs in all.

5. *Of the Affections, &c.*—We have already ſaid as much reſpecting the nature of the *affections*, *paſſions*, *emotions*, and *diſpoſitions* in general, (ſee MORAL *Education*, col. 24.) as we ſhould find neceſſary for our preſent purpoſe; and we ſolicit the peruſal of thoſe obſervations in this place. They are followed by a ſtatement of the leading principles reſpecting the origin and progreſs of the affections, &c.; and though we adduced them, in the article referred to, with a ſpecific reference to the proceſſes of education, we believe they will be found to include all that it might have been deſirable to introduce in the preſent caſe. The remarks and illuſtrations founded on thoſe principles, which we have ſubjoined to them, have a more peculiar application to the immediate object of that article; but we venture to recommend the peruſal of them to the ſtudent of mental philoſophy, as having a cloſe connection with his purſuit. Preſuming upon our reader's reference to the account we have given of the nature of our mental feelings, and to the leading principles reſpecting them, we ſhall proceed to offer ſome obſervations reſpecting the diviſion and claſſification of our feelings.

The lateſt writer on the arrangement and explanation of the feelings is Dr. Cogan, in his Philoſophical Treatiſe on the Paſſions; and his work is the beſt which is acceſſible, to the Britiſh public at leaſt. Of his valuable treatiſe we have already given an ample account under the article PASSION; and we here cite again particular paſſages that occur under that article, in order to give our readers a better opportunity of forming a competent judgment of our remarks. Dr. Cogan uſes the term *paſſions* with much greater latitude than what we have aſſigned to it, in the paſſage above referred to; and we think he is not fortunate in ſo doing. This generic term, *feelings*, limited to *mental* feelings, as diſtinct from *ſenſations*, might perhaps have ſupplied its place, in thoſe caſes in which he has employed it in its wideſt acceptation. But as to the more limited ſenſe, to which he appears to wiſh to confine it by his definition, it is not calculated to bring into view thoſe extraordinary workings of the mind, to which alone we would limit the term. We agree with him, that the term *paſſion* ſhould convey an idea of the *paſſiveneſs* of the mind, when under its influence, as far as it relates to that influence; but we conceive that this paſſiveneſs is not the prominent feature of a paſſion.

But we will quote this philoſopher's explanation of paſſions, and alſo of emotions; reſpecting which laſt we have alſo to regret our differing conſiderably from him. "The term paſſion," he ſays, p. 6, "may with ſtrict propriety be uſed, and uſed excluſively, to repreſent the *firſt feeling*, the *percuſſion* as it were, of which the mind is conſcious from ſome impulſive cauſe; by which it is wholly acted upon, without any efforts of its own either to ſolicit or eſcape the impreſſion." We ſhould have little objection to ſuch a limitation of the term, if we had any other to expreſs thoſe peculiar ſtates of excitement to which we have applied it, and we apprehend more agreeably to its common acceptation. The fact is, that though common language ſupplies a conſiderable variety of diſcriminating terms for the purpoſes of mental philoſophy, and particularly for the department of intellect, we ſtill want ſeveral to mark the various ſhades and diverſities of feeling, which are now, to the deſtruction of all accuracy, claſſed under one or two general heads, and diſtinguiſhed only by their generic appellation. A great deal will be effected when thoſe terms, which we already have, become more ſettled and limited in their application.

But to proceed with Dr. Cogan's explanation of the term *emotions*. "The ſtate of abſolute paſſiveneſs, in conſequence of any ſudden percuſſion of mind, is of ſhort duration. The ſtrong impreſſion, or vivid ſenſation, immediately produces a re-action correſpondent to its nature, either to appropriate and enjoy, or to avoid and repel the exciting cauſe. This re-action is very properly diſtinguiſhed by the term *emotion*. The ſenſible effect produced at the firſt inſtant, by the cauſe of the paſſion, greatly agitates the frame: its influence is immediately communicated to the whole nervous ſyſtem; and the commotions excited in that, indicate themſelves both by attitudes and motions of the body, and particular expreſſions of countenance. Theſe effects are ſuch univerſal concomitants, that no very important change in the ſtate of the mind can take place, without ſome viſible change of a correſpondent nature in the animal economy. Emotions, therefore, according to the genuine ſignification of the word, are principally and primitively applicable to the ſenſible changes and viſible effects which particular paſſions produce upon the frame, in conſequence of this re-action, or particular agitation of mind." The term, *emotions*, therefore, Dr. Cogan, though he more commonly employs it in a much leſs exceptionable ſenſe, clearly regards as denoting "the external marks or viſible changes produced by the impetus of the paſſions upon the corporeal ſyſtem;" but he ſtates that it "is ſometimes expreſſive of lively ſenſations," or rather feelings, "which do not produce viſible effects in any degree proportionate to their feelings;" and that it "is frequently employed to mark the firſt impreſſion which particular objects make upon ſuſceptible minds, whether they remain concealed or not." The fact appears to the writer of this article to be, that though the term may be applied to the viſible effects of inward feelings, yet that this is only becauſe they are regarded as the ſigns or conſequences of mental emotions; and that the concomitance of the uſual viſible effect is ſo far from being eſſentially neceſſary, that in many individuals of ſtrong feelings, placed under habitual reſtraint as to the expreſſion of them, the moſt powerful internal emotions have little or no perceptible external effect. To entitle feelings to the appellation of *emotions*, we conceive that they muſt ariſe and proceed in the mind, without any direct exertion, (if attended with which, they have been well termed the *workings* of the mind,) and they muſt be accompanied with ſome degree of excitation. When the excitement is very powerful, and the cauſe painful, the emotions produced might be more appropriately termed *agitations*: we ſhould ſpeak of the emotions of ſorrow, the agitations of deſpair; the emotions of maternal ſolicitude, the agitations of terror, &c. *Rapture* denotes a ſtrongly excited ſtate of mind, producing lively emotions, ariſing from a pleaſurable cauſe.

The arrangement of our feelings muſt be in a great meaſure determined by the object in view. If this be, to take the feelings as they are, in their compound ſtate, and to arrange them ſo as to ſhew their relationſhip and tendency to affect one another, having in view the phenomena rather than the cauſes of them, we ſhould be inclined to give a decided preference to Dr. Cogan's elegant, and, in ſeveral reſpects, ſatisfactory claſſification: but if the object be to trace them to their ſources, in order to ſhew how they are generated, directly or indirectly, from the relics of ſenſations, and how they are modified by the various combinations of them, which, as has been already obſerved, is of the higheſt moral importance, Dr. Hartley's arrangement muſt have the preference, having been expreſsly formed with that ſpecific view.

The outline of Dr. Cogan's arrangement (ſee the article Passion) is thus ſtated by himſelf (p. 53.): "When the nature of the exciting cauſe is more accurately aſcertained, it will be found to reſpect either the *ſelfiſh* or the *ſocial* principle: hence ariſe two important diſtinctions, forming two different claſſes. In each claſs, the predominant idea of a *good*, and the predominant idea of an *evil*, will conſtitute two different orders. The leading paſſions and affections under each order point out the *genera*. The complicated nature of ſome of the paſſions, and other contingent circumſtances, may be conſidered as conſtituting *ſpecies* and *varieties* under each characteriſtic *genus*." Beſides the feelings which he thus arranges, (comprehending, with one remarkable exception, all which can with accuracy be termed either paſſions or affections,) there is a claſs of feelings, exerting their influence indiſcriminately in paſſions of the moſt oppoſite characters, which with great propriety he terms *introductory emotions*: theſe are the feelings of *ſurpriſe*, excited by the apparent novelty of the object, or by the unexpectedneſs of its introduction; of *wonder*, ariſing from apparent intricacy or embarraſſment; and of *aſtoniſhment*, ariſing from what is vaſt and incomprehenſible. We agree with Dr. Cogan, that the popular, as well as philoſophical uſe of the term *emotions*, renders it peculiarly appropriate to theſe feelings; and we feel it neceſſary to add to our account of emotions in Moral *Education*, that the term is employed to denote ſimilar ſtates of excited feeling, whether or not introduced by the exerciſe of the affections: and this extenſion of the term is requiſite for the employment of it in connection with ſome of the objects of taſte, as we think it is uſed by Mr. Alliſon. At the end of the laſt preceding paragraph but one, we have endeavoured to expreſs ourſelves with leſs limitation.

Although we have already given a conciſe ſketch of Dr. Cogan's claſſification under the article Passion, to which head the plan upon which this Cyclopædia is conducted led us naturally to refer it, we ſhall here, with a view to the more convenient introduction of our remarks on this part of his ſyſtem, be under a neceſſity of retracing part of the ground which has been occupied by a preceding article. The importance of the ſubject renders it needleſs to make an apology to our readers for a repetition, without which the diſcuſſion of this intereſting branch of mental philoſophy would have been partial and incomplete. The definitions, unleſs otherwiſe intimated, will, we truſt, be found to be a correct repreſentation of at leaſt the ſubſtance of thoſe given by Dr. Cogan.

Claſs I.—Feelings relating to *Self-love*. *Order* 1.—Feelings excited by the idea of *good* (1) in *poſſeſſion*. *Joy* is the vivid delight ariſing from the immediate reception of ſomething peculiarly grateful to the mind, and uſually depending upon a ſudden impulſe. *Gladneſs* is an inferior degree of joy. *Cheerfulneſs* is an emotion of ſtill gentler influence, often inſpired by very trivial circumſtances in perſons of a lively diſpoſition, and free from anxious care. [Here, beſides an employment of the term *emotion*, which very little accords with Dr. Cogan's own explanation of it, we have to obſerve, that *cheerfulneſs* is rather a *ſtate of mind*, than an *emotion*; though it may occaſionally be attended with emotions peculiar to itſelf, and ſtill more frequently prediſpoſes to pleaſing emotions: it appears to us peculiarly to denote that tranquil healthful frame of mind, in which it is alive to the gentler feelings of pleaſure, and is free from all tendency to gloomy or otherwiſe painful trains of thoughts.] *Mirth* is a higher degree of cheerfulneſs, generally excited by what is facetious or ludicrous. [This feeling may in many caſes have a near alliance to cheerfulneſs; but the wildeſt mirth is often found where cheerfulneſs is utterly unknown.] If the good be not tranſitory or evaneſcent, we remain under the influence of contentment, ſatisfaction, or complacency. *Contentment* expreſſes the acquieſcence of the mind in the portion of good we poſſeſs. *Satisfaction* denotes a pleaſing ſtate of mind, exceeding that communicated by ſimple contentment. *Complacency* (p. 66.) is full and continued ſatisfaction, connected with a conſiderable degree of approbation, ariſing from the perception of ſome kind of excellence. Dr. Cogan's remarks here are peculiarly intereſting and valuable. *Pride* is that exalted idea of our ſtate, qualifications, or attainments, which exceeds the boundaries of juſtice, and induces us to look down upon inferiors with ſome degree of unmerited contempt. *Vanity* is that ſpecies of pride, which, while it preſumes upon a degree of ſuperiority in ſome particular articles, fondly courts the applauſe of every one within its ſphere of action, ſeeking every occaſion to diſplay ſome talent or ſuppoſed excellence: (ſee MORAL *Education*, col. 38.) *Haughtineſs* is an overt act of pride, manifeſted by ſome action or expreſſion, indicative of unmerited contempt of others. *Arrogance* indicates itſelf by ſome particular claims to precedency, or marks of diſtinction and reſpect from thoſe whom pride conſiders its inferior in ſtation or character, or by impertinent pretenſions to an equality with ſuperiors.

" Theſe indications of falſe complacency," continues Dr. Cogan, p. 72. " in their mildeſt influence may be placed with ſtrict propriety among the *affections:* upon ſudden occaſions they riſe into *emotions;* and ſometimes, particularly when connected with anger, from a ſuppoſed inſult or neglect, they poſſeſs every characteriſtic of *paſſion.*" We notice this obſervation, partly as according much more with the explanation we have endeavoured to give of the laſt two claſſes of feeling, than with Dr. Cogan's own, and partly to add one farther remark on the diviſion of our feelings. The term *affection* may be employed to denote any mental ſtate in which the mind is *affected* with pleaſure or pain by external impreſſions, or by its own ideas; and it may ſometimes be convenient thus to employ it; but between this very wide acceptation, and that which we have already ſtated in MORAL *Education*, col. 24, and which we know not how to extend, without loſing its peculiar import, there is a term wanting, to denote thoſe feelings or ſtates of mind, which (though ſometimes the rudiments of emotions and paſſions) have a more permanent habitual character, where yet the feelings of love or hatred cannot be traced as component parts. Thus, we know not how to regard pride as an affection, unleſs we uſe the term in its wideſt acceptation: pride conſiſts in too high thoughts of ourſelves; and for the complex ſtate of feeling with which ſuch thoughts are accompanied, and which give them habitual influence among our motives to action, we want a generic appellation. Similar remarks might be made reſpecting the feelings of contentment, cheerfulneſs, ſorrow, melancholy, &c. In many caſes the term *diſpoſition* would anſwer the purpoſe; but our preſent nomenclature is clearly inadequate to diſcriminate all the claſſes of our feelings.

I. *Order* 1. (2) Feelings relating to *Self-love*, excited by the idea of *good* in *expectancy*. *Deſire* is that influential effect which the perception of good or evil produces within us, in conſequence of which we ſeek to obtain the one and avoid the other. *Wiſhes* are inactive deſires, in caſes where no expectations can be formed, no efforts made. A wiſh may refer to *paſt* ſcenes or to *impoſſibilities*, where deſire is totally inapplicable. [Dr. Cogan's view of the *varieties* of deſire is too brief for much abridgment: it includes ſome of the religious feelings.] *Hope* is the encouragement given to deſire; the pleaſing expectancy that its objects ſhall be obtained.

I. *Order* 2. Feelings relating to *Self-love*, which are excited by the idea of *evil*. (1) Feelings ariſing from actual loſſes and diſappointments, which claſs under the head of ſorrow. *Sorrow* expreſſes a mental ſuffering under the privation of ſome good which we actually poſſeſſed, or concerning which we entertained a pleaſing expectation. *Grief* is ſometimes conſidered as ſynonimous with ſorrow; and in this caſe we ſpeak of the *tranſport* of grief: at other times it expreſſes more ſilent, deep, and painful feelings, ſuch as are inſpired by domeſtic calamities. When the mind is very deeply impreſſed with a ſenſe of calamity, for a continuance, and the attention cannot by any means be diverted from it, the ſubject is in a ſtate of *melancholy*. Sorrow is often diverſified by being blended with other feelings. Sometimes it aſſumes the appearance of *diſcontent* and *diſſatisfaction;* the one, chiefly produced by an humiliating compariſon of our ſituation with thoſe of others; the other by a partial accompliſhment of our ardent wiſhes. Where the diſappointment is great, eſpecially when referred to the agency of others, diſſatisfaction becomes *vexation* or *chagrin;* all implying irritation as well as ſorrow. *Impatience* is alſo a mixture of ſorrow and anger, under the immediate ſenſation of ſomething irkſome, or at the cauſes of unpleaſant delay. *Repining* is ſorrow united with ſome degree of reſentment, where the mind dares not break forth into ſtrong expreſſions of anger. *Patience* is a calm acquieſcence in a ſtate in which we experience uneaſineſs or ſuffering. *Reſignation* adds a ſubmiſſive diſpoſition reſpecting the intelligent cauſe of our uneaſineſs. *Humility* is a degree of habitual ſorrows, or painful apprehenſions, concerning our moral or intellectual deficiencies.

We obſerve here the influence of too great a deſire to generaliſe in the claſſification of our feelings. Humility may ſometimes be nearly allied to ſorrow; but it ſurely is not neceſſarily ſo. He who is conſcious of having ſpared no exertions in the cultivation of his mind, may feel a tranquil humility in contemplating his own inferiority, without any diſcontent or ſorrow; the pious mind may take delight in contemplating its infinite inferiority, to the great object of its adorations; and ſo on. *Humility* is the diſpoſition which leads us to think lowly of ourſelves: where it is a ſteady influential diſpoſition, it is productive of tranquil emotions, ſometimes even of ſatisfaction at the ſuperiority of others: where it is attended with the conſciouſneſs of wrong cauſes of inferiority, ſorrow muſt blend with it; but an humble ſenſe of our own intellectual and moral qualities is ſo cloſely allied to contentment, and ſo effectually preſerves us from the painful and uneaſy emotions of pride, that humility, in its habitual character, is more nearly related to happineſs than to miſery. *Humiliation* ſeems moſt correctly to ſtand for that feeling which Dr. Cogan denominates humility. (On humility, as oppoſed to pride and vanity, ſee PHILOSOPHY, *Moral*.) In the ſubſequent diviſion, Dr. Cogan ſpeaks of his having arranged *remorſe* under the head of ſorrow. There is a remarkable deficiency of that and the related feelings, (at leaſt in the ſecond edition, to which alone we have the power of referring,) and we will endeavour to ſupply it. *Penitence* denotes the ſorrow we feel at the conſciouſneſs of paſt tranſgreſſions or neglect of duty When the feelings of penitence poſſeſs ſo much influence in the mind, as to excite it to ſteady reſolutions of amendment, and to effectual efforts after reformation, both in the affections and conduct where wrong, they may be denominated *repentance*. *Contrition* ſeems to expreſs a more permanent ſtate of ſorrow at the recollection of paſt ſins and failures, in which the mind is deeply humbled, and the ſpirit wounded, often giving a tinge of melancholy to the trains of thought and feeling. It does not exclude the hope of final acceptance; but it indulges not the rapture of aſſurance. It is cloſely allied to humility; and may often be conſidered as a mixture of humility and penitential ſorrow. *Remorſe* is the corroding uneaſineſs and diſtreſs of mind, which accompanies the recollection of glaring breaches of duty, which have been followed by irreparable injuries, eſpecially to the welfare of others. It does not neceſſarily lead to repentance; where it does, the hope which this inſpires, ſoothes and reduces the feelings to contrition.

I. *Order* 2. (2) Feelings ariſing from *ſelf-love*, relating to *apprehended* evil. The generic feeling of this diviſion is *fear*, produced by the immediate apprehenſion of ſome impending evil, either of loſs or diſappointment. *Conſternation* is a ſtrong foreboding of tremendous evils which are likely to follow misfortunes already experienced; and it chiefly refers to alarms excited by ſome general calamity of incalculable extent. *Abject fear* ſeems to be inſpired chiefly by the idea of an irreſiſtible power in its cauſe. *Terror* rouſes to defend or eſcape. *Dread* is a degree of permanent fear; an habitual and painful apprehenſion of ſome remote evil. *Deſpair* is the permanent fear of evil, without any mixture of hope. *Remorſe* (Dr. Cogan ſays) "has been already placed under ſorrow; but whenever it is connected with a fear of puniſhment, it deſerves a place under this paſſion alſo, which greatly increaſes its agonies." *Cowardice* is that habitual diſpoſition which diſqualifies for oppoſing dangers and difficulties. *Puſillanimity* is terrified at mere trifles, or imaginary dangers. *Timidity* is a leſs reproachful term, employed when there is ſome apology from ſex, tender years, or feebleneſs of frame. *Doubt*, conſidered as a feeling, and diſtinct from ſimple deliberation, is that comfortleſs ſtate which is occaſioned by the uncertainty of an event, and the predominancy of fearful apprehenſion reſpecting it. *Irreſolution* repreſents the mind as fluctuating between hope and fear, in caſes where it ought to determine. *Shame* is a painful ſenſation occaſioned by the quick apprehenſion that reputation and character are in danger. *Modeſty* may be deemed an habitual ſolicitude; not to offend againſt any ſpecies of decorum. [This ſolicitude is the conſequence of the feelings of modeſty, not modeſty itſelf. We do not however know how to improve upon our baſis.] In oppoſition to fear are *fortitude*, which expreſſes that firmneſs of mind which reſiſts dangers and ſufferings; *courage*, which is active fortitude; and *intrepidity*, which denotes a courage perfectly undaunted.

I*. *Order* 2. (3) Feelings ariſing from the *immediate perception* of evil, relating to the conduct which appears to deſerve reprehenſion. *Anger* is a ſtrong paſſion or emotion, impreſſed or excited by a ſenſe of injury received, or in contemplation. Anger in the exceſs of its violence is termed *rage*. *Wrath* is a violent and permanent anger. *Reſentment* is a lower degree of wrath. *Indignation* is reſentment, againſt conduct which appears peculiarly unworthy. (See alſo Claſs II. Order 2. (2.) *Peeviſhneſs* is a ſlighter degree of anger, perpetually recurring to irritable perſons from trifling cauſes.

Claſs II. Feelings derived from the *ſocial principle*. *Order* 1. Thoſe excited by *benevolence*, in which *good* is the predominant idea. (1) Reſpecting *good deſires* and *diſpoſitions*. *Benevolence*, or *good-will*, is the love or deſire of the good of others. *General benevolence* relates to all beings rendered capable of enjoyment; *philanthropy* to the whole human race indiſcriminately. *Affection*, in the moſt limited ſenſe of the term, denotes the habitual attachment and benignant diſpoſitions, which the mind experiences in connection with the domeſtic relations, various degrees of conſanguinity, and particular friendſhips. *Sympathy* is an inward feeling, which harmoniſes with the condition and feelings of its object. *Compaſſion* is a benevolent ſorrow, at the ſufferings or approaching miſery of others. *Mercy* is that dignified compaſſion which induces us to ſuppreſs reſentment, to pardon offences, or mitigate puniſhment, as far as diſcretion may admit. *Commiſeration* denotes ſympathy for ſorrows, for which there is no apparent remedy. *Pity* is nearly allied to commiſeration and compaſſion; but it is more frequently applied to particular circumſtances in the ſtate of the object, rather than his immediate feelings. *Generoſity* prompts us to beſtow favours which may require ſacrifices from us, but are not called for by any particular pretenſions on the part of the object of them. *Liberality* is a ſpecies of generoſity, chiefly applied to free donations, or to ſubduing unfavourable prepoſſeſſions reſpecting the opinions of another. *Charity* in its original import is ſynonimous with *love;* it ſometimes expreſſes a diſpoſition to favourable judgments of others; at other times it denotes beneficence to the poor. *Condeſcenſion* deſignedly waves ſuppoſed perſonal advantages to relieve an inferior from painful feelings.

II. *Order* 1. (2) Feelings derived from *good opinion*. *Gratitude* is a pleaſant affection, excited by a lively ſenſe of benefits received or intended, or even by the deſire of being beneficial. *Thankfulneſs* refers to verbal expreſſions of gratitude; yet, "a heart full charged with thankfulneſs," is equally correct and expreſſive. *Admiration* is that act of the mind, by which we diſcover, approve, and enjoy ſome unuſual ſpecies of excellence, whether intellectual or moral. [We doubt whether Dr. Cogan is borne out by the recent uſage of our beſt writers, in this reſtriction of the term. He intentionally leaves the more ancient uſage, which gave it nearly the latitude which its derivation allowed; and it is well to give greater preciſion to the uſe of terms; but the word appears to be juſtly applied to excellence of every ſpecies, even where there is no explicit reference to intellectual or moral qualities; we admire a beautiful proſpect, without reference to the wiſdom of him who cauſed its beauty. And with the *diſcovery* of the excellence admired, *admiration* has nothing to do. We would define it to be a lively pleaſurable feeling, ariſing from the perception of excellence.] *Eſteem* is the value we place upon ſome degree of worth. It is higher than ſimple *approbation*, which is a deciſion of the judgment. *Reſpect* is that favourable impreſſion, which the goodneſs of a character has made upon the perſon contemplating it, united with a ſhare of good ſenſe. *Approbation* is the feeling attending the perception of any valuable moral quality. *Eſteem* is the affection entertained towards an individual, whoſe character is marked by thoſe virtuous and amiable diſpoſitions which have no neceſſary connection with the higher qualities of the underſtanding. The judgment may approve; but its deciſion is not itſelf approbation; this is more properly the feeling conſequent on the approving deciſion. *Reſpect* relates to the higher moral qualities, which indicate conſiderable ſtrength of underſtanding. *Veneration* is a higher degree of reſpect, in which the mind appears to be more forcibly ſtruck with wiſdom, connected with the ſterner virtues. *Awe* is an impreſſion made by a lively idea of power, modified by circumſtances or qualities, which ſuggeſt the idea of ſafety. *Reverence* relates to ſuperiority in moral endowments, connected with awe at intellectual powers, and a conſciouſneſs of our own comparative deficiencies. The complacential feelings are liable to abuſe, and give riſe to *fondneſs*, which indicates attachment to whatever belongs to us, or is immediately connected with us, far beyond its intrinſic merit; and to *partiality*, which is an exceſs of perſonal attachment, inclining to ſuch a favourable opinion of the motives, conduct, and general merit of its object, as is inconſiſtent with the juſtice due to others.

II. *Order* 2. Feelings excited by *diſplacency*, in which *evil* is the predominant idea. Dr. Cogan uſes *diſplacency* in preference to *malevolence*, as it does not include what the latter always implies, the idea of ill-will. (1) Diſplacency indicated by *malevolent deſires and diſpoſitions*. "*Hatred* expreſſes the diſpoſition we entertain concerning, or the manner in which we are affected by, the contemplation of what we ſuppoſe to be an evil." *Malevolence* is hatred directed towards perſons, leading to wiſh and do them ill. *Malignancy* or *malignity* expreſſes a diſpoſition which cheriſhes inveterate hatred, and employs every means of injury: the former ſeems applied to radical depravity; the latter to indications of it in temper and conduct. *Malice* expreſſes the diſpoſitions of inferior minds to execute every purpoſe of miſchief within their abilities. *Envy* is the painful ſenſation excited by the view of ſomething deſirable in the ſtate and ſituation of another, which ſelf-love wiſhes to appropriate: it entertains a degree of ſorrow that the good contemplated ſhould eſcape ourſelves, and of anger that it ſhould fall to the ſhare of another. *Rancour* is a degree of malice which preys upon its poſſeſſor. *Cruelty* is the diſpoſition which delights in the contemplation or infliction of abſolute miſery. *Cenſoriouſneſs* is a diſpoſition to find fault with the conduct, ſentiments, or motives of others. *Prejudice*, when uſed alone, denotes the diſpoſition to prejudge the character, conduct, or motives of another, to his diſadvantage, without having the proper evidence before us. *Diſlike* is a ſpecies of hatred diveſted of all ill-will towards the object of it, and of every wiſh for his unhappineſs. *Ingratitude* is an inſenſibility to benefits received, ariſing from ſtupidity, culpable inattention, or pride. *Apathy* is a ſtagnation of the ſocial feelings. A ſecond ſpecies of malevolence relates to thoſe occaſional and more tranſient fits of ill-will, which are excited by particular provocations, and which are not totally repugnant to the benevolent affections. Theſe are indicated by anger, and its various modifications. (See Claſs I. Order 2, (3), for *Anger*, *Rage*, *Wrath*, and *Reſentment*.) *Revenge* is an inſatiable deſire, prompting to ſacrifice every conſideration of pity and humanity to the principle of vindictive juſtice, deriving pleaſure from the infliction and contemplation of the miſery of its object. *Suſpicion* is a comfortleſs ſtate of doubt reſpecting the conduct and character of another. *Jealouſy* is a painful apprehenſion of rivalſhip in caſes that are peculiarly intereſting to us.

II. *Order* 2. (2) Diſplacency indicated by *unfavourable opinions* of conduct and diſpoſition. *Horror* is that very ſtrong and painful feeling, which is excited by the view or contemplation of ſomething peculiarly atrocious in the conduct of another. It may alſo be excited by the extremes of agony, mental or corporeal. *Indignation* expreſſes a ſtrong and elevated diſapprobation of mind, which is inſpired by ſomething flagitious in the conduct of another. *Contempt* is a more calm and deliberate affection of the mind, whoſe objects are meanneſs of character, perverſeneſs of conduct, and radical imbecility, where it ought not to exiſt. *Diſdain* is ſuch a degree of contempt as precludes any commerce with the party deſpiſed. *Irriſion* expreſſes the feeling inſpired by any peculiarity of ſentiment, diſpoſition, or conduct, which we deem an offence againſt ſome acknowledged law of congruity or propriety, but which is not of ſufficient magnitude to excite anger, or any of its ramifications. Its objects are the whimſical and abſurd.

In various parts of Dr. Cogan's analytical ſurvey, of which we have now given the outline, he introduces moral and philoſophical remarks of a highly intereſting nature, reſpecting the effects produced on the corporeal and mental ſyſtem, by the various feelings which he deſcribes; and the ſecond part of his work conſiſts of obſervations on the laws of excitement, the cauſes which create a diverſity in our affections, and the influence of the paſſions. The whole deſerves the attention of every philoſophical inquirer, and will be found of great moral ſervice to the reflecting mind. "It may with juſtice be advanced," ſays Dr. Cogan, (Pref. p. iv.) "that the hiſtory of ourſelves, in this department, is of much greater utility than abſtruſe ſpeculations concerning the metaphyſical nature of the human ſoul, or even the moſt accurate knowledge of its intellectual powers: for it is according as the paſſions and affections are excited, and directed towards the objects inveſtigated by our intellectual natures, that we become uſeful to ourſelves or others; that we riſe into reſpectability, or ſink into contempt; that we diffuſe or enjoy happineſs, diffuſe or ſuffer miſery."

Though Dr. Cogan's arrangement is in many reſpects ſatisfactory, two leading objections lie againſt it, which we ſhall notice, with a view to thoſe who may follow him in his track. The firſt is, that there is no diſtinct appropriate claſs for thoſe feelings which reſpect the *religious* principle. We are the more ſurpriſed at this, ſince the writings of Dr. Cogan clearly deſignate him as a religious philoſopher. If it were deſirable to diſcriminate feelings of the ſame general nature, according as they reſpect the ſelfiſh or the ſocial principle, the very peculiar effect produced upon them, by the direction of them to the Supreme Being, entitled them, when ſo directed, to a ſeparate diviſion. The conſequence has been, that the religious feelings, as ſuch, are but very curſorily conſidered: ſome are omitted, ſuch as *faith* and *truſt*; and at leaſt one is introduced in an unhappy ſituation, we mean that of *reſignation*, which can ſcarcely be ſaid to operate upon the principle of ſelf-love. This, however, is a defect which may be eaſily ſupplied; but the radical inconvenience of the arrangement ariſes from the primary diviſions, which cauſe the ſeparation of feelings generically the ſame, or the repetition of them, under each claſs. There is no broadly marked diſtinction in many of the feelings, in conſequence of their reſpecting the ſelfiſh or the ſocial principle. The feelings of ſorrow, for inſtance, do not *eſſentially* differ in their character, whether the cauſe of grief be wholly perſonal, or be ſuch as to excite deep but diſintereſted ſympathy. It would, we are ſatisfied, have been but to drop the primary diviſion, and to conſider each claſs of feelings under its various modifications; under each ſpecies pointing out the characteriſtic differences produced by the change of objects, whether perſonal, ſocial, or religious. The ſelfiſh and the ſocial principles ſo continually run into each other, that every attempt to found a diſtinct claſſification upon them, however beautiful the arrangement may appear in theory, muſt be attended with great embarraſſment in the application of it.

Hartley's arrangement is two-fold: firſt, the paſſions or affections in general; and, ſecondly, the paſſions and affections, as excited by different claſſes of mental pleaſures and pains. He appears to uſe the terms paſſions and affections as ſynonimous; and he employs them with a latitude which we cannot conſider as by any means expedient. Reſpecting the latter object, we ſhall have an opportunity of ſpeaking under the different claſſes. We ſhall here briefly ſtate his arrangement of the general paſſions and affections.

As all the paſſions ariſe from pleaſure and pain, Hartley obſerves, the firſt and moſt general diſtribution is into love and hatred; *i. e.* we may term all thoſe affections of the pleaſurable kind, which objects and incidents raiſe in us, *love;* and all thoſe of the painful kind, *hatred.* When theſe are excited to a certain degree, they put us upon a variety of actions, and may be termed *deſire* and *averſion;* underſtanding by this laſt word an active hatred. *Hope* and *fear* are the attendants upon deſire and averſion. Theſe affect us more or leſs, according to the more or leſs frequent recurrency of the pleaſing and painful ideas, the greater or leſs probability of the expected event, the greater or leſs diſtance of time, &c.; the power of aſſociation diſplaying itſelf every where in the agitations of mind excited by theſe paſſions. *Joy* and *grief* are love and hatred exerted towards an object which is preſent. After theſe are over, and the object withdrawn, there generally remains a *pleaſing* or *diſpleaſing recollection*, which recurs with every recurrency of the idea of the object, or of the aſſociated ideas, and keeps up the love or hatred. In like manner, the five grateful paſſions, love, deſire, hope, joy, and pleaſing recollection, all enhance one another; as do the five ungrateful ones, hatred, averſion, fear, grief, and diſpleaſing recollection. And the whole ten, taken together, Hartley conſiders as comprehending all the general paſſions of human nature.

6. *Of the Will.*—The will is that ſtate of mind which is immediately previous to, and cauſes thoſe expreſs acts of memory, imagination, judgment, and bodily motion, which are termed voluntary. This is nearly Hartley's account of it in his Introduction; and it is the leaſt exceptionable we know of. He afterwards ſays (prop. 89.) "the will appears to be nothing but a deſire or averſion ſufficiently ſtrong to produce an action that is not automatic, primarily or ſecondarily. At leaſt it appears to me that the ſubſtitutions of theſe words for the word *will*, may be juſtified by the common uſage of language. The will is, therefore, that deſire or averſion which is ſtrongeſt for the then preſent time." As he conſiders all love and hatred, all deſire and averſion as generated by aſſociation, he of courſe refers the will to the ſame origin.

The ſubject is truly difficult; and is not a little perplexed by the various theories which have been invented reſpecting the voluntary powers: and Hartley appears to us far from ſucceſsful. Indeed it would probably have been beſt to leave the matter entirely to every one's own conſciouſneſs, with his firſt account of it. The will certainly aſſumes different complexions, according to the nature of the motives influencing it; ſometimes it is a ſimple determination of the underſtanding, at other times it is the reſult of the affections, paſſions, &c. The cauſes influencing the will, with the variations in their influence, the connection of it with action, mental or corporeal, its influence over the trains of thought and feeling, &c. open a wide field for inveſtigation equally intereſting and important: and we regret that circumſtances do not permit us to enter upon it. And to this ſuggeſtion to the inquirer, we wiſh to add another: Whether the feeling termed *deſire* is generated by aſſociation from the relics of ſenſation. We have ſometimes thought it neceſſary to admit a ſimple elementary principle in the human mind ſuch, that if its intellectual faculties could be fully developed without experiencing any pleaſures or pains, a caſe which is of courſe utterly impoſſible as man is conſtituted, the communication of pleaſurable feeling would immediately excite deſire. But, upon more mature reflection, we are decidedly inclined to believe, that, aided by the exerciſe of the underſtanding, the operation of the aſſociative power on the relics of ſenſations, is fully adequate to the production of *deſire.* Our doubts have been ſimilar, and alſo our preſent views, reſpecting *belief.* We would attempt an analyſis of theſe principles of our mental conſtitution, but find our materials as yet too imperfect; and we refer to the ſubject chiefly to excite to it the attention of thoſe who take an intereſt in ſuch ſpeculations. When Newton made his immortal diſcoveries reſpecting the grand phyſical principle of nature, it muſt have appeared to his immediate ſucceſſors that there was little more to be done in natural philoſophy, ſo far as reſpects the direct phenomena of attraction; thoſe who know any thing of the progreſs of aſtronomy ſince that period, and particularly of the extent of the application of the law of gravitation to the apparent irregularities of the planetary motions, muſt perceive that the field opened by Newton affords abundant room for the exerciſe of the moſt vigorous intellect: and in the infinitely varied and complicated phenomena of mind (important as is the diſcovery of the grand law occaſioning or affecting them all, and extenſive as is Hartley's application of it), there is ſtill ſcope for the unremitting exertion of the higheſt powers of the underſtanding, to obſerve, to analyſe, and to explain them. But we will proceed from what we think he has not fully inveſtigated to his *practical* obſervations, in which his principles always ſhine reſplendent. We ſhall here extract, without alteration, the remarks of that nature from his 89th propoſition. The reader, who is unacquainted with his Obſervations, will perceive in them the uſual characteriſtics of his ſtyle; great ſimplicity ſeldom riſing above neatneſs, and ſeldom failing to reach it, and perſpicuity ſcarcely ever interrupted, except by that compreſſion and profundity of thought which require a conſtant effort of cloſe attention till the mind is familiarized to his inveſtigations.

"Since the things which we purſue do, when obtained, generally afford pleaſure, and thoſe which we fly from affect us with pain, if they overtake us, it follows that the gratification of the will is generally attended or aſſociated with pleaſure, the diſappointment of it with pain. Hence a mere aſſociated pleaſure is transferred upon the gratification of the will; a mere aſſociated pain upon the diſappointment of it. And if the will was always gratified, this mere aſſociated pleaſure would, according to the preſent frame of our natures, abſorb as it were all our other pleaſures; and thus, by drying up the ſource from whence it ſprung, be itſelf dried up at laſt: and the firſt diſappointments, after a long courſe of gratification, would be intolerable. Both which things are ſufficiently obſervable, in an inferior degree, in children that are much indulged, and in adults, after a ſeries of ſucceſsful events. Gratifications of the will without the conſequent expected pleaſure, and diſappointments of it without the conſequent expected pain, are particularly uſeful to us here. And it is by this, amongſt other means, that the human will is brought to a conformity with the divine; which is the only radical cure for all our evils and diſappointments, and the only earneſt and medium for obtaining laſting happineſs.

"We often deſire and purſue things which give pain rather than pleaſure. Here, it is to be ſuppoſed, that at firſt they afforded pleaſure, and that they now give pain on account of a change in our nature and circumſtances. Now, as the continuance to deſire and purſue ſuch objects, notwithſtanding the pain ariſing from them, is the effect of the power of aſſociation, ſo the ſame power will at laſt reverſe its own ſteps, and free us from ſuch hurtful deſires and purſuits. The recurrency of pain will at laſt render the object undeſirable and hateful. And the experience of this painful proceſs, in a few particular inſtances, will at laſt, as in other caſes of the ſame kind, beget a habit of ceaſing to purſue things, which we perceive by a few trials, or by rational arguments, to be hurtful to us upon the whole.

"A ſtate of deſire ought to be pleaſant at firſt from the near relation of deſire to love, and of love to pleaſure and happineſs. But in the courſe of a long purſuit, ſo many fears and diſappointments, apparent or real, in reſpect of the ſubordinate means, and ſo many agitations of mind paſſing the limits of pleaſure, intervene, as greatly to checquer a ſtate of deſire with miſery. For the ſame reaſons, ſtates of averſion are checquered with hope and comfort."

For ſome extracts from Dr. Reid on the will, ſee Div. VIII. § 2. of this article, near the end.

We ſhall only add here, as a farther ſuggeſtion for the inquirer, that rudiments of mental deſire are to be ſought in the uneaſy ſenſations attending the mere corporeal appetites when not ſupplied ſoon enough, the pleaſure ariſing from their gratification, and the aſſociation early formed between thoſe pleaſures and the means of gratification: they muſt, therefore, be ſought for in the infant at the breaſt; but in obſerving for this purpoſe, we muſt carefully diſtinguiſh between mere mechanical motion, and that in which the percipient principle is concerned.

7. *Of the Claſſes of Intellectual Pleaſures and Pains, with ſome Account of their Origin.*—The intellectual pleaſures and pains are arranged by Hartley in ſix claſſes. Perhaps the arrangement, and certainly the appellations, of the claſſes, are not unexceptionable; but ſo much light is thrown upon this part of our mental ſtructure by the analyſis of them given by Hartley, and it is ſo much eaſier to find fault than to improve, that we ſhall probably do beſt by taking the arrangement, and, with a few paſſing remarks, the appellations, as we find them, and by laying before our readers ſuch a ſpecimen of his analytical inveſtigations as may lay a ſolid foundation for correct notions on this important point, and lead them to ſeek for further information in his Obſervations. The intellectual pleaſures and pains are; 1. Thoſe of *imagination*, ariſing from natural or artificial beauty or deformity. 2. Thoſe of *ambition*, ariſing from the opinions of others concerning us. 3. Thoſe of *ſelf-intereſt*, ariſing from the poſſeſſion or want of the means of happineſs and ſecurity from, or ſubjection to, the hazards of miſery. 4. Thoſe of *ſympathy*, ariſing from the pleaſures and pains of others. 5. Thoſe of *theopathy*, ariſing from the conſideration of the attributes of the Deity, and the relation in which we ſtand to him. And 6. Thoſe of the *moral ſenſe*, ariſing from the contemplation of moral beauty and deformity.

In p. 89, Hartley ſeems to conſider the above as the order in which the intellectual pleaſures and pains are generated: if ſo, he is certainly in an error. The elementary principles of ſympathy have an earlier origin than thoſe of imagination or ambition; and thoſe of the moral ſenſe than the theopathetic feelings. Taking the claſſes each as a whole, he is probably right; but their reciprocal influences on each other begin too early to allow of any nice diſtinction between them. Indeed the mental feelings generally run into and modify one another ſo much that they baffle all minute accuracy in arrangement. Even in the departments of natural hiſtory and phyſical ſcience this is the caſe; and the difficulty might, *à priori*, be expected to be much greater in the claſſification of our mental phenomena.

In connection with the pleaſures of imagination, we wiſh to mention Mr. Alliſon's Eſſays on the Nature and Principles of Taſte, as a work of very great merit, which, while it can ſcarcely fail to be highly intereſting to all who are habituated to think on what paſſes within them, furniſhes ample illuſtration of the principle of aſſociation. It may not, perhaps, be erroneous to ſay, that if he had conſidered that principle in all its bearings, he would occaſionally have written differently; but he has done ſo much, that the Hartleyan muſt view him as a fellow-labourer. We do not recollect that he, any where, refers to Hartley; *perhaps* (but we think not) he may view his inveſtigations in the ſame light with his friend Mr. Stewart; but we do not heſitate in believing, that both he and Mr. Stewart owe much more to Hartley than the latter would be willing to allow. We muſt alſo refer our readers, in this connection, to the ſecond part of Mr. Stewart's Philoſophical Eſſays; and to various parts of the 5th chapter of his Elements.

(1) *Of the Pleaſures and Pains of Imagination.*—This claſs of feelings may be diſtinguiſhed into ſeven kinds, the *pleaſures* ariſing from the *beauty of the natural world;* from the *works of art;* from the liberal arts of muſic, painting, and poetry; from the *ſciences;* from the *beauty of the perſon;* from *wit and humour;* and the *pains* which ariſe from groſs *abſurdity*, *inconſiſtency*, or *deformity*. As the pleaſures of the firſt claſs admit of the moſt ſimple analyſis, we ſhall ſelect this as a ſpecimen.

The pleaſant taſtes and ſmells, and the fine colours of fruits and flowers, the melody of birds, and the grateful warmth or coolneſs of the air in the proper ſeaſons, transfer the relics of theſe pleaſures upon rural ſcenes, which riſe up inſtantaneouſly ſo mixed with each other, and with ſuch as will immediately be enumerated, as to be ſeparately indiſcernible. If there be any object in the ſcene calculated to excite fear and horror, the naſcent ideas of theſe magnify and enliven all the other ideas, and by degrees paſs into pleaſures, by ſuggeſting the ſecurity from pain. In like manner the grandeur of ſome ſcenes, and the novelty of others, by exciting ſurpriſe and wonder, that is, by making a great difference in the preceding and ſubſequent ſtates of mind, ſo as to border upon, or even enter into, the limits of pain, may greatly enhance the pleaſure.

Uniformity and variety, in conjunction, are alſo principal ſources of the pleaſures of beauty, being made ſo partly by their aſſociation with the beauties of nature, partly by that with the works of art, and with the many conveniences which we derive from the uniformity and variety of the works of nature and of art; they muſt therefore transfer part of the luſtre borrowed from the works of art, and from the conveniences they afford, upon the works of nature. Poetry and painting are much employed in ſetting forth the beauties of the natural world, at the ſame time that they afford us a high degree of pleaſure from other ſources; hence they blend ſome or other of the relics of thoſe other pleaſures with thoſe of natural beauty. The many amuſements which are peculiar to the country, and whoſe ideas and pleaſures are revived in a faint degree by the view of rural ſcenes, and ſo mixed together as to be ſeparately indiſcernible, further augment the pleaſures ſuggeſted by the beauties of nature. To theſe we may add the oppoſition between the offenſiveneſs, dangers, and corruption of populous cities, and the health, tranquillity, and innocence, which the actual view, or the mental contemplation of rural ſcenes introduces; and the pleaſures of ſociality and affection which have many connections with them; and thoſe pleaſures which the opinions and encomiums of others reſpecting natural beauties produce in us, in this, as in other caſes, by means of the contagiouſneſs obſervable in mental as well as in bodily diſpoſitions. It is alſo to be remarked that green, which is the moſt agreeable to the organ of ſight, is the moſt general colour of the vegetable kingdom, that is, of external nature; but at the ſame time with ſo many varieties, that it loſes little or none of its effect in producing pleaſure, which it would do if it were all of the ſame tint. Thoſe perſons who have already formed high ideas of the power, knowledge, and goodneſs of the Author of nature, with ſuitable affections, generally feel the exalted pleaſures of devotion upon every view and contemplation of his works, either in an explicit and diſtinct manner, or in a more ſecret and implicit one; hence part of the general indeterminate pleaſures here conſidered, is deducible from the pleaſures of theopathy.

The above may be conſidered as the principal ſources of the beauties of nature to mankind in general. Inquiſitive and philoſophical perſons have ſome others ariſing from their peculiar knowledge and ſtudy of natural hiſtory, aſtronomy, and philoſophy in general; for the profuſion of beauties, uſes, fitneſſes, elegance in minute things, and magnificence in great ones, exceed all bounds of imagination; and new ſcenes, and thoſe of unbounded extent, ſeparately conſidered, ever preſent themſelves to view, the more any one ſtudies and contemplates the works of God.

Upon the whole the reader may ſee that there are ſufficient ſources for all thoſe pleaſures of imagination which the beauties of nature excite in different perſons; and that the differences which are, in this reſpect, found in different perſons, are ſufficiently analogous to the differences of their ſituations in life, and of the conſequent aſſociations formed in them. Thoſe who are cloſely attentive to what paſſes within them, may alſo, when contemplating the beauties of nature, frequently diſcern the relics of many of the particular pleaſures here enumerated while they recur in a ſeparate ſtate, and before they coaleſce with the general indeterminate aggregate; and this verifies the account here given. It is alſo a confirmation of it, that an attentive perſon may obſerve great differences in the kind and degree of the reliſh which he has for the beauties of nature in different periods of his life; eſpecially as the kind and degree will be found to agree in the main with the foregoing account. To the ſame purpoſe it may be obſerved, that theſe pleaſures do not cloy very ſoon, but are of a laſting nature when compared with the ſenſible ones; ſince this follows naturally from the great variety of their ſources, and the evaneſcent nature of their conſtituent parts.

(2) *Of the Pleaſures and Pains of Ambition.*—The opinions of others concerning us, when expreſſed by correſponding words or actions, are principal ſources of happineſs or miſery. The pleaſures of this kind are uſually referred to the head of honour, the pains to that of ſhame. We are here to enquire by what aſſociations it is brought about that men are ſolicitous to have certain particulars concerning themſelves made known to the circle of their friends and acquaintance, or to the world in general; and certain others concealed from them; and alſo why all indications that theſe kinds of particulars are made known, ſo as to produce approbation, eſteem, praiſe, &c. or diſlike, cenſure, contempt, &c. occaſion ſuch exquiſite pleaſures as thoſe of honour, or ſuch intenſe pains as thoſe of ſhame. Theſe particulars may be claſſed under four heads: *external* advantages or diſadvantages; *bodily* perfections or imperfections; *intellectual* accompliſhments or defects; *moral* ones, that is, virtue or vice. We ſhall, as before, ſelect the analyſis of one of theſe claſſes of the feelings of ambition.

The intellectual accompliſhments and defects which occaſion the feelings of ambition, are ſagacity, memory, invention, wit and learning; and their oppoſites, folly, dulneſs, and ignorance. Now it is evident that independent of the intrinſic value of the former claſs, and diſadvantage of the other, the circumſtance of their being made known to others, reſpectively produces certain privileges and pleaſures, or ſubjects to inconveniences and pains. It follows, therefore, that every diſcovery of this kind to others, alſo every mark or aſſociate of ſuch diſcovery, will, by aſſociation, raiſe up the relics of thoſe privileges and pleaſures, or inconveniences and pains reſpectively; and theſe being gradually blended together, and united with thoſe with which each repetition of the producing cauſe is accompanied, afford in each inſtance a peculiar compound pleaſure or pain, which, by the cuſtom of our language, has the word *honour* or *ſhame* reſpectively connected with it.

This general account will apply to each of the four claſſes of the feelings of ambition; but the feelings of honour or ſhame connected with this particular claſs, require a more minute analyſis. A great part, perhaps the greateſt, is derived from the high ſtrained encomiums, applauſes, and flatteries, paid to talents and learning, and the outrageous ridicule and contempt thrown upon folly and ignorance, in all the diſcourſes and writings of men of genius and literature; theſe perſons being extremely partial to their own excellencies, and carrying the opinion of the world along with them by the force of their abilities and eloquence. It is alſo to be obſerved, that, in the education of young perſons, and eſpecially of boys and young men, great rewards are conferred, in conſequence of intellectual abilities and attainments, and great puniſhments follow negligence and ignorance; which rewards and puniſhments being reſpectively aſſociated with the words expreſſing praiſe and cenſure, and with all their other circumſtances, transfer upon praiſe or cenſure compound vivid relics of thoſe pleaſures and pains.

In like manner all the kinds of honour and ſhame, by being expreſſed in words and ſymbols which are nearly related to each other, enhance each other; thus, for inſtance, the careſſes which are given to a child, when he is dreſſed in fine clothes, prepare him to be much more affected with the careſſes and encomiums beſtowed upon him when he has been diligent in getting his leſſon; and, indeed, it ought to be remarked, that the words and phraſes of the parents, governors, ſuperiors, and attendants, have ſo great an influence over children, when they firſt come to the uſe of language, as inſtantly to generate an implicit belief, a ſtrong deſire, or a high degree of pleaſure. Unleſs very improper treatment has been practiſed, they have at that early period no ſuſpicions, jealouſies, recollections or expectations of being deceived or diſappointed; and therefore a ſet of words expreſſing pleaſure of any kind which they have experienced, put together in almoſt any manner, will raiſe up in them a pleaſurable ſtate, and the oppoſite words a painful one. Whence it is eaſy to ſee, that the language expreſſing praiſe or blame muſt inſtantly, from the mere aſſociations connected with the ſeparate words, put them into a ſtate of hope and joy, or of fear and ſorrow. And when the foundation is thus laid, praiſe and blame will keep their influences, from the advantages or diſadvantages attending them, though the ſeparate words ſhould loſe their particular influences, as they manifeſtly do in our progreſs through life.

The honour and ſhame ariſing from intellectual accompliſhments, do often, in learned men, after a time, deſtroy in a great meaſure their ſenſibility in reſpect of every other kind of honour and ſhame; which ſeems chiefly to ariſe from their converſing much with books and learned men, ſo as to have a great part of the pleaſures which they receive from ſuch intercourſe cloſely connected with the encomiums on abilities and learning, and to hear all terms of honour applied to them, and the keeneſt reproach and the moſt inſolent contempt caſt upon the contrary defects. And as the pleaſures which raillery, ridicule, and ſatire afford to the by-ſtanders, are very conſiderable, ſo the perſon who is the object of them, and who begins to be in pain upon the firſt ſlight marks of contempt, has this pain much enhanced by the contraſt, the exquiſiteneſs of his uneaſineſs and confuſion riſing in proportion to the degree of mirth and inſolent laughter in the by-ſtanders; ſo that it happens that very few perſons have courage to ſtand the force of ridicule, but rather ſubject themſelves to conſiderable bodily pains, to loſſes, and to the anxiety of a guilty mind, than appear fooliſh, abſurd, ſingular, or contemptible to the world, or even to perſons of whoſe judgment and abilities they have a low opinion.

(3) *Of the Pleaſures and Pains of Self-intereſt.*—Self-intereſt may be diſtinguiſhed into three kinds; *groſs* ſelf-intereſt, or the purſuit of the means whereby the pleaſures of ſenſation, imagination, and ambition are to be obtained, and their pains avoided; *refined* ſelf-intereſt, or the explicit, deliberate, ſeeking for ourſelves of the pleaſures of ſympathy, theopathy, and the moral ſenſe, and a like explicit endeavour to avoid their pains; and *rational* ſelf-intereſt, or the explicit purſuit of our greateſt happineſs, without any partiality to any particular kind, or direct or indirect means of happineſs.

The love of money may be conſidered as the chief ſpecies of groſs ſelf-intereſt, and in an eminent manner aſſiſts in unfolding the mutual influences of our pleaſures and pains, with the factitious nature of our intellectual ones, and the doctrine of aſſociation in general, as well as the particular progreſs, windings, and endleſs redoublings of ſelf-love. For it is evident at firſt ſight, that money cannot naturally and originally be the object of our faculties; no child can be ſuppoſed to be born with a love of it; yet we ſee that ſome ſmall degrees of this love riſe early in infancy; that it generally increaſes during youth and manhood; and that at laſt in ſome old perſons it ſo ingroſſes and abſorbs all their paſſions and purſuits, as that from being conſidered as the repreſentative ſtandard and means of obtaining the commodities which occur in real life, it ſhall be eſteemed the adequate ſymbol and means of happineſs in general, and the thing itſelf, the ſum total of all which is deſirable in life. But we have already ſaid ſo much on the origin and progreſs of this affection, (ſee Div. IV. 2. (3), that we ſhall here only attend to the checks which, in the courſe of life, uſually prevent the love of money from acquiring that power, which, without ſuch reſtraint, would overcome all the particular deſires on which it is founded.

Firſt, then, it is checked by the ſtrong deſires of young perſons, and others after particular gratifications; for theſe deſires, by overpowering their acquired averſion to part with money, weaken it gradually, and conſequently weaken the pleaſure of keeping it and the deſire of obtaining it; all which are cloſely connected together in this view; notwithſtanding that the laſt, *viz.* the deſire of obtaining, and conſequently (in an inverted order) the pleaſure of keeping, and the averſion to part with, are, in another view, ſtrengthened by the deſires of particular pleaſures to be purchaſed by money. And this contrariety of our aſſociations is not only a means of limiting certain paſſions, but it may be conſidered as a mark ſet upon them by the Author of nature, to ſhew that they ought to be limited even in this life, and that they muſt ultimately be annihilated every one in its proper order. Secondly, the inſignificance of riches in warding off death and diſeaſes, and, in many caſes, ſhame and contempt alſo, and in obtaining the pleaſures of religion and the moral ſenſe, and even thoſe of ſympathy, ambition, imagination, and ſenſation, firſt leſſen their value in the eſtimation of thoſe who reflect, and afterwards aſſign to them a very low rank among the means of happineſs. Thirdly, the eager purſuit of any apprehended ſource of happineſs, ſuch as fame, learning, &c. leaves little room in the mind for avarice or any other foreign end.

Theſe conſiderations not only account for the limitation ſet to the love of money, but for the various apparent inconſiſtencies and peculiarities obſervable in it in different individuals. Thus profuſeneſs, with reſpect to ſenſual and ſelfiſh pleaſures, is often joined with avarice; covetous perſons are often rigidly juſt in paying, as well as exacting, and are ſometimes generous where money is not immediately and apparently concerned; they have alſo moderate paſſions in other reſpects, and for the moſt part are ſuſpicious, timorous, and complaiſant; and the moſt truly generous, charitable, and even pious perſons are highly frugal, ſo as to put on the appearance of covetouſneſs, and even ſometimes and in ſome things to border upon it. We alſo ſee why the love of money muſt in general grow ſtronger with age, and eſpecially if the particular gratifications, to which the perſon was moſt inclined, become inſipid or unattainable; why frequent reflections upon money in poſſeſſion, and the actual viewing of large ſums, ſtrengthen the aſſociations by which covetouſneſs is generated; and why children, perſons in low life, and indeed moſt others, are differently affected towards the ſame ſum of money in different forms, gold, ſilver, notes, &c.

The love of money is univerſally deemed a more ſelfiſh paſſion than the purſuit of the pleaſures of imagination, honour, or ſympathy; yet all are generated by aſſociation from ſenſible pleaſures, having their origin in ſelf; all in their ſeveral degrees tend to private happineſs, and all are in certain caſes purſued coolly and deliberately from the proſpect of obtaining private happineſs by them. The reaſons why the love of money has in ſo peculiar and decided a manner the ſhame of ſelfiſhneſs connected with it, appear to be as follow. The pleaſures which it produces are nearly, and in general completely, of a ſolitary nature, and ſhun participation. As far as money is deemed a means to the accompliſhment of ſome uſeful purpoſe, it ceaſes to be deſired on its own account, and then its pleaſing aſſociations are communicable; but the love of money, as an end, is excluſive to the individual poſſeſſor. And in addition to this it is obvious, that in general it is not only confined to the individual, but prevents others from receiving the advantage which it might procure to them. The pleaſures of ſympathy, on the other hand, conſiſt in doing good to others; thoſe of ambition are ſcarcely attainable in any other way; and thoſe of imagination are not only capable of a very extenſive communication, but are moſt perfect when enjoyed in company. Farther, a regard to ſelf frequently recurring muſt denote a pleaſure ſelfiſh; ſo that if any, even of the moſt generous pleaſures, and ſuch as at firſt ſight have no immediate relation to ſelf-intereſt, be purſued in a cool deliberate way, not from the mere impulſe of preſent inclination, but from the opinion that it will afford pleaſure; they muſt be referred to ſelf-intereſt. Now money has ſcarcely any other relation to pleaſure, than as an evident means; ſo that after it has acquired the power of pleaſing inſtantaneouſly, the intermediate ſteps and aſſociations muſt frequently appear; and hence it forces on the mind a more conſtant reference to its tendency to promote the happineſs of the individual poſſeſſor. The other pleaſures have in general a far greater ſhare of indirect aſſociations with previous pleaſures; and acquire the power of gratifying, not ſo much from being the manifeſt cauſes of other gratifications, as their moſt common adjuncts; whereas money is generally the moſt viſible of all cauſes.

Honour, power, learning, and many other things, are however purſued in part after the ſame manner, and for the ſame reaſons as riches; namely, from a tacit ſuppoſition, that the acquiſition of every degree of theſe is treaſuring up a proportional degree of happineſs, to be produced and enjoyed at pleaſure. And the deſires of each of theſe would, in like manner, increaſe perpetually during life, did they not curb one another by many mutual inconſiſtencies, or were not all damped by the frequent experience and recollection, that all the means of happineſs ceaſe to be ſo, when the body or mind ceaſe to be diſpoſed in a manner proper for their reception. It is alſo worthy of obſervation that riches, honours, power, learning, and all other things which are conſidered as means of happineſs, become means to each other in a great variety of ways; thus transferring upon each other all the aſſociated pleaſures, which they collect from other quarters, and approaching nearer and nearer perpetually to a perfect ſimilarity and ſameneſs with each other, in the inſtantaneous pleaſures which they afford when purſued and obtained as ends. It appears likewiſe, that all aggregates of pleaſure thus collected by them all, muſt, from the ſtructure of our frame, and of the world which ſurrounds us, be made at laſt to centre and reſt upon him who is the inexhauſtible fountain of all power, knowledge, goodneſs, majeſty, glory, property, &c.; ſo that even avarice and ambition are, in their reſpective ways, carrying on his benevolent and all-wiſe deſigns. And the ſame thing may be hoped of every other paſſion and purſuit; one may hope that they all agree and unite in leading to ultimate happineſs and perfection. However, they differ greatly in their preſent conſequences, and in their future ones, reaching to certain intervals of time indefinite and unknown to us, and thus becoming good or evil, both naturally and morally, in reſpect of us and our limited apprehenſions, judgments, and anticipations. And yet one may humbly hope that every thing muſt be ultimately good, both naturally and morally.

(4) *Of the Pleaſures and Pains of Sympathy.*—The ſympathetic affections, or thoſe by which we feel when others feel, may be divided into four claſſes; thoſe by which we *rejoice* at the *happineſs* of others, thoſe by which we *grieve* for their *miſery*, thoſe by which we *rejoice* at their *miſery*, and thoſe by which we *grieve* at their *happineſs*. Of the firſt kind are *ſociality*, *good will*, *generoſity*, and *gratitude*; of the ſecond, *compaſſion*, and *mercy*; of the third, *moroſeneſs*, *anger*, *revenge*, *jealouſy*, *cruelty*, and *malice*; and of the fourth, *envy*. It is eaſy to be conceived that aſſociation ſhould produce affections of all theſe four kinds; ſince in the intercourſes of life, the pleaſures and pains of one perſon are in various ways intermixed with, and dependent upon, thoſe of others, ſo that compounds of their relics are excited in all the poſſible ways, in which the happineſs or miſery of one perſon can be combined with the happineſs or miſery of another; *viz.* in the four above-mentioned. We have already entered ſo much at length into the riſe and progreſs of the benevolent affections, (ſee Div. IV. 2. § 3. and Moral *Education*,) that we deem it moſt expedient to give here the analyſis of the third claſs, thoſe by which we *rejoice* at the *miſery* of others, previouſly ſtating Hartley's application of the terms above mentioned. *Sociality* is the pleaſure we take in the company and converſation of others, particularly of our friends and acquaintance. *Good-will* (or *benevelence* in its more limited ſenſe) is that pleaſing affection which engages us to promote the welfare of others to the beſt of our power. *Generoſity* is that modification of benevolence which diſpoſes us to forego great pleaſures, or to endure great pains for the benefit of others. *Gratitude* is that modification of benevolence which ariſes from the paſt reception of favours, leading to make every practicable return of good to our benefactor. *Compaſſion* is the uneaſineſs which a man feels at the miſery of another. *Mercy* is compaſſion exerciſed towards one who has forfeited his title to happineſs or the removal of miſery by ſome demerit, particularly againſt ourſelves. *Moroſeneſs* is that diſpoſition which leads us to be diſſatisfied with the efforts of others for our comfort, to be diſpleaſed at their innocent enjoyments, and to feel a pleaſure in impoſing reſtraints upon their ſatisfaction. *Anger* is a ſudden ſtart of paſſion, by which men wiſh and endeavour harm to others. *Revenge* prompts to inflict and rejoice in evil, in return for evil real or ſuppoſed. *Malice* deliberately wiſhes the miſery of others. *Cruelty* diſpoſes men to take delight in inflicting pain, and in contemplating miſery. *Jealouſy* ariſes from the ſuſpicion of a rival in the affections of a perſon of the other ſex. *Envy* is the diſpoſition by which we conſider the good things poſſeſſed by others as a diminution of our own happineſs, and grieve at their enjoyment of them.

Moroſeneſs, *peeviſhneſs*, *ſeverity*, &c. are moſt apt to ariſe in thoſe perſons who have ſome real or imagined ſuperiority over others, which either magnifies their failures of duty, or at leaſt renders the individual very attentive to ſuch failures. Bodily infirmities and frequent diſappointments, by making the common intercourſes of life inſipid, and enhancing ſmall injuries; delicacy and effeminacy, by increaſing the ſenſibility both of body and of mind with reſpect to pain and uneaſineſs; luxury, by producing unnatural cravings, which claſh not only with the like cravings of others, but alſo with the common courſe and conveniencies of life; and, in ſhort, all kinds of ſelfiſhneſs have the ſame effect upon the temper. The ſevere ſcrutiny which perſons ſincerely penitent for paſt departures from duty make into their own life, and the rigid cenſures which they paſs on their own actions, are often found in proud and paſſionate tempers to raiſe ſuch indignation againſt vice, as breaks out in an undue ſeverity of language and behaviour with reſpect to others; and this eſpecially if they ſeem to themſelves to have overcome all great vices, and are not yet arrived at a due ſenſe of the many latent defects ſtill remaining in them. And this is much increaſed by all opinions which repreſent the Supreme Being as implacable towards a part of his creatures, and this part as reprobate towards him. By all which we may ſee, that every thing which makes diſagreeable impreſſions on our minds, at the ſame time that our fellow creatures are preſent with us in ſenſation or in idea, and eſpecially if theſe be connected by the relation of cauſe and effect, &c. will in fact produce in us moroſeneſs or peeviſhneſs. This follows from the doctrine of aſſociation, and is alſo an evident fact. It is likewiſe a ſtrong argument for cheerfulneſs and the pleaſures of innocent moderate mirth.

Anger and *revenge* may be analyſed as follows. The appearance, idea, approach, actual attack, &c. of any thing from which a child has received harm, muſt, by the law of aſſociation, raiſe in his mind the relic of that harm. The ſame harm often ariſes from different cauſes, and different harms from the ſame cauſes; theſe harms and cauſes have an affinity with each other, and thus they are variouſly mixed and blended together, ſo that a general confuſed idea of harm, with the uneaſy ſtate of the nervous ſyſtem, and the conſequent activity of the parts, are raiſed up in young children upon certain appearances and circumſtances. By degrees the denials of gratifications, and many intellectual aggregates, with all the ſigns and tokens of them, raiſe up a like uneaſineſs by the law of aſſociation; and thus it happens, that when any harm has been received, any gratification denied, or other mental uneaſineſs occaſioned, a long train of aſſociated relics of painful impreſſions enhance the diſpleaſing feeling, and continue it much beyond its natural ſtate. This is the naſcent ſtate of the paſſion of anger, in which it is nearly allied to fear, being the continuance of the ſame internal feelings quickened on the one hand by the actual painful or uneaſy impreſſion, but, on the other, moderated by the abſence of the apprehenſion of future danger. By degrees the child learns, from obſervation and imitation, to uſe various muſcular exertions, words, geſtures, &c. in order to ward off or remove the cauſes of uneaſineſs or pain, and ſo goes on multiplying perpetually, by further and further aſſociations, both the occaſions of anger and the expreſſions of it; and, in particular, aſſociates the deſire of hurting another, with the apprehenſion or actual receiving of harm from that other. As perſons grow up to adult age, and diſtinguiſh living creatures from things inanimate, rational and moral agents from irrational ones, they learn to refer effects to their more ultimate cauſes; and thus their reſentment paſſes from the inanimate inſtrument to the living agent, eſpecially if this latter be rational and moral. When the moral ideas of juſt and unjuſt, right and wrong, merit and demerit, have been acquired and applied to the actions and circumſtances of human life, in the manner to be hereafter deſcribed, the internal feelings of this claſs have great influence in increaſing or moderating our reſentment.

Cruelty and *malice* are the genuine and neceſſary effects of anger indulged and gratified. They are moſt apt to riſe in proud, ſelfiſh, and timorous perſons, thoſe who conceive highly of their own merits, and of the conſequent injuſtice of all offences againſt them, and who have an exquiſite feeling and apprehenſion in reſpect of private gratifications and uneaſineſſes. The low and unhappy condition of thoſe around him, gives a dignity to a man's own; and the infliction of puniſhment, or mere ſuffering, ſtrikes a terror, and ſo affords ſecurity and authority. Add to theſe, the pleaſures ariſing from gratifying the will, and perhaps ſome from mere curioſity, and from the rouſing an obdurate callous mind to a ſtate of ſenſibility. Thus we may perceive how nearly one ill paſſion is related to another; and that it is poſſible for men to arrive at laſt at ſome degree of pure cruelty and malice.

(5) *Of the Pleaſures and Pains of Theopathy.*—In order to form juſt ideas reſpecting the origin and nature of the theopathetic affections, it will be deſirable to ſhew what aſſociations are formed with the word *God*, and with the equivalent and related terms and phraſes. Many of the actions and attributes of men are in common language applied to God; and it is probable that children, in their firſt attempts to decypher the meaning of the word, ſuppoſe it to ſtand for a man whom they have not ſeen; and their viſible conceptions connected with the term, will, therefore, be that of a human form. When they hear or read that God reſides in heaven, (that is, according to their conceptions, among the ſtars,) that he made all things, that he ſees, hears, knows, and can do all things, vivid ideas which ſurpriſe and agitate the mind are raiſed up in it; and if they have made ſome progreſs in intellect, they will feel great perplexity in their endeavours to realize ſuch ideas to themſelves; and this perplexity will add to the vividneſs of the ideas, and altogether will transfer to the term *God* and its equivalent, ſuch ſecondary ideas as may be referred to the heads of magnificence, aſtoniſhment, and reverence. When children hear that God has no viſible ſhape, that he cannot be ſeen, &c., it adds much to their perplexity and aſtoniſhment, and at the ſame time deſtroys many of their former ideas; ſtill, however, ſome viſible ideas of the heavens, the throne of God, &c. ſeem to remain. When a child hears that God is the rewarder of good actions, and the puniſher of evil actions, and that the moſt exquiſite future happineſs or miſery, deſcribed under a great variety of particular emblems, are prepared by him for the good or bad reſpectively, he feels ſtrong hopes or fears riſing alternately in his mind, according to the judgment which he paſſes upon his own actions, founded partly upon the previous judgment of others, and partly upon an imperfect moral ſenſe or conſcience begun to be produced in his mind. At different periods of this progreſs, thoſe ideas which have ariſen from his filial relation, unite and blend with all the ideas previouſly connected with the term God, in conſequence of the frequent application of the term Father to the Supreme Being; and there cannot be a reaſonable doubt, that the notions and feelings which he has formed towards his earthly parents at firſt form a conſiderable ſhare in, and for a long period afterwards tend to modify, thoſe belonging to the term God. On the whole, therefore, it is probable, that among Jews and Chriſtians, children begin with a definite viſible conception attached to the word; that this is by degrees obliterated without any thing of a ſtable preciſe nature ſucceeding in its room; and that by further degrees, a great variety of ſtrong mental affections recur in their turns when they think of God.

The affections exerted towards God may be claſſed under two general heads, *love* and *fear*: to the former may be referred *gratitude*, *confidence*, and *reſignation*, alſo *enthuſiaſm*, which may be conſidered as a degeneration of it; to the latter, *reverence*, which is a mixture of love and fear, alſo *ſuperſtition* and *atheiſm*, which are degenerations of it.

The *love* of God, with its related affections, is generated by the contemplation of his bounty and benignity, as theſe appear from the view of the natural world, the declarations of ſcripture, or a man's own obſervation and experience reſpecting the events of life. It is ſupported and much increaſed by the conſciouſneſs of upright intentions and ſincere endeavours, with the conſequent hope of future reward; and by prayer, vocal and mental, public and private, inaſmuch as this gives a reality and force to all the ideas before ſpoken of. Frequent converſation and reading, in which the devout affections are excited, have great efficacy alſo from the infectious nature of our diſpoſitions, and from the perpetual recurrency of the appropriate words, and of their ſecondary ideas, firſt in a faint ſtate, afterwards in a ſtronger and ſtronger perpetually. The contemplation of the reſt of the divine attributes, his omnipotence, omniſcience, eternity, omnipreſence, &c. have alſo a tendency to ſupport and augment the love of God, when this is ſo far advanced as to be ſuperior to the fear: till then, theſe wonderful attributes enhance the fear ſo much, as for a time to check the riſe and growth of the love. Even the fear itſelf very much contributes to the generation and augmentation of the love, and in a manner greatly analogous to the production of other pleaſures from pains. And indeed it ſeems that, notwithſtanding the variety of the ideas and feelings which contribute to this affection, there is ſo great a reſemblance among them, that they muſt languiſh by frequent recurrency, till ideas of an oppoſite nature, by intervening at certain ſeaſons, give them freſh life.

On this theory, the love of God is evidently deduced in part from directly intereſted motives, *viz.* from the hopes of a future reward; and partly from motives or ſources of it, in which direct explicit ſelf-intereſt does not appear, but which may be traced up to it ultimately. However, after all the ſources of this affection have coaleſced together, it becomes as diſintereſted as any other. It appears alſo that this pure diſintereſted love of God may, by a concurrence of a ſufficient number of ſufficiently ſtrong aſſociations, ariſe to ſuch a height as to prevail over any other of the deſires, intereſted or diſintereſted.

Enthuſiaſm may be defined, a miſtaken perſuaſion in any perſon that he is a peculiar favourite with God, and that he receives ſupernatural marks thereof. The vividneſs of the ideas of this claſs eaſily generates this falſe perſuaſion in perſons of ſtrong imaginations, religious ignorance, and narrow underſtandings, eſpecially where the moral ſenſe is but imperfectly formed, by giving a reality and certainty to all the reveries of a man's own mind, and confirming the aſſociations in a preternatural manner. It may alſo be eaſily contracted by contagion, as daily experience ſhews; and indeed more eaſily than moſt other diſpoſitions, from the lively language uſed by enthuſiaſts, and from the great flattery and ſupport which enthuſiaſm gives to pride and ſelf-conceit.

The *fear of God* ariſes from a view of the evils of life, the threatenings of the ſcriptures, the ſenſe of guilt, the infinity of the divine attributes, and from prayer, meditation, and converſation, and reading on ſuch ſubjects. When confined within proper limits, it is *awe*, *veneration*, and *reverence;* when exceſſive, or not duly regarded, it degenerates either into *ſuperſtition* or *atheiſm*. *Superſtition* may be defined a miſtaken opinion concerning the ſeverity and puniſhments of God, magnifying them with reſpect to ourſelves or others. *Atheiſm* is either *ſpeculative*, which denies the exiſtence of a God; or *practical*, which is the neglect of him, where a perſon thinks of him ſeldom, or with reluctance, and pays little or no regard to him in actions, though he does not deny him in words. Both kinds in Chriſtian countries ſeem to proceed from an explicit or implicit ſenſe of guilt, and conſequent fear of God, ſufficient to generate an averſion to the thoughts of him, and to the methods by which the love might be generated, and yet too feeble to reſtrain from guilt; and it is the tendency of all pain to prevent the recurrence of the circumſtances which produced it. On the religious affection in their early ſtages, ſee MORAL *Education*, IV.

(6) *Of the Pleaſures and Pains of the moral Senſe.*—There are certain diſpoſitions of mind, with the actions flowing from them, which when a perſon believes himſelf to be poſſeſſed of, and reflects upon, a pleaſing conſciouſneſs and ſelf-approbation riſe up in his mind, excluſively of any direct explicit conſideration of advantage likely to enſue to himſelf from the poſſeſſion of thoſe diſpoſitions: in like manner, the view of them in other perſons raiſes up a diſintereſted love and eſteem for thoſe perſons. And the oppoſite qualities and actions are attended with the condemnation both of ourſelves and others. This is in general the ſtate of the caſe, but there are many particular differences, according to the particular education, diſpoſition, profeſſions, ſex, &c. of each perſon. The general agreement and particular differences in our ideas of right and wrong, and conſequent approbation and diſapprobation, ſeem to admit of an analyſis and explanation from the following particulars.

Firſt: Children are for the moſt part inſtructed in the difference and oppoſition of virtue and vice, and have ſome general deſcriptions of the virtues and vices with which they are particularly concerned. They are told that the firſt are good, pleaſant, noble, beautiful, fit, worthy of praiſe and reward, &c.; the laſt odious, painful, ſhameful, worthy of blame, puniſhment, &c. So that the painful and diſpleaſing aſſociations, previouſly annexed to thoſe words in their minds, are, by means of that confidence which they place in their parents and inſtructors, transferred to the virtues and vices reſpectively. And the mutual intercourſes of life have the ſame effect, in a leſs degree, with reſpect to adults, and thoſe children who receive little or no inſtruction from others directly. Virtue is in general approved, and ſet off with all the encomiums and honourable appellations which any other thing admits of; and vice loaded with cenſure and reproaches of all kinds, in all good converſation and books. And this happens oftener than the contrary, even in bad ones: ſo that as far as men are influenced in their judgments by thoſe of others, the balance is on the whole on the ſide of virtue.

Secondly: There are many immediate good conſequences which attend upon virtue, and many ill conſequences upon vice; and this during the whole progreſs of our lives. Senſuality and intemperance ſubject men to diſeaſes and pain, to ſhame and anxiety: temperance is attended with eaſe of body, freedom of ſpirits, the capacity of being pleaſed with the objects of pleaſure, the good opinion of others, the perfection of the ſenſes, and of the mental and corporeal faculties, &c. Anger, malice, and envy, bring returns of anger, malice, and envy from others, with injuries, reproaches, fears, and perpetual diſquietudes; and in like manner, good will, generoſity, compaſſion, are rewarded with ſuitable returns, with the pleaſures of ſociality and friendſhip, and with high encomiums. And when a perſon, by the previous love of man, is qualified to worſhip God in any meaſure as he ought, this affords the ſincereſt joy and comfort; while, on the contrary, the neglect of God, or practical atheiſm, murmuring againſt the courſe of providence, fool-hardy impiety, &c. are evidently attended with great anxiety, gloomineſs, and diſtraction, as long as any traces of morality or religion are left upon the mind. Now theſe pleaſures and pains are often recurring in various combinations, and being variouſly transferred upon each other, from the great affinity between the ſeveral virtues and their rewards, and the vices and their puniſhments, will at leaſt produce a general mixed pleaſing conſciouſneſs, when we reflect upon our own virtuous affections or actions; a ſenſe of guilt and anxiety, when we reflect upon the contrary; and alſo raiſe in us the love and eſteem of virtue, and the hatred of vice in others.

Thirdly: The many benefits which we receive immediately from the piety, benevolence, or temperance of others, or which have ſome obvious connection with them, and the miſchiefs reſulting from their vices, lead us to love or hate the perſons themſelves by aſſociation, and then to love and hate the virtues and vices themſelves; and this without regard to our own intereſt, and whether we view them in ourſelves or others. The love and eſteem of virtue in others is much increaſed by the pleaſing conſciouſneſs which our own practice of it affords to the mind; and, in like manner, the pleaſure of this conſciouſneſs is much increaſed by our love of virtue in others.

Fourthly: The great ſuitableneſs of all the virtues to each other, and to the virtue, order, and perfection of the world, impreſs a very lovely character upon virtue; on the contrary, ſelf-contradiction, deformity, and miſchievous tendency of vice, render it odious, and the object of abhorrence to all who reflect on the ſubject. The terms which are employed to denote the pleaſures of the imagination, are employed in connection with virtue; and all the aſſociated feelings, attached to the terms, are conſequently aſſociated with virtue, adding greatly, therefore, to the pleaſures derived from the contemplation of an act of ſublime virtue.

Fifthly: The hopes and fears of a future life are themſelves pleaſures and pains of a high nature. When a ſufficient foundation has been laid by a practical belief of religion, by thoughts of death, by the loſs of friends, by corporeal pain, by worldly diſappointments and afflictions, for the formation of ſtrong aſſociations of the pleaſures of theſe hopes with duty, and the pains of theſe fears with ſin, the repetition of theſe aſſociations will at leaſt make duty itſelf a pleaſure, and convert ſin into a pain, and give luſtre and deformity to all their reſpective appellations. And theſe aſſociations will gradually become ſo ſtrong, that the expreſs recollection of the hopes and fears of another world will vaniſh from the view of the mind.

Sixthly: All meditations upon God, and all the expreſſions of the feelings of our minds towards him, by degrees transfer all the perfection, greatneſs, and gloriouſneſs of his natural attributes upon his moral ones, that is, upon moral rectitude. By theſe means we ſhall learn to be merciful, holy, and perfect, becauſe God is ſo; and to love mercy, holineſs, and perfection, wherever we ſee them.

Hence it appears that all the pleaſures and pains of our nature, thoſe of ſenſation, imagination, ambition, ſelf-intereſt, ſympathy, and theopathy, as far as they are conſiſtent with each other, with the conſtitution of our minds, and with the courſe of the world, produce in us a moral ſenſe, and lead to the love and approbation of virtue, and to the fear and abhorrence of vice. This moral ſenſe, therefore, carries its own authority with it, inaſmuch as it is the ſum total of all the reſt, and the ultimate reſult from them. When it has advanced to conſiderable perfection, a perſon may be made to love and hate merely becauſe he ought; that is, the pleaſures of moral beauty and rectitude, and the pains of moral deformity and unfitneſs, may be transferred, and made to coaleſce almoſt inſtantaneouſly. After this profound analyſis of the moral ſenſe from Hartley, it may appear like preſumption to refer to MORAL *Education*, III. The view there may, however, perhaps be ſerviceable to ſome, in connection with the early cultivation of it.

8. *Intellectual Perceptions or Ideas of Conſciouſneſs.*—We have now ſhewn the means by which a vaſt variety of complex ideas, whether notions or feelings, are generated by the aſſociative power from the ſimple relics of ſenſations, or from theſe variouſly combined; and Hartley is of opinion, that by ſimilar means are formed all the notions and feelings of the mind. We have ourſelves expreſſed a ſimilar opinion in MORAL *Education*, col. 21; but there is one claſs of ideas which we do not feel able to refer to the operation of the aſſociative power on the ſimple ideas of ſenſation, or any combinations of them. We reflect upon what paſſes within us, and we perceive not only objects of thought, but certain operations of the mind upon them by which they are variouſly modified. We can not only direct the mind's eye to theſe operations when actually taking place, but we can form recollections of them when they are at an end: we not only perceive them as they are paſſing, but we can recall notions of them long after they have ceaſed; we can reaſon about them, and, what is more, we can think of them, and, without their recurrence, can retrace impreſſions derived from attending to them when they were going on. And, in like manner, with reſpect to the various feelings and ſtates of mind, we can not only direct the attention of the mind to them at the time, but we can think of them after other feelings and ſtates of mind have been introduced; we can remember how the mind was affected by them; and can form recollections of them, which may be almoſt entirely deſtitute of the pleaſure or pain which made part of them; in other words, we can form notions of them, which can be recalled, diſtinct from the feelings or ſtates of mind themſelves. Senſations, and the combinations of their relics, may be properly conſidered as furniſhing the *occaſions* for theſe notions which the mind forms by attention to its own ſtates and operations; but the notions could never, as far as we can perceive, have been formed without ſuch exerciſe of reflection, by any operation of the aſſociative power on ideas of ſenſation, or the moſt complex compounds of ideas derived from them. The term intellectual perception aptly expreſſes the power of the mind to perceive the operations of feeling and intellect; and as the term perception is in common uſe to expreſs not only the power, but the reſult of its exerciſe, we might conveniently denote the notions we form of our mental ſtates and operations, by the term *intellectual perceptions;* we think it better, however, to term them, in reference to an appropriate ſignification of the term conſciouſneſs, already adverted to, *ideas of conſciouſneſs.*

The readers of Locke will at once perceive that we here refer to a claſs of thoſe ideas which that philoſopher ſtiles *ideas of reflection;* and we ſhould not have departed from his nomenclature, if we had not thought it unneceſſary to apply the term to many of thoſe notions which he refers to this claſs of our ideas, and to avoid error from the extent already given to his term, we prefer the employment of another.

Hartley is eminently ſucceſsful in the analyſis of the mental *feelings;* it appears to us that he has eſtabliſhed the derivation of them all from ſenſation by the agency of the aſſociative power. Reſpecting this grand claſs of our ideas, he has left nothing for future inquirers but to purſue the method he has adopted; to trace the various modifications of feeling to their leſs complex feelings, and to ſhew how theſe ariſe from the relics of ſenſible pleaſures and pains; to trace out the influence of external circumſtances, corporeal temperament, and the operations of intellect upon them, and their mutual influence upon each other. Reſpecting the notions of the underſtanding, a great deal yet remains to be done. Hartley has given a clue to the formation of a great variety of them; and has ſhewn the application of his principles to a ſufficient number to prove their great extent and importance; but after repeated reflection we feel compelled to admit that the ideas of the underſtanding which we have ſpoken of under this head, cannot be referred to ſenſations as their origin, though, without ſenſations, they could not have exiſted, ſince there would otherwiſe have been nothing to call forth the operations of the mind from attention to which thoſe notions are derived.

Theſe ideas of conſciouſneſs are obviouſly ſubject to the general operations of the aſſociative power. They can be connected with other ideas, ſo as to be introduced among our trains of thought agreeably to the common principles of aſſociation; and combinations of theſe ideas can be formed, ſo as to produce general, or abſtract, notions of various mental ſtates or operations, including the common qualities in which they agree.

With reſpect to our more refined and complicated notions, there is a wide field for highly important analytical inquiry; to ſhew from what impreſſions their rudiments are formed, and by what proceſſes they have been combined and modified. Much is done in the formation of our notions by the unintentional exerciſe of the aſſociative power, and by what may be termed accidental impreſſions derived from external objects; but much muſt alſo be referred to the voluntary exerciſe of the intellect.

V. *Of the Motive Power.*—In our general view of the primary mental faculties, we ſtated as an obvious fact, that without any external excitement of the nerves by which muſcular motion is produced, the mind can produce ſuch motion, in other words, that ſtate of the motory nerves by which muſcular motion is effected can be produced by the mind. To account for this fact, we infer that the mind poſſeſſes a power or capacity of influencing the motory nerves, ſo as to produce muſcular motion, which may be called the motive power. Even ſuppoſing that the ſenſorial changes by which muſcular-motion is followed, whatever they may be, are of the ſame nature with thoſe produced by external impreſſions on the organs of ſenſe, (Hartley, p. 15.),—and admitting, what appears certain, that it is owing to the aſſociative power that ideas, and ſometimes that ſenſations, produce motory changes of the ſenſorium,—ſtill we muſt infer the exiſtence of a motive power, otherwiſe ideas and ſenſations could not be the exciting cauſe of muſcular motion: in other words, whatever be the mental cauſes of muſcular motion, that motion, if it begin from the mind, implies that the mind poſſeſſes the power of which we ſpeak, ſeparate from the cauſe of ſenſations, of ideas, and of the connections among them. Indeed this appears to be generally admitted, but the operations of the motive power are uſually referred to the head of will.

A great number of the phenomena of muſcular motion are explicable by the laws of aſſociation, and as far as we perceive, they can only be explained by them. There are five claſſes of muſcular motion: 1. Where it is produced by ſome foreign excitement of the muſcular ſyſtem, without the intervention of the mind, in which caſe it may be termed *involuntary*. 2. Where it is produced by ſenſations, or ſenſible changes, without volition, or any other aſſociated ſenſation, idea, or motion, having been concerned in the connection between ſenſation and motion, it is termed *automatic* in the Hartleyan nomenclature. 3. Where it follows the ſtate of mind called will directly, and without our perceiving the intervention of any other idea, or of any ſenſation or motion, it may be termed *voluntary* in the higheſt ſenſe of this word. If the intervention of other ideas, or of ſenſations and motions, all of which we ſuppoſe to follow the will directly, be neceſſary, it is imperfectly voluntary; yet ſtill it is termed voluntary in popular language, if it follow certainly and readily upon the intervention of a ſingle ſenſation, idea, or motion, excited by the power of the will. 4. If more than one of theſe be required, or if the motion do not follow with certainty and facility, it is to be eſteemed leſs and leſs voluntary, ſemi-voluntary, or ſcarce voluntary at all, agreeably to the circumſtances. 5. Where the motion has been voluntary, but is become automatic by the influence of the aſſociative power, it is termed by Hartley *ſecondarily automatic*. With the firſt of theſe claſſes, mental philoſophy has little or nothing to do. As to the ſecond, till more is known reſpecting the nature of thoſe changes which take place in the ſenſorium, the mentaliſt can do little more than ſtate the fact; but it muſt be obſerved, that automatic motions are not to be found pure, except in the motions of the new-born infant, or ſuch as are excited by ſome violent irritation or pain. The third and fifth claſſes afford farther illuſtration of the doctrine of aſſociation; and we ſhall ſelect from the Mental Principia, with ſome alterations, ſuch ſtatements as will ſuffice to explain the progreſs of muſcular motion from automatic to voluntary, and from voluntary to ſecondarily automatic.

The moſt ſimple inſtance of this progreſs, is in the action of graſping. The fingers of young children bend upon almoſt every impreſſion which is made on the palm of the hand, thus performing the action of graſping in the original *automatic* manner. After a ſufficient repetition of the motions which concur in this action, the ſenſorial changes preceding them are ſtrongly aſſociated with different ideas, the moſt common of which probably are thoſe excited by the ſight of a favourite plaything or other object which the child is uſed to graſp and hold in his hand. He ought therefore, according to the doctrine of aſſociation, to perform and repeat the action of graſping, upon having ſuch a plaything, &c. preſented to his ſight: and it is a known fact that children do ſo. Here the action is imperfectly automatic. By purſuing the ſame method of aſſociation, we may ſee how, after a ſufficient repetition of the proper aſſociations, the ſound of the words *graſp*, *take hold*, &c., the ſight of the nurſe's hand in a ſtate of contraction, the recollection of a hand in that ſtate, and innumerable other aſſociated circumſtances, that is, ſenſations, ideas, and motions, will produce the action of graſping; till, in conſequence of the action being found to anſwer certain purpoſes which are wiſhed for, that ſtate of mind, which we may call the will to graſp, is generated, and ſufficiently aſſociated with the action to produce the requiſite muſcular motions inſtantaneouſly. The action is therefore *perfectly voluntary* in this caſe; and by the innumerable repetitions of it in this perfectly voluntary ſtate, it at laſt acquires a ſufficient connection with ſo many ſenſorial changes, either ſenſitive, ideal, or motory, that, whether or not they are ſo vivid, or ſo accordant with the ſtate of mind at the time, as to obtain the notice of the mind, it follows them in the ſame manner as originally automatic actions do the correſponding ſenſations, that is, it becomes *ſecondarily automatic*. In the ſame manner may all the actions performed by the hands be explained; all thoſe which are very familiar in life, paſſing from the original automatic ſtate, through the ſeveral degrees of voluntarineſs, till they become perfectly voluntary, and then repaſſing through the ſame ſtages in an inverted order, till they become ſecondarily automatic on many occaſions, though ſtill perfectly voluntary on ſome occaſions, *viz.* whenſoever an expreſs act of the will is concerned.

A more intereſting, but much more complicated caſe, is that of the employment of the organs of ſpeech, for which, however, we muſt refer our readers to Hartley's Obſervations, p. 21, or Prieſtley's Abridgment, p. 33; and ſhall merely ſtate a caſe from Hartley, illuſtrating the tranſition from voluntary actions into ſuch as are ſecondarily automatic.

Suppoſe a perſon who has a perfectly voluntary command over his fingers, to begin to learn to play upon the piano forte. The firſt ſtep is to move his fingers from key to key with a ſlow motion, looking at the notes, and exerting an expreſs act of volition in every motion. By degrees the motory changes become connected with each other, and with the impreſſions of the notes, by the influence of the aſſociative power, the acts of volition becoming leſs and leſs expreſs all the time, till at laſt they become evaneſcent and imperceptible. For an expert performer will play from notes, or from ideas of them, or from the connection of the ſeveral complex parts of the decomplex motions, ſome or all, and at the ſame time carry on a quite different train of thoughts in his mind, or even hold a converſation with another. Whence we may conclude, that the paſſage from the ſenſible, ideal, or motory changes which precede, to thoſe motory changes which follow, is as ready and direct, as from the ſenſible changes to the original automatic motions correſponding to them; and, conſequently, that there is no intervention of the ſtate of mind called will. At leaſt, the doctrine of aſſociation favours this: and the fact ſhews that there is no perceptible intervention, none of which we are conſcious. See alſo Darwin's Zoonomia, ſect. xvii. 2.

We may hence underſtand in what manner the firſt rudiments are laid of that faculty of *imitation* which is ſo obſervable in young children. They ſee the actions of their own hands; they hear themſelves pronounce. Hence the impreſſions made by themſelves on their own eyes and ears become aſſociated circumſtances, and conſequently muſt, in due time, excite to the repetition of the actions. Hence like impreſſions made on their eyes and ears by others will have the ſame effect; or, in other words, they will learn to imitate the actions which they ſee, and the ſounds which they hear. Imitation is a great ſource of the exerciſe of the voluntary power; and makes all the ſeveral modes of walking, handling, and ſpeaking, &c. conformable to thoſe of the age and nation in which a perſon lives; and in particular to thoſe of the perſons with whom he converſes. Beſides the two ſources of it juſt mentioned, it has many others; ſome of theſe are, the reſemblance which children perceive between their own bodies with all the functions of them, and thoſe of others; the pleaſures they experience in and by means of all imitative motions; the directions and encouragements given them on this head; the high opinions which they form of the power and happineſs of adults, and their conſequent deſire to reſemble them in theſe and all their aſſociated circumſtances. Imitation begins in various kinds of voluntary actions about the ſame time; and increaſes, not only by the ſources alleged, but alſo by the mutual influence of every inſtance of it over every other, ſo that the velocity of its growth is for ſome time greatly accelerated. It is of the greateſt conſequence to children in their attainment of accompliſhments, bodily and mental. And thus every thing to which mankind have a natural tendency, is learned much ſooner in ſociety than the mere natural tendency would produce it; and many things are learned ſo early, and fixed ſo deeply, as to appear parts of our nature, though they may be mere derivatives and acquiſitions.

VI. *Of the Memory.*—The memory is defined by Hartley to be that faculty by which traces of ſenſations and ideas recur, or are recalled, in the ſame order and proportion, accurately or nearly, in which they were once actually preſented. The rudiments of memory are laid in the perpetual recurrency of the ſame impreſſions, or groups of impreſſions. Theſe, by the operations of the retentive power, leave traces or relics; and by the operation of the aſſociative power, theſe are united in the order in which they were preſented to the mind. Now, the ſingle ſenſible impreſſions, and ſmall groups of them, being few in compariſon of all the large groups, they recur the moſt frequently, ſo as ſooner to produce the elements of memory.

Suppoſe a perſon to have ſo far advanced in life as to have acquired all theſe elements; that is, that he has ideas of the common appearances and occurrences of life, under a conſiderable variety of ſubordinate circumſtances, which would readily recur to his mind by ſlight cauſes, he will be thus eaſily enabled to retrace other occurrences; for theſe will conſiſt either of the old impreſſions variouſly combined, or of new ones in ſome way or other connected with them. This may be exemplified and explained by the circumſtance, that it is difficult to remember even well known words which have no connection with each other; and ſtill more ſo words which are neither familiar, nor formed according to familiar analogies; but that, on the other hand, perſons acquainted with any branch of ſcience or of art, very eaſily retains facts connected with it which were previouſly unknown. The recollection of ideas is alſo greatly aided by the connection of words, both with them and with the original impreſſions; for words being, from the conſtant uſe of language, familiar to perſons of moderate mental culture, even in various combinations, they are eaſily retained, and moſt materially aſſiſt in producing the recurrence of the correſponding ideas. And thus when a perſon is relating a paſt fact, the ideas do in ſome caſes ſuggeſt the words, and in others, the words ſuggeſt the ideas. Hence illiterate perſons, other things being equal, do not remember nearly ſo well as others. Hence alſo the importance, contrary to the views of education which a few years ago were ſo faſhionable, of teaching the young to remember words as well as things; for in moſt caſes, as words ſerve as the bond of ideas, ideas will be looſe and floating in the mind unleſs connected with words.

The difference between ideas and ſenſations principally conſiſts in the greater vividneſs and diſtinctneſs of the latter; but caſes are known to occur, in which viſual conceptions are ſo vivid and diſtinct, that they are miſtaken for actual ſenſations. This is particularly the caſe when, in conſequence of diſeaſe, the ſyſtem is peculiarly ſuſceptible of excitement; and ſometimes when the mind is very much abſorbed in contemplating its own ideas, ſo that the impreſſions from external objects produces little effect upon it. It is a fertile ſource of thoſe ideas reſpecting apparitions which are ſo prevalent among perſons of phyſical ſenſibility, without that culture of the intellect, which would enable them to attend to their own thoughts and manner of thinking. Such lively recollections of paſt impreſſions may, however, be uſually diſtinguiſhed from ſenſations, by allowing the attention to relax ſo that they may ceaſe to be forcibly detained as objects of conſciouſneſs; when it will in general be eaſily perceived that the mind loſes ſight of them; whereas it can loſe ſight of impreſſions from external objects only by fixing the attention upon ideas, or by corporeal motions of ſome kind or other. Theſe remarks might, perhaps with greater propriety, have been made under the head of imagination, becauſe it is ſeldom that in ſuch caſes the vivid conceptions recur in the exact (or nearly exact) order of actual impreſſion, which is the eſſential difference between the trains of imagination and thoſe of memory: they are, however, referrible to either claſs of phenomena.

Ideas of recollection differ from thoſe of imagination, principally in the readineſs and ſtrength of the aſſociations; but partly, and in many caſes almoſt entirely, by the connection of the former with known and allowed facts, by various methods of reaſoning appropriate to the peculiar circumſtances of the caſe, and by recollecting that we had before conſidered them as recollections, &c. All perſons are at one time or other at a loſs to know whether trains of vivid ideas, ſucceeding each other readily and rapidly, are ideas of recollection or of imagination, that is, mere reveries: and the more they agitate the matter in their minds the more does the reverie appear like a recollection. Perſons of irritable nervous ſyſtems are more ſubject to ſuch fallacies than others; and inſane perſons often impoſe upon themſelves in this way, *viz.* by the vividneſs of their ideas and aſſociations, produced by bodily cauſes. The ſame thing often happens in dreams.

The vividneſs and readineſs of recollected trains is alſo one grand means of aſcertaining the dates of facts; for as this diminiſhes (other things being equal) in proportion to the period which has elapſed ſince the reception of the ideas, and the formation of the aſſociations, if the vigour of theſe be diminiſhed, we refer them to a more remote period, in proportion to that diminution; and if by any cauſe it be kept up, the diſtance of time appears diminiſhed. Thus it is, if any intereſting event, the death of a friend, for inſtance, have been often recollected or related, till we come to make oral or mental calculations, it appears to have happened but yeſterday, as we term it. However, from this circumſtance, we are often apt to confound events, as to the order of time, referring them to more recent or remote periods, according to the ſtrength and vigour of the ideas and aſſociations, or the contrary. In general we judge of the period of events by aſſociated circumſtances, particularly by viſible permanent memorials. And hence it happens, that illiterate perſons have often great difficulty in aſſigning periods to events with any tolerable accuracy. Our readers, when they take ſuch things into account, and conſider how difficult it muſt in moſt caſes be for illiterate perſons, who have frequently changed their employments, to refer ſuch changes to any ſpecific dates, will not feel unwilling to admit, that the preſumption formed againſt the reputed murderers of Mr. Steele, in conſequence of their incorrect ſtatements, as to their places of employment four years before their trial, ſhould have weighed very little in the deciſion againſt thoſe unhappy men.

We diſtinguiſh a new place, perſon, &c. from one which we remember, in a manner ſimilar to that in which we diſtinguiſh recollected ideas, and thoſe of imagination; by the greater vividneſs of the impreſſion, and the ſtrength and readineſs of the aſſociated circumſtances. If we doubt whether we have before ſeen a perſon who is newly introduced to us, we try to recall ſome aſſociated circumſtance, ſuch as the time and place where we may be ſuppoſed to have ſeen him; and if this prove erroneous, we immediately infer, that our doubt ariſes from ſome reſemblance which he has with ſome one whom we then or there ſaw, or with ſome one whoſe face is familiar to us.

The memory of children is imperfect, becauſe the elementary rudiments of memory are not ſufficiently fixed by the retentive power, nor their uſual groups ſufficiently formed in the mind. They are alſo imperfect in the uſe of thoſe words, and other ſymbols, which ſo materially aid the recollection; and in particular they are found very deficient in arranging facts in the order of time, judging moſt frequently from the vividneſs of their recollections, and not having the uſe of thoſe denotements of time, on which the memory principally depends for accuracy in this branch of recollection. In old perſons, whatever be the part of the ſyſtem on which the retentive power depends, that power is moſt materially diminiſhed, as alſo the ſenſitive power, while the aſſociative power has, in their habitual direction of it, been ſtrengthened in its operations. Hence new impreſſions can ſcarcely be received, and ſeldom are retained; while the parts which are received and retained excite old trains of aſſociations, rather than continue thoſe which were recently impreſſed. When old perſons relate the incidents of their youth with great preciſion, it is rather owing to the recollection of many preceding recollections and relations, than to the recollection of the thing itſelf.

Memory depends greatly upon the ſtate of the brain. Concuſſions and other diſorders of the brain, exceſs in ſenſual pleaſures, and the uſe of ſpirituous liquors, impair it; and it is recovered by degrees, as the cauſes which affected the brain are removed. In like manner, dreams which happen in a peculiar ſtate of the brain, *viz.* during ſleep, vaniſh as ſoon as vigilance, a different ſtate, takes place; but if they be recollected immediately upon waking, and thus connected with a ſtate of vigilance, they may be remembered.

When a perſon deſires to recollect a thing that has eſcaped him, ſuppoſe the name of a viſible object, he recalls the viſible idea, or ſome other aſſociate, again and again by a voluntary power, and thus at laſt brings in the required aſſociation and idea. But if the deſire be very great, it changes the ſtate of the mental organs, and has an oppoſite effect; ſo that the deſired idea does not recur till all has ſubſided, and perhaps not even then.

The excellence of memory conſiſts partly in its ſtrength and accuracy of retention, partly in the readineſs of recollection. The former principally depends on the ſtrength and accuracy of perception in attention to our ſenſations, and partly upon the aſſociative faculty; the latter depends entirely upon the ſtrength and peculiar biaſſes of the operations of that power. The intellectual faculties depend greatly upon the memory; hence, though ſome perſons may have ſtrong memories with weak judgments, yet no man can have a ſtrong judgment with a weak original power of retaining and remembering. Before we conclude our view of this faculty, we beg leave ſtrongly to recommend to our younger readers, eſpecially if they poſſeſs a philoſophic caſt of mind, an attentive peruſal of the very uſeful and intereſting chapter of Dugald Stewart on this ſubject, particularly thoſe parts which relate to the improvement of the memory; and to thoſe in particular, who are in any way concerned in the work of education, we hope we ſhall be excuſed, when we recommend the peruſal of the ſeventh diviſion of INTELLECTUAL *Education*, on this faculty. See MEMORY and MNEMONICS.

VII. *Imagination.*—In the uſe which Mr. Stewart makes of the term imagination, it includes the fancy, and (as he himſelf ſtates) is in no reſpect a diſtinct power, but compounded of ſeveral others. "It includes," he ſays, "*conception* or ſimple apprehenſion, which enables us to form a notion of thoſe former objects of perception or of knowledge, out of which we are to make a ſelection; *abſtraction*, which ſeparates the ſelected materials from the qualities and circumſtances which are connected with them in nature; and *judgment* or taſte, which ſelects the materials and directs their combination. To theſe powers we may add, that peculiar habit of aſſociation to which I formerly gave the name of *fancy;* as it is this which preſents to our choice all the different materials which are ſubſervient to the efforts of imagination."—"This," he obſerves in another place, "is the proper ſenſe of the word, if imagination be the power which gives birth to the productions of the poet and the painter," and we may add of genius in general. We have no objection to ſuch an appropriation of the term. In the Hartleyan nomenclature, however, it is uſed indiſcriminately with fancy, in the ſenſe in which Mr. Stewart ſeems to employ the latter term.

The recurrence of ideas, ſays Hartley, eſpecially viſible and audible ones, in a vivid manner, but without any regard to the order obſerved in paſt facts, is aſcribed to the power of imagination or fancy. Every ſucceeding thought is the reſult either of ſome new impreſſion, or of an aſſociation with the preceding. It is impoſſible, indeed, to attend ſo minutely to the ſucceſſion of our ideas, as to diſtinguiſh and to remember for a ſufficient time, the very impreſſion or aſſociation which gave riſe to each thought or conception; but we can do this as far as it can be expected to be done, and in ſo great a variety of inſtances, that we have full right to infer it in all. A *reverie* differs from imagination only in this, that the perſon being more attentive to his own thoughts, and leſs diſturbed by external objects, more of his trains of ideas are deducible from aſſociation, and fewer from new impreſſions. It is to be obſerved, however, that in all caſes of imagination and reverie, the train and complexion of the thoughts depend, in part, upon the then ſtate of body or mind. A pleaſurable or painful ſtate of the ſtomach, for inſtance, joy or grief, will make all the thoughts tend to the ſame caſt. "Objects and circumſtances may be ſo diſpoſed," ſays Mr. Grant, (in a very valuable paper on reverie, for which ſee Mancheſter Memoirs, vol. i. or Nicholſon's Journal, vol. xv.) "as to give to reverie a pleaſing or penſive, a refined or an elegant direction. I believe it is unneceſſary to aſk, whether the mind will not be more apt to depart from ſerious meditation in a gaudy chapel, than in the ſolemn gloom of a cathedral? It is remarked by an eminent medical writer, that light, introduced by opening the window-ſhutters, gave a gayer caſt to the ideas of a patient who laboured under reverie. The ſtudy of Taſſo was a Gothic apartment, and he fancied his familiar ſpirit to converſe with him through a window of ſtained glaſs."

It would be eaſy and uſeful to enlarge on this faculty, and particularly on the regulation of it as affecting the character and happineſs; but we ſhould probably be able to add little to what our readers have acceſs to in Stewart's Elements, in the laſt chapter of which they will find an elegant, ſcientific, and highly important inveſtigation of the ſubject. We muſt alſo refer them to the leſs palatable, but not leſs wholeſome food for the underſtanding, in Hartley's 91ſt propoſition, in which he examines how far the phenomena of imagination, reveries, and dreams, are agreeable to the principle of aſſociation; and alſo to prop. 92, where he makes the ſame inveſtigation reſpecting "deviations from ſound reaſon and alienations of mind." On the phantaſms produced by diſeaſe, there is an intereſting detail of facts in one particular caſe, in Nicholſon's Journal, vol. xv. See IMAGINATION.

VIII. *Underſtanding.*—This term, in its moſt extenſive application, clearly includes the operations of ſenſation and aſſociation, except thoſe which reſpect the affections; but we uſe it here in a narrower ſenſe, as we have already ſtated, in reference to thoſe mental ſtates or operations by which we contemplate ſenſations and ideas, conſidered as ſuch, and the various operations of the mind, diſcern the relations which exiſt among the objects of perception and thought, purſue truth, and aſſent to or diſſent from propoſitions.

1. *General Obſervations on the Operations of the Underſtanding. Conſciouſneſs* we regard as the capacity of the mind, by which it is capable of being affected by ſenſorial changes, whether ſenſible, ideal, or motory. Conſciouſneſs is in fact the notice of the mind itſelf; and the term is, in the moſt appropriate ſenſe, applied to that ſtate with which every mental change or operation is attended, if it in any degree excites the notice of the mind. It is by conſciouſneſs alone that we have any knowledge of the other powers of the mind; and when directed to their operations, the appellation is peculiarly appropriate. When it is excited by ſenſible changes it is uſually called *perception*; conſciouſneſs referring to the operations of the mind as ſuch; perception to them, as produced by external objects. (See Div. II.) We are *conſcious* of ideas and ſenſations; we *perceive* the external objects which produce impreſſions on the ſenſes.

When the notice of the mind is continued to any particular object, or to a continual ſucceſſion of objects, whether or not that continuance is cauſed by volition, the ſtate of mind is called *attention.* When it is brought ſo far under the direction of the mind, that it can be directed at will, then it is with propriety termed *the power of attention.* See Div. VIII. 2, and INTELLECTUAL *Education*, IV.

When the attention is excluſively directed to ſome object of thought ſeparate from others, or to ſome component part of the object ſeparate from its other parts; then it is termed *abſtraction*, by which we underſtand *ſeparate attention.* See § 2, and INTELLECTUAL *Education*, V. VI.

When the attention is directed to our perceptions, (or, in other words, to the qualities, circumſtances, and changes of external objects, as they affect the mind through the medium of the ſenſitive and aſſociative power,) it is termed *obſervation.* The term is one of ſuch familiar and generally appropriate uſe, that it can ſcarcely be miſunderſtood; it is never applied to attention to the ideas of abſent objects of ſenſe, but ſolely to attention directed to the preſent objects of perception, leading to thought reſpecting them. See INTELLECTUAL *Education*, III.

When the attention of the mind is directed to its own ſtates, affections, and operations, it is termed *reflection.* As obſervation commonly implies ſome exerciſe of the reaſoning faculty, ſo alſo does reflection: but ſimple attention to our own thoughts and feelings, and to our manner of thinking and feeling, is in the ſtricteſt ſenſe *reflection.* The term is however uſed in common language much more extenſively—to denote the *attentive conſideration* of any ſubject of *thought.* It does not ſeem to be ever uſed in reference to the preſent objects of perception to which obſervation is excluſively appropriated: but the act of thinking on any intellectual object is often termed reflection. In philoſophical inveſtigations, however, it ſeems beſt to limit it, to the attentive conſideration of what paſſes within, of the ſtates, affections, and operations of the mind.

When the mind is employed in the conſideration of any object of thought, it is ſaid to be *thinking.* In a wide ſenſe it includes every intellectual operation, in other words, whatever may be termed an act of the underſtanding, that is, every act of the mind, properly ſo called, except ſenſation and feeling. But it appears moſt appropriate to that ſtate in which the mind is actively employed in the conſideration of thought, whether its perceptions, notions, or feelings. The term *thought* has two ſignifications, the *act* of thinking and the *ſubject* of thinking. Conſidered as denoting the ſubject of thinking, it nearly correſponds with *notion*, *opinion*, &c.

When the mind is left in its trains of thought very much to the operation of the aſſociative power, without any direct reſtraint upon it from without or within, its ſtate is termed *meditation;* which bears nearly the ſame relation to the underſtanding, that reverie does to the imagination. The term is, however, uſed where the mind is more actively engaged, particularly on ſerious ſubjects of thought. It does not very greatly differ in its import from *contemplation*, but this term often appears more particularly to refer to the fields of *obſervation*, rather than of *reflection.*

The characteriſtic faculty or capacity of the underſtanding, is the power of *comparing* the different objects of thought, and *diſcerning* the various *relations* which exiſt among them, ſuch are thoſe of identity, ſimilarity, equality, proximity, continuity in time and place, difference, diſſimilarity, cauſe and effect, &c. &c. This property of the mind is ſo intimately connected with every act of ſenſation and thought, that it might be conſidered as in ſome ſenſe included in the powers by which we acquire ſenſations and ideas. But we are not aware of any ſufficient advantage reſulting from connecting it with them. The receiving of a ſenſation, and the recurrence of an idea, even when theſe are made the objects of an attentive conſideration, do not neceſſarily involve in them any compariſon with another : and this is therefore properly to be regarded as a diſtinct act of the mind. The paper we are writing upon is rectangular ; and if we form a conception of it, we have the ſame appearance as the original ſenſation preſented : but the mind cannot, with any degree of propriety, be ſaid to *judge*, when it merely forms that conception, or receives the correſponding ſenſation. As ſoon as our attention is directed to the form of the paper, and by comparing it with the idea annexed to the word *rectangular*, we perceive the agreement of the form with the import of the term, we form a judgment, and the operation of the mind is well called *judging*.

It was ſome years ago propoſed by the preſent highly reſpectable profeſſor of moral philoſophy at Glaſgow, to give the appellation *intellectual perception* to the *power of the mind*, by which we *perceive relations ſubſiſting among the various objects of thought*. Whether that philoſopher ſtill retain the appellation, or the preciſe views which he then took of the ſubject, we have not had the opportunity of aſcertaining ; but our preſent inveſtigations lead us to regard them as very judicious. He then conſidered ſenſation, memory, and intellectual perception, as the three primary faculties of the mind : employing the appellation memory in a wider ſenſe than is uſually given to it, ſo as to make the aſſociation of ideas in reality a branch of memory. In this we cannot agree with him. As to the appellation, and the diſcrimination of the power from the other faculties of the mind, and the importance which he attached to it, we ſee more and more reaſon to adopt his views. Still we think it more convenient and accordant with the reſt of our plan, to employ the more cuſtomary appellation *judgment*, as being a term of greater latitude. That it has been defined ſo as to baffle every effort to know from the definition what operation of the mind was intended by it, we are aware ; and alſo that it is often uſed very looſely ; but the laſt circumſtance is in our favour : and we wiſh to include under it three operations of the mind ; 1ſt, the attention to different objects of thought, conſidered as different, with a view to aſcertain their mutual relations or connections; which is appropriately termed *compariſon :* 2dly, the diſcerning of the relation which is the object of the mind ; which is an operation of the *intellectual perception :* and laſtly, the conſequent aſſociation of the ideas, as bearing the obſerved relation, which is, in the narroweſt ſenſe, the *judgment*. The firſt may be to a certain degree voluntary : the ſecond depends upon the culture, extent, acuteneſs of the diſcernment, or intellectual perception, and cannot be ſaid to be voluntary any more than our ſenſations are ; the laſt is a proceſs which, like every other caſe of aſſociation, may be made more efficacious and permanent by voluntary effort, by directing the attention to it, &c. but is not in itſelf a voluntary operation.

We would by no means be underſtood as intending to aſſert that becauſe the intellectual perception is to be regarded as an eſſential principle of the human mind, and not altogether an acquired faculty, and as involuntary in its operations, that it operates in all alike. If, owing to the influence of aſſociation, the *perceptions* of the ſame *external* objects greatly vary in different individuals (ſee Intellectual *Education*, II.), it cannot be ſurpriſing that the *intellectual perception*, or the *diſcernment of relations* among the objects of *thought*, ſhould alſo vary greatly. We do not therefore compare it with *ſenſation*, in which the ſimple effect of external impreſſions is invariable, except in the degree of intenſity, and cannot differ in different periods of life, or ſtates of mind, or progreſs of mental culture. The perceptions of relations, even the moſt common, (ſuch as thoſe of reſemblance or difference,) vary greatly in readineſs, correctneſs, and extent, in different individuals, and in the ſame individual at different periods of life. It is ſuſceptible of great improvement by proper cultivation. It depends for its exerciſe upon the memory : and its vigour and correctneſs depend upon the degree of habitual and diſcriminative attention given to the various objects of thought. The more refined relations can only be diſcerned among the objects of thought, when the nature of the relations themſelves is underſtood : and this often involves ſome extenſive proceſſes of the aſſociative power in connection with the general cultivation of the underſtanding ; and the facility and correctneſs with which the mind diſcerns ſuch relations, depends greatly upon the purſuits of the individual, and the habitual tendencies of his mind, derived from them and from the mental character generally.

The judgment clothed in words is called a *propoſition*. Every propoſition expreſſes a connection exiſting in the mind of the ſpeaker between the ideas denoted by the terms of the propoſition, as bearing to each other the relation declared by the propoſition : but it is, we apprehend, no uncommon error to ſuppoſe that every propoſition expreſſes a judgment, ariſing from a direct act of judging. Paſſing by thoſe numerous caſes in which the act of judging has once taken place, but is no longer neceſſary, there is a variety of others continually occurring, where the propoſition expreſſes no more than that the idea denoted by the predicate makes part of the complex idea of the ſubject, either univerſally, or at that particular time. *Milk is white* is a propoſition ; but if we ſuppoſe a perſon, who has often ſeen milk, to ſtate it for the firſt time, we apprehend no mental proceſs takes place to which we can juſtly give the appellation of judging. There is no compariſon, diſcerning, conſidering, and deciding as to the coincidence of the ideas denoted by *milk* and *white ;* he merely expreſſes a ſimple fact : if he has the ſubſtance before him, he tells you what he ſees ; if he thinks of it, (forms a conception of it,) he tells you what he recollects.

When a perſon is ſomewhat practiſed in obſerving what paſſes within him, the greateſt difficulty he has to encounter is to ſeparate the proceſſes of language from thoſe of ſimple thought ; and thoſe who are acquainted with the writings of ſome of the beſt mental philoſophers, will ſee abundant reaſon to believe, that in various inſtances they have either not attended to the diſtinction between them, or have been unſucceſsful in detecting the actual procedures of the mind. The fact is, as we have before obſerved, thought is more or leſs continually accompanied with words, even where it is not communicated to others. Where the object of the mind is ſomething of which it can form diſtinct or indiſtinct conceptions, or conſiſts of mere feelings, words are not neceſſary ; but where the proceſſes of reaſoning or inveſtigation are concerned, it is probably in the experience of all thinking perſons, that theſe proceſſes are conſtantly introducing the conceptions of *words*, either as objects of ſight or of hearing. This may be peculiarly the caſe with thoſe who are much employed in the communication of their thoughts ; for ſince it is only by clothing them in words that they can communicate them, they can ſcarcely fail to be more accuſtomed to think in words, much as they would ſpeak in words, than he who confines his ſpeculations to himſelf. At all times, however, it contributes greatly to the clearneſs of thought, to expreſs it in words ; but if, as is indiſputably the caſe, eſpecially in mental inveſtigations, we find words fail us, when we endeavour to communicate the nice diſcriminating features of thought, it muſt alſo be allowed that there are proceſſes of thought beſides thoſe which are aided by words.

Further, we have little doubt that it will be found accordant with the experience of all who think much of what paſſes within them, that in the rapidity of thought, and even in drawing general concluſions from particular facts, the mind makes uſe of abbreviated forms of expreſſion to itſelf, and that only the outlines occur of thoſe modes of expreſſion, which would be requiſite in conveying our thoughts into the minds of others. Something analogous to this muſt be familiar to all who compoſe with great fluency, when merely writing, for their own future tranſcribers. To keep up in ſome meaſure with the ſpeed of thought, they continually uſe abbreviations, not merely of words, but of ſentences; ſometimes even making a whole word ſtand for a train of thought, which paſſing with great rapidity, ſeems to require little time to ſtate it in words; but when clothed in words, ſo as to be fit for communication, forms a ſeries of ſentences, which, even in a train of conceptions, would require that time tenfold. In rapid thought, even on the moſt abſtract ſubjects, we are confident that a faint conception of ſome leading words, or of abbreviations of them, is often all that paſſes in the mind.

But to return. We were about to obſerve, that from the cloſe connection between the proceſſes of thought and thoſe of language, important miſtakes in mental philoſophy have ariſen; and we regard as one of them that definition of judgment, which Mr. Stewart has ſanctioned in his Outlines, ſect. 9. "Judgment is defined by the writers on logic to be an act of the mind, by which one thing is affirmed or denied of another; a definition which, although not unexceptionable, *is as good as the nature of the ſubject admits of.*" We ſee great reaſon, from Mr. Stewart's Philoſophical Eſſays, to believe that, in the continuation of his Philoſophy of the Human Mind, (a work which we look forward to with as much earneſtneſs as any of his indiſcriminate admirers,) he will be much more attentive to the proceſſes of thought, as diſtinct from language, than his earlier reſearches lead us to conſider him. If ſo, he can ſcarcely avoid perceiving that he has too haſtily adopted ſome of the errors of his predeceſſors; and among other things he will, we doubt not, give a very different explanation of judgment from that which we have quoted. If he had ſaid, it is that act of the mind which attends the affirming or denying one thing of another, though, from the views which we lately ſtated, we ſhould conſider him as making it too general, including proceſſes of the mind which can be regarded in no light as acts of judgment, yet the leading error would have been avoided. Still it would have left us in ignorance. The queſtion ſtill is, what proceſs of thought, or act of the mind, accompanies the *thoughtful* ſtatement of a propoſition?

The repetition of a ſhort familiar propoſition is a mere act of the memory. It is of courſe merely an aſſociation of *terms;* and as the impreſſion is united with that combination of terms, that it is true, it may paſs in the mind without exciting any idea of its appropriate meaning: but in general it will be found, that a notion of its import paſſes rapidly in the mind, along with the ſtatement of the terms themſelves. In ſuch caſes, we can do little more than detect the exiſtence of fleeting thought. But when the propoſition is not familiar to the memory or belief, or the attention is from ſome cauſe or other particularly directed to its import, then is the period to examine what is the proceſs of the mind when uſing it or receiving it. Let a ſimple caſe be taken. We ſay, *Gold is heavy,* and the propoſition is ſo familiar to us, that the mind is ſcarcely conſcious of any thought going along with it; yet we are certain, if we pay the leaſt attention to it, as an expreſſion of a truth, that ſuch is the fact: for as ſoon as we ſay, *Silver is fuſible,* we not only perceive that the *words* are not the ſame, but that the internal notion attending the ſtatement is different. But if we realiſe the meaning of the propoſition, as expreſſive of ſome proceſs in our own mind, we find it to be, that the complex notion of gold includes in it a notion of its heavineſs; and as this laſt is not one which can be repreſented to the mind as a diſtinct part of that complex notion as the colour of it may, we may be obliged to think of what is the *feel* of it, when we hold a piece in our hands. In this laſt caſe, (and as it appears to us, in this only,) there is an operation of the judgment, properly ſo called. If the propoſition merely ſtates a connection ſubſiſting in the mind of the ſpeaker between the ideas denoted by the terms employed, and eſpecially if the import of the predicate forms an eſſential part of the complex idea denoted by the ſubject, we ſee nothing which can with ſtrict propriety be termed an act of judging. It may indeed be convenient in popular language to give the appellation judgment to every caſe, in which, by an act of attention, we aſcertain the connection exiſting in our minds between two ideas; but if the formation of that connection be ſimply the reſult of mere ſenſation or aſſociation, without any conſideration or compariſon, it cannot itſelf be called a judgment, conſidered as an operation, without making obſcurity more obſcure, by confounding things which are utterly diſtinct.

Let us take the caſe reſpecting the form of ſolids. The perception of a globe includes in it the notion of its real ſhape, though the impreſſion upon the retina could of itſelf communicate no ſuch idea. We may, if we pleaſe, call this connection of the notion of the real ſhape with the viſual appearance a judgment; but it is in reality an effect which would be produced by the operation of the aſſociative power, without the intervention of volition or reflection. We can think of no definition of judgment which can include this caſe, which will not include every operation of aſſociation. But if we attentively conſider the viſual appearance of an object, in order to determine its form, and compare it with that ſame other object whoſe form we have aſcertained, then we clearly have an act of judging:—it may be ſaid, and of reaſoning too. We allow it. If reaſoning ſignifies drawing concluſions from premiſes, every act of judging is an act of reaſoning. Reaſoning is expanded judging, and judging is compreſſed reaſoning. If reaſoning denote an operation of the mind, exactly correſponding with the ſyllogiſtic expreſſion of an act of reaſoning, we think there is no ſuch operation; except when we are intentionally employing a ſeries of *propoſitions*, mentally, much the ſame as we would in communicating our reaſonings.

The real ſtate of the caſe appears to us to be, that a direct exerciſe of the underſtanding is always included in the operation of judgment, properly ſo called. And it ſhould be obſerved, that a propoſition, which is merely the ſtatement of a connection in the mind of the *ſpeaker*, in no way the reſult of conſideration, but neceſſarily ariſing from the influence of external impreſſions on the ſenſitive powers, or from the agency of the aſſociative power upon the relics of theſe, without the intervention of the underſtanding, properly ſo called,—ſuch a propoſition may occaſion in the *hearer's* mind a real judgment, and may even require it, before the truth of it can be admitted. The propoſition may be merely the ſtatement of a complex thought; but as the terms of it repreſent that thought in certain parts, and in ſucceſſion, if the complex thought is not itſelf familiar to the mind of the hearer, ſo as to be excited at once by the propoſition, he is ſet by it to compare, to diſcern, and to decide; in other words, to judge.

We perceive here a wide field for intereſting inveſtigation; not involving mere verbal diſtinctions, though theſe are often of the utmoſt importance to the progreſs of knowledge; but reſpecting the real procedures of the underſtanding in the acts of judging and reaſoning; but circumſtances do not permit us to enter upon it.

We feel ſatisfaction in perceiving, that the views to which our examination of this ſubject has led us, in ſeveral reſpects agree with thoſe ſtated by Condillac, in his Cours d'Etude Grammaire, part i. chap. 3. We ſuſpect, that he was led to them by the hypotheſis, which he early adopted, that the judgment, the reflection, the paſſions, and all the faculties of the ſoul, are nothing but ſenſations under different modifications; but though the foundation is clearly erroneous, his remarks, as far as they go, are very judicious. We ſay as far as they go, for he does not appear to have conſidered any other caſes, but thoſe which reſpect our perceptions merely. If in the formation of theſe, or our complex notions of any kind, the underſtanding has not been concerned, we do not perceive any operation of the judgment connected with the propoſition ſtating the fact; the exerciſe of the judgment, if exerciſed at all, precedes the affirmation or negation.

We have before ſaid, that, in the popular ſenſe, the term *judgment* is uſed more extenſively than in the philoſophical acceptation (as referring to a particular power or act of the mind) it can be well employed. It is often uſed with as much latitude as *underſtanding*. We ſpeak of the ſolidity, the accuracy, the clearneſs, &c. of the judgment, or of the underſtanding, with little or no diſcrimination; but it will probably be found that the two words are often diſtinguiſhed juſt as the words *underſtand* and *judge*. The underſtanding conveys leſs the idea of activity than the judgment; and refers more to the perception of truth than to the formation of right notions. We might even ſay, that a good underſtanding and ſound judgment are not inſeparably connected. In the wide ſenſe of the term, judgment is applicable to every act of the mind, by which an opinion is formed, and conſequently includes not only judgment, ſtrictly ſo called, but extends to the whole round of aſſociations which reſpect the objects of the underſtanding. Still, even there, the communication of the judgment by language, and the judgment itſelf, are two diſtinct operations of the mind; and ſhould in all caſes be kept diſtinct by the mental philoſopher. In this ſenſe, as moſt accordant with our then object, we employed it in INTELLECTUAL *Education*, VIII. In that diviſion of the article, we have introduced ſome remarks reſpecting the leading excellence of the jugdment, *viz. diſcrimination*, to which we beg leave to refer the reader.

Thoſe operations of the underſtanding which are denominated *reaſoning*, clearly are of the ſame nature with judgment. Where the relation or connection ſubſiſting between two objects of thought is ſhewn by conſidering their mutual relation or connection with one or more others, there is an act of reaſoning; and the term is ſtrictly applicable wherever one truth is inferred from another. In a variety of inſtances it is difficult to ſay whether a judgment is formed by any proceſs of reaſoning or ſimply by intuition; but it is clear, that a variety of truths, which are intuitively evident to the cultivated mind, require diſtinct proceſſes of judging in others. And on the other hand, that truths appear intuitively evident, which have in reality been the ſubject of previous examination, but by familiarity are become ſo aſſociated with the feeling of belief, that it is difficult to ſuppoſe they have ever been otherwiſe.

We ſhall here notice one other claſs of the operations of the underſtanding, which may with propriety be called *inveſtigation*, that by which truth is perceived and diſcovered. The exerciſes of the underſtanding, when in the purſuit of truth, continually involve operations of reaſoning; they depend moſt cloſely upon the diſcrimination of the judgment; they imply, what indeed this ſtate always implies, the exerciſe of abſtraction; and yet there is ſomething beyond all this neceſſary. It conſiſts in tracing out the proofs on which any poſition depends, in determining their reſpective weight as evidence in diſcovering the general principles agreeable to which particular phenomena have been produced, or the cauſes operating to produce any known effect and their reſpective influence. Mr. Stewart (Outlines, p. 58.) gives the denomination *invention* to theſe procedures of the underſtanding. "The proceſs of the mind," he ſays, "in diſcovering media of proof for eſtabliſhing the truth of doubtful propoſitions, and alſo the proceſs by which we bring new truths to light, is properly called *invention*."

We prefer our own appellation, becauſe it is a leſs ſuſpicious one. The term *invention* ſeems miſapplied in reference to the diſcovery of truth; though we willingly admit, that in various proceſſes of inveſtigation, the invention is frequently exerciſed. We do not recollect, that this philoſopher has furniſhed, in his writings, any clue to theſe proceſſes of the underſtanding; and we are inclined to think, that no one has thrown ſo much light upon the actual procedures of the mind in the diſcovery or aſcertainment of truth, as Hartley has in his 76th, 77th, and 78th propoſitions, particularly the 77th. It contains a fund of profound and important obſervations, the value of which cannot be affected by their having among them a few opinions which muſt be regarded as mere ſpeculations; they are the ſpeculations of a maſter mind, intent upon inquiries of an intereſting nature; and contemplating with pleaſure, what he conſidered as important views reſpecting the attainment of that, which indiſputably was with him the firſt object,—truth. One ſuch ſentence has furniſhed Mr. Stewart, on more than one occaſion, with an appeal to common ſenſe againſt Hartley, which appears to have had great ſhare in finally cloſing his own mind againſt the reception of the leading principles of Hartley's Philoſophy, and even againſt the admiſſion of the real importance and profundity of many of his obſervations, which, we ſhould have imagined, muſt have ſecured that great philoſopher the reſpect of every candid inveſtigator into the laws of the mind, whatever be the ſyſtem he has adopted.

Our readers muſt here allow us to digreſs ſomewhat from our main object, to conſider Mr. Stewart's modes of demoliſhing the Hartleyan philoſophy. In his account of the life and writings of Dr. Reid, we perceive indications of the low eſtimation in which he holds the inveſtigations of Hartley. He there claſſes him with Darwin; and throws out various inſinuations againſt him as a mere theoriſt, who, and ſome others, form an exception to the progreſs of the philoſophical world towards the inductive plan of ſtudying human nature. And he ſpeaks of the "*reveries* of Hartley," which, he ſays, have for a while been called from oblivion by the chemical diſcoveries which have immortalized the name of Prieſtley. We think it was profeſſor Robiſon who ſpoke of Hartley as an *idiot*. Mr. Stewart is nearer the truth. There certainly are in Hartley's works ſome ſpeculations, which may be termed reveries of a philoſophical underſtanding, if we chooſe ſo to repreſent them; and he has blended with his grand principles, a theory reſpecting the phyſical cauſes of thought, which, however ingenious and plauſible, affords but little inſight into the phenomena of thought. In a few inſtances he has expreſſed himſelf with incorrectneſs reſpecting ideas, ſo as to appear to refer them to the material organization, when his ſyſtem clearly referred only the occaſions of thought to matter, and the ideas themſelves to the ſentient principle in man; and he has ſometimes uſed the term to denote *ſtates* of mind or even *operations* of mind. We are of opinion, too, that he has in a ſmall number of caſes carried too far the application of the grand law of aſſociation; and, in particular, that he has too much neglected the re-action of the ſentient principle on the mental organs; or perhaps more correctly, the effects produced on the operations of the aſſociative power by the exerciſe of the underſtanding. Though in his leading inveſtigations we profeſs ourſelves his humble followers, becauſe we deem them alike important and juſt, we are not inſenſible of the faults of his great work, and are ready to leave him wherever we ſee reaſon to believe that he leaves human nature. But after every detraction from the merits of his work, which the moſt rigid *juſtice* can make, we regard it as a treaſure of comprehenſive and judicious obſervations and accurate and profound inveſtigations reſpecting the phenomena of the human mind, of unrivalled excellence and importance.

Dr. Johnſon, we are told, valued this work next to the bible, and the writer of this article does the ſame. Its value cannot be fully appreciated except making it the guide in obſervation and reflection on human nature, ſimilar to thoſe which led the author to his concluſion reſpecting moral and mental truth; and our own admiration of it ariſes in proportion to our acquaintance with the proceſſes of thought and the phenomena of affection.

"The authors (ſays Mr. Stewart, § 81.) who form the moſt conſpicuous exceptions to this gradual progreſs, conſiſt chiefly of men, whoſe errors may be eaſily accounted for, by the prejudices connected with their circumſcribed habits of obſervation and inquiry;—of phyſiologiſts, accuſtomed to attend to that part alone of the human frame, which the knife of the anatomiſt can lay open; or of chemiſts who enter on the analyſis of thought, freſh from the decompoſitions of the laboratory; carrying into the theory of mind itſelf (what Bacon expreſsly calls) 'the ſmoke and tarniſh of the furnace'." If this obſervation had not been ſo ſituated that it muſt be inevitably referred to Hartley in connection with Prieſtley and Darwin, we ſhould have believed that a philoſopher who evinces ſo much good ſenſe and general candour as Mr. Stewart, could not have involved him in this cenſure. Such particulars of his life are before the public as ſhould have prevented it altogether. His education obviouſly was of that regular judicious kind, which was calculated to give a due ſcope to the exerciſe of the underſtanding; and his great talents very early diſplayed themſelves. He was originally intended for the church, and he proceeded for ſome time in his thoughts and ſtudies towards that object, but was prevented from entering upon it by ſome conſcientious ſcruples; and he then devoted himſelf to the medical profeſſion, in which he made himſelf eminent by his ſkill, integrity, and benevolence. He had been from his youth, and ſtill continued, in the purſuit of thoſe branches of knowledge which peculiarly tend to expand and ſtrengthen the underſtanding; and lived in intimacy with ſome of the moſt learned and intelligent men of his age, ſuch as Law, (afterwards biſhop of Carliſle,) Butler, Warburton, Jortin, Hales, Smith, &c. There was in fact every thing to bring his mind into that ſtate in which the perception of truth is moſt eaſy; for with his habits of patient perſevering inveſtigation and obſervation, correct and penetrating underſtanding, an extenſive acquaintance with the moſt important branches of human knowledge, he united thoſe moral qualities, the want of which has more than any thing tended to cloud the mind, and prevent the intellectual eye from penetrating into moral truth. His thoughts were not immerſed in worldly purſuits or contentions, and therefore his life was not eventful or turbulent, but placid and undiſturbed by paſſion or violent ambition. He was free from ſenſuality, intemperance, pride, oſtentation, envy, and every other branch of ſordid ſelf-intereſt; and the principles which were taught in his works were the invariable guides of his life and conduct.

At the early age of twenty-five his great work was regularly undertaken; but for ſome years before that period his mind had been directed to enquiries and obſervations, which formed the germ of his ſubſequent inveſtigations. His work was not completed till about fourteen years afterwards; and after it had lain by for two or three years more, it was publiſhed in 1749, when he was little more than forty-three years of age. His mind was for many years conſtantly and intently engaged upon the object; but after the completion of it he did nothing more than keep up a general and vigilant attention to it, to enable him to make any alterations or modifications which might occur from his own reflections or the ſuggeſtions of his friends. It does not appear, however, that any thing material had occurred to him; for at his death, in 1757, he left behind him no additional papers or remarks whatever. He did not expect that his work would meet with any general or immediate reception in the philoſophical world, or even that it would be much read or underſtood; but at the ſame time he did entertain an expectation, that at ſome diſtant period his philoſophical principles would be adopted. Preſent appearances favour his opinion. About two or three years ago, a *fifth* edition was publiſhed of the original work; and beſides them, two editions have been ſold of Dr. Prieſtley's abridgment.

We have been led to this account of Hartley, to aſſiſt in counteracting the effect of Mr. Stewart's contemptuous expreſſions, and (one muſt ſay) unfounded ſtatements and inſinuations reſpecting that great philoſopher. We have been repeatedly reminded by them of thoſe excellent obſervations on *candour in controverſy*, which are to be found in Mr. Stewart's Outlines, p. 240, two or three ſentences of which we will quote, and leave to the reader's own reflection. "He who is conſcious of his own inventive powers, and whoſe great object is to add to the ſtock of human knowledge, will reject unwillingly any plauſible doctrine, till after the moſt ſevere examination; and will ſeparate with patience and temper the truths it contains, from the errors that are blended with them. No opinion can be more groundleſs, than that a captious and diſputatious temper is a mark of acuteneſs. On the contrary, a ſound and manly underſtanding is in no inſtance more ſtrongly diſplayed, than in a quick perception of important truths, when imperfectly ſtated and blended with error;—a perception which may not be ſufficient to ſatiſfy the judgment completely at the time, or at leaſt to enable it to obviate the difficulties of others, but which is ſufficient to prevent it from a haſty rejection of the whole from the obvious defects of ſome of the parts."

In a ſubſequent part of the account of Reid, Mr. Stewart quotes the paſſage from Hartley, which we referred to at the commencement of theſe remarks. We will quote it ourſelves, and then ſhew in what manner it has been quoted by Mr. Stewart. After ſome highly important obſervations reſpecting the nature of evidence, and on the conduct of the underſtanding in the inveſtigation of truth, Hartley continues, p. 350, "Theſe ſpeculations may ſeem uncouth to thoſe who are not converſant in mathematical inquiries; but to me they appear to caſt light and evidence upon the methods of purſuing knowledge in other matters, to ſharpen the natural ſagacity, and to furniſh loci for invention. *It appears alſo not impoſſible* that future generations ſhould put all kinds of evidences and inquiries into mathematical forms, and *as it were* reduce Ariſtotle's ten categories, and biſhop Wilkins's forty ſumma genera, to the head of quantity alone, ſo as to make mathematics, and logic, natural hiſtory, and civil hiſtory, natural philoſophy, and philoſophy of all other kinds, coincide omni ex parté." The parts which we have put in italics are of conſequence. The firſt ſhews that the author did not indulge any *very* ſanguine expectations on this ſubject, and meant that it ſhould be regarded merely as, in his eſtimation, judging from what he ſaw of the analogy *between different methods of ſearching after truth*, a thing not impoſſible; and the expreſſion *as it were* clearly qualifies it. Both theſe in Mr. Stewart's quotations are omitted. In the account of Dr. Reid, p. 93, after having ſpoken of the undue love of ſimplicity which has been directed to the proceſſes of the underſtanding, and adduced a ſpecimen from Hume, he proceeds, "and Dr. Hartley, with a ſtill more ſanguine imagination, looked forward to an era, 'when future generations ſhall put all kinds of evidences and enquiries into mathematical forms; reducing Ariſtotle's ten categories'," &c. We ſhould have expected that this indulgence of the imagination (if ſuch it muſt be termed) would have been pardoned by every one, who had ever experienced the enthuſiaſm ariſing from the belief that he had aſcertained important principles of inveſtigation, and had traced out the connection exiſting among the branches of human knowledge: or by any one converſant with the writings of philoſophers on ſubjects connected with the mental inveſtigation; for ſuch ſpeculations are not unfrequently to be met with among the moſt judicious of them. One we have juſt noticed in the writings of Condillac, much reſembling Hartley. (Cours d' Etude, de l'Art de Raiſonner, ch. xi.) "Si nous pouvons découvrir toutes les vérités poſſibles, & nous en aſſurer d'une manière évidente, nous ferions une ſuite de propoſitions identiques, égales á la ſuite des vérités; et *par conſéquent nous verrions toutes les vérités ſe reduire à une ſeule.*"

Hartley's conjecture is obviouſly an inſulated one; in no way neceſſary to, or illuſtrative of, his reaſoning, in the propoſition in which it ſtands. If it had been left out, it would never have been miſſed; and we think it highly unjuſt to repreſent it, as Mr. Stewart appears to us to have done, as a kind of criterion of the value of his obſervations. In the laſt work of the northern philoſopher, p. 15, he quotes the following paſſage from De Gerando. "The philoſophy of mind has its alchemiſts alſo; men whoſe ſtudies are directed to the purſuits of one ſingle principle, into which the whole ſcience may be reſolved; and who flatter themſelves with the hope of diſcovering the grand ſecret by which the pure gold of truth may be produced at pleaſure." Mr. Stewart then adds, "Among theſe alchemiſts in the ſcience of mind, the firſt place is undoubtedly due to Dr. Hartley, who not only attempts to account for all the phenomena of human nature, from the ſingle principle of *aſſociation* combined with the *hypothetical* aſſumption of an inviſible fluid or *ether* producing vibrations in the medullary ſubſtance of the brain and nerves; but indulges his imagination in anticipating an era, "when future generations ſhall put all kinds of evidence and inquiries into mathematical forms; reducing Ariſtotle's ten categories, &c." as before. The reader will obſerve the ſame unaccountable inaccuracy in the quotation as before, which clearly gives it a different complexion from what it has in the Obſervations. After citing this paſſage, Mr. Stewart adds, "*If I had never read another ſentence of this author, I ſhould have required no farther evidence* of the unſoundneſs of his underſtanding." On this ſummary argument we ſhall make only one remark. If, after reading Mr. Stewart's Elements, we were to ſay, he teaches us that when a perſon is moſt intently engroſſed in ſome intereſting and profound inveſtigation, ſo that his attention would not be diſtracted even by a ſudden and violent noiſe, he is at the ſame time *conſcious* of all the impreſſions which external objects make upon the organs of ſenſe, he is at the ſame time *willing* all thoſe little motions of his limbs, to which he has accuſtomed himſelf while thus engaged, we require no further evidence of the unſoundneſs of his underſtanding, we ſhould do him great injuſtice, and ourſelves great injury. Mr. Stewart proceeds; "It is however on ſuch raſh and unwarranted aſſertions as this, combined with the ſuppoſed comprehenſiveneſs of his metaphyſical views, that the peculiar merits of Hartley ſeem now to be chiefly reſted by the more enlightened of his admirers. Moſt of theſe, at leaſt whom I have happened to converſe with, have ſpoken of his phyſiological doctrines as but of little value compared with the wonders which he has acccompliſhed by a ſkilful uſe of the aſſociating principle." The grounds of *our* admiration of Hartley we have already ſtated; and we can only ſay, that our acquaintance with Hartleyans, leads us to conclude, that we are not ſingular in that reſpect.

But Mr. Stewart advances, p. 17, one ſtatement which is regarded by ſome of his followers as a total overthrow of the Hartleyan philoſophy. The generalizations which he has attempted are merely *verbal;* deriving whatever ſpeciouſneſs they may poſſeſs, from the unprecedented latitude given to the meaning of common terms. After telling us, for example, that "all our internal feelings, excepting our ſenſations, may be called *ideas*," and giving to the word *aſſociation* a correſponding vagueneſs in its import, he ſeems to have flattered himſelf that he had reſolved into one ſingle law, all the various phenomena, both intellectual and moral, of the human mind." On this moſt extraordinary ſtatement we muſt offer a few remarks.

(1) There is no evidence to prove that Hartley ever flattered himſelf with having reſolved into one ſingle law all the various phenomena both intellectual and moral of the human mind. In his Preface, to which we refer our readers, he ſtates his views as to what he had done. "I have here put together all my ſeparate papers on theſe ſubjects, digeſting them in ſuch order as they ſeemed naturally to ſuggeſt; and adding ſuch things as were neceſſary to make the whole appear there complete and ſyſtematical.

"I think, however, that I cannot be called a ſyſtem-maker, ſince I did not firſt form a ſyſtem and then ſuit the facts to it, but was carried on by a train of thoughts from one thing to another, frequently without any expreſs deſign, or even any previous ſuſpicion of the conſequences that might ariſe. If the reader will be ſo favourable to me as to expect nothing more than hints and conjectures in difficult and obſcure matters, and a ſhort detail of the principal reaſons and evidences of thoſe that are clear, I hope he will not be much diſappointed. However, be this as it will, I have, in one part or other of theſe papers, alleged all that I know material in ſupport of my ſyſtem; and therefore am now deſirous to recommend it to the conſideration of others. I have tried to reconcile ſuch inconſiſtencies real or apparent, and to cut off ſuch repetitions and redundancies, as have ariſen from my writing the ſeparate parts of this work at different times and in different ſituations of mind. But I have ſtill need of great indulgence from the reader on theſe and other accounts." Pref. p. 14.

We have no doubt whatever, that he has furniſhed the grand clue to the analyſis of all the mental pleaſures and pains, and of the notions of the underſtanding, ſo as to prove ſenſations to be the elements of the whole, (though, as we have before obſerved, he does not appear to have attended explicitly enough to the modifications of them cauſed by the intentional operation of the underſtanding); but he never repreſented himſelf as having himſelf accompliſhed this analyſis. He does not even go ſo far as Mr. Stewart repreſents him by an error in another of his quotations, p. 128. In another paſſage he expreſſes his hopes, that "by purſuing and perfecting the doctrine of aſſociation *he* may ſome time or other be enabled to analyſe all that vaſt variety of complex ideas, which paſs under the name of ideas of reflection and intellectual ideas, into their ſimple compounding parts; that is, into the ſimple ideas of ſenſation of which they conſiſt." Hartley uſes the pronoun *we;* and it is clear, (both from the nature of the paſſage, and his almoſt uniform uſe of the ſingular pronoun,) that he did not mean *himſelf*, but inquirers following the ſame track. It is really melancholy to obſerve how much Mr. Stewart has laboured to excite prepoſſeſſions againſt the Hartleyan ſyſtem.

(2) We are not aware that Hartley himſelf ever thought, that the ſingle principle of aſſociation, united with the power of ſenſation, was *every thing* that is neceſſary to account for all the phenomena of the underſtanding. He certainly endeavours to ſhew, that the aſſociative principle has a wide and important influence in the operations of the underſtanding, furniſhing it with all the materials for its exerciſe, except mere ſenſations, and being, in a variety of caſes, concerned in thoſe operations; but he never repreſents the *underſtanding* itſelf as nothing more than *aſſociation*. The very firſt clauſe of his definition of the underſtanding, that it is "the faculty by which we *contemplate* mere ſenſations and ideas," is ſufficient (unleſs there were the moſt deciſive evidence to the contrary) to ſhew that he did not conſider them as the ſame. The fact is, Hartley's Obſervations, as might be expected from his own account of them, conſtitute much leſs a ſyſtem than is generally ſuppoſed; and there is a great variety of important obſervations reſpecting the proceſſes of the mind, which do not appear to have been deſigned in any way to ſupport the doctrine of aſſociations, though they grow out of his inveſtigations on the ſubject. We do readily admit, however, that if Mr. Stewart derived his ideas of Hartley merely from the ſtatements of ſome of his followers, he would not have been without juſtification.

(3) Hartley is charged with employing the word *aſſociation* with a vague import. This is the firſt time, we ſuppoſe, that the charge has been publicly made; and we deem it altogether unfounded. We do not recollect that Hartley has any where actually defined the term; but we take for granted that it is impoſſible for any one to attend to his tenth and twelfth propoſitions, without underſtanding the import in which he uniformly uſes it without, we believe, *any* real variation; and we preſume it will be found to be that in which we have uniformly employed it in this article, in reference to the principle or law of aſſociation in its two operations, connections and combinations. (See Div. I. IV.) That Hartley has carried the application of the term beyond Mr. Locke's uſe of it, is only that extenſion of a term which ariſes from increaſed acquaintance with the phenomena to which it is applicable. If Mr. Stewart can point out any inſtance in which Hartley has employed the term where it is inconſiſtent with his own uſe of it in theſe two fundamental propoſitions, there he has ſome room to cenſure. "I ſhall not enquire at preſent," ſays Mr. Stewart (Elements, 4to. p. 134.) "into the proper Engliſh meaning of the words *conception* and *imagination*. In a ſtudy ſuch as this, ſo far removed from the common purpoſes of ſpeech, ſome latitude may perhaps be allowed in the uſe of words; provided only we define accurately thoſe we employ, and adhere to our own definitions." Hartley employs his terms with a well defined real meaning, in no reſpect vague nor more comprehenſive than his phenomena required. If he have in any inſtance claſſed among the phenomena of aſſociation any mental operation which does not belong to it, it is a fault in his philoſophy, not in his term. Not leſs unfounded is Mr. Stewart's cenſure on Hartley, for giving the appellation *ideas* to all our internal feelings, excepting our ſenſations. Other philoſophers have included in the term *ſenſations* as well, or, which is much worſe, have termed all our internal feelings *ſenſations*. The queſtion ſtill is, has Hartley adhered to his own definitions; and we think that there are exceedingly few inſtances to the contrary, and theſe few do in no way affect the ſoundneſs of his inveſtigations.

(4) But we are told that *his generalizations are merely verbal*, deriving whatever ſpeciouſneſs they may poſſeſs from the unprecedented latitude given to the meaning of common terms. We have already intimated that the fundamental principle of Dr. Reid's philoſophy (if it be more than nominal) is ſo completely in oppoſition to the Hartleyan doctrine of aſſociation, that they cannot be received together. And the influence of that principle is to us clear in the ſingular ſtatement which we have juſt quoted: though Hartley clearly uſes the word idea without any reference to the *phantaſtical* theory. We will, for a moment, ſuppoſe that he had not uſed it at all, that he had done as we have ſometimes done in this article, uſed the term *notions* in reference to the underſtanding, and *feelings* in reference to the paſſions and affections, &c.: ſo as to have divided what he includes under *ideas*, into *notions* and *feelings*. Now we appeal to the candid inquirer, whether, if he had ſucceeded in ſhewing how the aſſociative power operates upon the relics of ſenſations, forming them into various groups and combinations, ſo as to produce complex notions and feelings; and how each ſenſe contributes the elements for this operation of the aſſociative powers, and what elements from each ſenſe enter into the more refined notions and feelings; and in tracing the great influence which aſſociation has in various proceſſes of the underſtanding, and in the operations referred to the head of memory and imagination; and laſtly, in pointing out how the feelings, (the mental pleaſures and pains,) are formed from the more or leſs complex combination of the elements furniſhed by the ſenſible pleaſures and pains; whether, if he had ſucceeded in doing all this, the inveſtigation could be juſtly termed *a mere* VERBAL *generalization*, deriving whatever *ſpeciouſneſs* it may poſſeſs from the unprecedented latitude given to the meaning of common terms? We maintain that he has eminently ſucceeded in all this; and that he has done more towards *explaining* the moſt important phenomena of thought, of feeling, and of language, than any other philoſopher ancient or modern, or, we may venture to ſay, even than all put together, whoſe inveſtigations have been completely independent of his.

Mr. Stewart may think (and his implicit admirers may think alſo) that he has demoliſhed the whole fabric of the Hartleyan philoſophy at a blow; but in our apprehenſion the only way to effect it, is by ſhewing either that Hartley has given an erroneous view of our mental phenomena, or that he erred in applying a univerſally acknowledged principle to the explanation of them. We are ſatisfied that his ſyſtem has been ſubjected to much longer and cloſer examination than Mr. Stewart ſeems to have given it, without any reſult unfavourable to its *general* truth and importance; and that as long as human nature continues as it is, it muſt retain its truth and its fundamental importance.

We are the more confirmed in the concluſion that Mr. Stewart has not yet given the proper Hartleyan theory a due examination by the following paſſage, p. 129, "His ultimate aim, in this part of it, is preciſely the ſame with that of the ſchoolmen, when they attempted to explain, by the hypotheſis of certain *internal ſenſes*, how the *ſenſible ſpecies*, received from external objects, are ſo refined and ſpiritualized as to become, firſt, objects of memory and imagination; and, at laſt, objects of pure intellection. Such reveries are certainly not entitled to a ſerious examination in the preſent age." The writer of this article may obſerve, on the ſimilarity between the Hartleyan doctrine and that of the ſchoolmen, that it had previouſly ſtruck his own mind, and convinced him that their opinions, though mixed with error, were founded on actual obſervation on what paſſed within them. Their error lay in their hypotheſis reſpecting the *nature* of ſenſations. Fanciful, however, as this hypotheſis is, it is in our apprehenſion decidedly preferable to that which ſuppoſes that the mind thinks without any object of thought.

As to the originality of Hartley's principles, it is to us of little conſequence, provided they are true; but it cannot be doubted by thoſe who were acquainted with Hartley's character, that he has told us all that led him to his principles. Mr. Stewart (p. xx.) refers to a paſſage from Hume, which he regards as anticipating Hartley's concluſions, by repreſenting "the principles of union and coheſion among our ſimple ideas as a kind of *attraction*, of as univerſal application in the mental world as in the natural." But the works of Hartley manifeſt no acquaintance with the Treatiſe on Human Nature; and if he had ſeen it, though he might have derived from it ſome valuable extenſions of the connective exerciſe of the aſſociative power, the particular expreſſion which Mr. Stewart quotes could have afforded no aid to him reſpecting the compoſition of ideas. Mr. Hume, however, appears to have had a glimpſe of the truth reſpecting the formation of the moſt complex ideas from the ſimple elements of ſenſations. Mr. Stewart alſo quotes a paſſage from Smith's Harmonics, which clearly implies that he had ſome notions ſimilar to Hartley's hypotheſis of vibrations; and obſerves that the work was printed in 1749, but that the preface is dated 1748. Hartley's work was finiſhed a conſiderable time before; and when it is recollected that Smith and Hartley were intimately acquainted with each other, it is at leaſt probable that Smith's mind was directed to the ſubject by the inveſtigations of Hartley, and that he indirectly refers to them. We ſhould not have entered upon the ſubject of this paſſage, but from a "wonderful coincidence," noticed by Mr. Stewart, (p. 130.) "between Hartley's theory and that of Condillac concerning *the tranſformation of ſenſations into ideas.* Condillac's earlieſt work, which was publiſhed in 1746, three years before Hartley's Obſervations on Man, is entitled Eſſai ſur l'Origine des Connoiſſances. *Ouvrage ou l'on reduit à un ſeul principe toute ce qui concerne l'entendement humain.* This *ſeul principe*," adds Mr. Stewart, "is preciſely the *aſſociation of ideas*;" and he quotes an expreſſion from the preface, which, inſulated, gives ſome countenance to the opinion. But thoſe who know that in that work (i. 2. § 3.) he ſpeaks of the aſſociation of ideas, (*le liaiſon des idées*,) as having no other cauſe than the attention we have given them when preſented together, and that he traces, as we have elſewhere ſtated, every thing to *ſenſation*, muſt feel convinced that Mr. Stewart is here alſo in an error. We muſt mention, however, that he expreſsly diſclaims all inſinuation of the ſuſpicion of plagiariſm; but his mode of ſtatement will lead others to entertain it: and we therefore farther obſerve, that we have no reaſon to ſuppoſe that Condillac's work was ſoon known in England; that at any rate, Hartley's work was completed two or three years before its publication in 1749; and that the inveſtigations of Condillac are altogether of ſo different a character from thoſe of Hartley, that we doubt whether the Engliſh philoſopher could have derived any material aid from them in his reſearches. In ſaying this, we by no means wiſh to ſpeak with diſreſpect of Condillac's works, of which, as far as our acquaintance with them extends, we have been led to think highly, from the good ſenſe and perſpicuity which runs through the whole. Where he theoriſes, we often leave him; where he gives us the reſult of actual attention to the operations of the mind, his obſervations generally are juſt and important.

Theſe remarks have expanded far beyond our original intention, and we ſhould much ſooner have brought them to a cloſe, if the ſtatements which have led to them had proceeded from a writer of leſs real eminence than Mr. Stewart. Though not to be placed upon a par with ſeveral portions of his Elements, his Philoſophical Eſſays are in many reſpects valuable, and generally intereſting. We had not the opportunity of conſulting this work, till by far the greateſt part of this article was prepared for the preſs, or we ſhould probably have made ſome uſe of it in a way more grateful to our feelings than we have now done. The reader will find in that work ſome very juſt animadverſions on Horne Tooke's principle, that the import of a word is to be ſought in its origin; and on other points connected with language, Mr. Stewart has advanced various judicious obſervations, which, however, muſt in general be familiar to thoſe who have been accuſtomed to apply the principles of Hartley to the phenomena of language. And the Hartleyan can ſcarcely fail to feel aſtoniſhment, when he ſees Mr. Stewart ſtating (p. 158.), in unqualified terms: "Many authors have ſpoken of the wonderful *mechaniſm of ſpeech*; but none has hitherto attended to the far more wonderful mechaniſm which it puts into action behind the ſcene." He cannot but wonder that Mr. Stewart ſhould have forgotten the conciſe, yet moſt comprehenſive and profound obſervations of Hartley (ſee VIII. 3.); and the reader of Condillac will be compelled to ſuppoſe that the philoſopher's memory was as treacherous on this point, as when he repreſented his views of *attention* as original, though the leading obſervations he makes on the ſubject are diſtinctly ſtated at large, in the Eſſai ſur l'Origine, part 1. ſect. ii. ch. 2, &c.; and in different parts of the Art de Penſer in the Cours d'Etude.

We ſhould feel great ſatisfaction, if circumſtances permitted us to bring together the valuable obſervations on the nature of demonſtrative reaſoning, and on the proceſſes of the mind in reaſoning, which are to be found in different parts of Condillac's work; and in offering ſuch remarks on them as might ſerve to illuſtrate and extend them: but it is not practicable; and we ſhall merely recommend his work to the attentive ſtudy of thoſe who wiſh to purſue this branch of mental ſcience. The remainder of our article we ſhall employ in laying before our readers a few thoughts on ſome other proceſſes of the underſtanding, and a view of the principles of Hartley reſpecting the leading phenomena of the underſtanding, under the head of words, and the ideas aſſociated with them; and the nature of aſſent. In this view, though we ſhall generally uſe his own expreſſions, we ſhall occaſionally make ſuch alterations in them as will beſt adapt them to our object; and we therefore hope that no one will impute any ſuppoſed inaccuracy in our language to Hartley himſelf, without examining the original.

2. *Of Attention, Abſtraction, and Generalization.* (See theſe ſeveral articles.)—By inveſtigating the phenomena of mind, when a connection is already formed between volition and certain mental ſtates or operations, we are repeatedly led to conſider theſe ſtates or operations, however paſſive the mind might originally have been, as totally and in their own nature voluntary. This is remarkably the caſe with that ſtate of mind which is called attention. That this is in young children entirely involuntary, is certain; and thoſe who are endeavouring to form their minds to habits of ſtudy and reflection, know from conſtant experience that they have it little under their command. So far from having an original power of excluding vivid ideas or ſenſations, to devote the attention to thoſe which, though moſt certainly demanding it, do not make the ſame lively impreſſion upon the mind; it is a habit which requires ſtrict and ſevere diſcipline to produce it; it is a poſſeſſion honourable and invaluable; but, like every other of importance, not the acquiſition of the moment, but of a long continued courſe of rigorous, and in many caſes of painful, exertion. And when the habit of voluntary attention is formed, that is, when we can produce the ſtate of mind called attention by a determination of the will, how much may fairly be attributed to the nature of the object, which, though perhaps at firſt unintereſting, becomes pleaſing and impreſſive, and thus produces that ſtate by the original laws of our conſtitution. It even appears probable, that the perſon who has formed ſuch habits of attention to a particular ſcience, as to be able to give it his undivided attention, would be almoſt as incapable of directing it to frivolous objects, or to a ſcience to which habitual attention, or the nature of the ſubject, does not give any charms, as he was when he firſt entered upon his purſuits. In a word, when we take into conſideration that our attention is never undivided, except to thoſe things which are calculated to engage it, either by the original agreeableneſs of their nature, or that which they acquire in proportion as our habits become confirmed, and that the aſſociative faculty may, and in many inſtances does, form a connection between the mental ſtates we call attention and volition, we have probably then ſufficient data to account for the phenomena of attention, without calling in, with Mr. Stewart, the aid of a new faculty. See INTELLECTUAL *Education*, IV.

Abſtraction is defined by Mr. Stewart, the faculty by which the mind ſeparates the combinations which are preſented to it. This definition, ſo far as it goes, appears to be very correct; but if the proceſſes of generalization are intended to be contained in it, it is by no means ſufficient, as will immediately appear from the ſlighteſt conſideration of that mental proceſs. Abſtraction, in this acceptation of the term, is indeed eſſentially ſubſervient to every act of claſſification, but by no means comprehends that act in the number of its functions. Though we cannot agree with Mr. Stewart in all his ſtatements, in his chapter on attention, we muſt in one poſition which he advances, (if by attention he means the full devotement of the obſervation or reflection to an object,) *viz.* that the mind "cannot attend at one and the ſame inſtant to objects which we can attend to ſeparately." And if this be the caſe, what is abſtraction but attention directed to particular objects, owing either to ſomething vivid in the ſenſation they excite, or to the frequency of their recurrence; in fact, ſubject to all the laws of attention, perfectly involuntary in early life, and afterwards becoming to a certain degree voluntary, by means of the acquired power of the will.

In ſpeaking of the proceſs of generalization, ſome obſervations will apply to the proceſs of abſtraction ſeparately conſidered. (See alſo INTELLECTUAL *Education*, V, VI.) We ſhall, therefore, proceed to conſider the formation of general or abſtract notions; a proceſs in which the mind is moſt uſually paſſive; which is capable of ſatisfactory explanation upon the principles of the aſſociative power, and cannot (as we conceive) be explained without it.

Senſible objects, and particularly thoſe of ſight, are undoubtedly the firſt which exerciſe the power of abſtraction, or ſeparate attention; and here the proceſs is plain. The object makes its appropriate impreſſion upon the organs of ſenſe, and when withdrawn leaves in the mind an idea. Another ſenſation is received from an object bearing ſtrong features of ſimilarity to the former; by the laws of aſſociation, it calls up the idea before produced, and becomes aſſociated with it. Other ſimilar objects are preſented, and the features in which they agree being the moſt frequently called up, engage moſt the attention of the mind, and thus becoming, in ſome degree, ſeparate from the objects which originally were connected with them, conſtitute the abſtract idea. The readineſs with which theſe circumſtances of reſemblance recall the idea or *conception* of the individuals from which they were abſtracted, depends upon the habits of the individual, and the number of objects from which the abſtract notion was formed. If we had ſeen but two or three ſheep, it is probable that the circumſtances of reſemblance would be ſo connected in our minds with the individuals, that one or more of them would be conſtantly called up when conſidering the circumſtances of reſemblance; but if the number be much greater, that is, if the circumſtances of reſemblance have been frequently in the mind, and particular individuals much leſs frequently, the notion of theſe circumſtances of reſemblance becomes ſomewhat disjointed from the objects by which it was formed. And though it is probably impoſſible to have a general notion of any claſs of objects merely ſenſible, without the idea of an individual being preſent in the mind; yet from the cauſes we have mentioned, the general features of reſemblance not being particularly connected with any individual, thoſe features only are ſtrong and vivid, and call the attention of the mind, while all the other circumſtances of diſſimilarity have little effect upon it, and do not attract its attention.

The procedure of the mind appears to be exactly the ſame, though leſs obvious, and uſually more difficult of analyſis, when the general idea is more remote from ſenſation, when in fact the notions of the quality, or qualities even in the individual, may be very complex, and this in proportion as it is more intellectual and refined. In the former claſs of general notions, and even in ſome inſtances of the preſent, where the quality is definite and obvious, it is probable that language would not be requiſite. For the abſtraction, ſo far as it is involuntary, is ſolely the effect of the frequent recurrence of ſome particular qualities with which they are occaſionally combined. But thoſe abſtract ideas, in which the circumſtances of reſemblance between the compoſing ideas are not very obvious or very diſtinct, either would not have been formed at all by the bulk of mankind, or at leaſt would have been very confuſed. We can go very far with thoſe who contend that general ideas would not exiſt in the mind without the medium of language ; but that they could not from any deficiency of mental capacity to form them, does by no means appear certain. The ſame faculties which now produce them, might have produced them without the powers of *communication;* and there appears no reaſon why the deaf and dumb child may not form a general idea of men, or horſes, or fire, or any object of a ſimilar kind, as well as if capable of annexing terms to the objects of perception.

It can be no objection to this account of the procedure of the mind in generalization, that we are able to form claſſifications of objects from circumſtances which are not calculated to ſtrike the mind of the common obſerver. When left to itſelf, before habits of reflection are formed, the mind will be neceſſarily attracted by the moſt prominent *ſenſible* features of reſemblance, and the objects would become aſſociated by that bond of union ; and in very many caſes this would differ in different individuals ; but it is indubitable that we may acquire ſuch a command over our aſſociations, that we may be able to combine objects in our minds which have no cuſtomary tendency to ſuch combination, by a more factitious connection ; and that by the requiſite culture of the mind, certain connecting principles are either diſcovered or confirmed, which could not have been of any force in a more early period of mental progreſs. In the firſt of theſe caſes the aſſociation is voluntary, and if there were not ſome apparent benefit reſulting from it, or ſome circumſtances calculated to produce it in the mind, it would ſoon give place to a more natural union. So far, however, as any general idea is formed, its production is accompliſhed agreeably to the principles we have ſtated. In the ſecond the operation of the mind is moſt uſually involuntary ; when voluntary, the obſervations on the firſt ceaſe to apply.

It is obvious that the fewer and more diſtinct the circumſtances which are comprehended in the general notion of a claſs of objects, the more clear and definite will be the general notion itſelf. And it appears worthy of notice, and tends to confirm the account given of the formation of our general ideas, at leaſt thoſe of viſible objects, that the greater the variety ſubſiſting among the individuals or ſubordinate ſpecies comprehended under the general idea, (or, more properly, which poſſeſs that quality, or combination of qualities, which compoſe the general idea,) the leſs attention, other things being equal, do we pay to the peculiarities of the individual. Thus the general notion of a triangle is merely that of a figure having three ſides, formed from the relics of impreſſions derived from every triangle we have ſeen ; and the varieties of triangles are innumerable : and agreeably to the opinion already mentioned, though we certainly cannot form a *conception* of a triangle which ſhall be repreſentative of all others without poſſeſſing the peculiarities which conſtitute it an individual, yet the circumſtances of its having three ſides is ſo definite, and our attention is ſo thoroughly confined to it, that the peculiarities of the triangle are not unfrequently totally out of conſideration ; and if, owing to ſome particular aſſociations, the triangle on ſuch occaſions were not uſually the ſame, we ſhould afterwards be unable to ſay what kind of a triangle had been in the view of our minds.

To ſtate the fact reſpecting *conception* (which ſee) more generally ; if we attempt to form a conception of any object, it muſt, from the very nature of a conception, be individual, —repreſentative, perhaps, of a numerous claſs, but ſtill poſſeſſing thoſe peculiar features which conſtitute individuality. It may not be improper to ſuggeſt that the want of attention to the difference between a notion and *conception* may have, in ſome meaſure, miſled thoſe philoſophers who have denied the exiſtence of general notions. "The buſineſs of conception," ſays Mr. Stewart, "is to preſent us with an exact tranſcript of what we have felt or perceived ;" and admitting the truth of this, a conception is that tranſcript ſo preſented. We ſhall not enter into the enquiry, whether conception be a diſtinct faculty of the mind; we may, however, ſtate that it appears to us to be nothing different from memory, except as being a branch of that general faculty ; and that a conception differs from an idea, only as ſpecies does from genus ; that in fact without the aid of the aſſociative faculty, and with retention alone, every idea would be merely a conception. For *the recollection of an individual ſenſation, or group of ſenſations, whether ſeldom or frequently received,* is a *conception ;* but when a number of ſenſations poſſeſſing common features, but in others differing, are received into the mind, the ideas they form there by the laws of aſſociation, coaleſce with one another ; thus conſtituting thoſe complex ideas or notions, which never from their nature can be conceptions, but which yet may be diſtinct, and when words are uſed to denote them, the ſubjects of reaſoning.

Almoſt an infinite variety of the ſenſations we receive, are preſented to our view ſo conſtantly connected with others, that however much it may be in the power of the mind to attend to them in a ſeparate ſtate, it is impoſſible to form a conception of them ſeparately : but, on the other hand, there is a conſiderable number of qualities remote from mere ſenſation, belonging to an extenſive range of individual objects, which may be conſidered by the mind ſeparate from thoſe objects, and have internal feelings or complex ideas attached to the terms which denote them. Now we apprehend it is the grand difference between our general notions, when concerned about things merely ſenſible, and thoſe which we might call more purely intellectual, that in the former caſe, the conceptions being uſually clear, and frequently very vivid, are very eaſily brought up by the aſſociative power ; and the circumſtances of diſtinction being few, and merely ſenſible, are, from their very nature, calculated to produce a conception ; and ſo little do we poſſeſs any real abſtractive power, that it is in moſt caſes impoſſible to do this without introducing the conception of the whole object : on the other hand, the circumſtances of diſtinction in the caſe of *intellectual notions* are leſs definite ; they are frequently extremely numerous, and are ſeldom capable of exciting conceptions, and conſequently they do not readily call up any particular individual object to which the general term is applicable. We acknowledge that very much, in theſe latter reſpects, depends upon the peculiar circumſtances of the caſe, or upon the habits of the individual. If a perſon had been remarkably ſtruck with an act of juſtice, or of diſintereſted benevolence, for inſtance, it is probable that, while the vividneſs of the impreſſion laſted, he would never be able to think of thoſe qualities without the particular fact being recalled into the mind ; and if he poſſeſſed a lively imagination, or had been preſent at the performance of it, he would form an immediate conception of the whole ſcene : or if a perſon were not much in habits of ſpeculation, he would univerſally think of ſome example of the action poſſeſſing thoſe qualities. But theſe circumſtances, though they tend to illuſtrate the operation of the aſſociative power, do not in any way militate againſt the general truth of the above remarks.

The remarks we have made on the ſubject of abſtraction or generalization, have been, in a conſiderable degree, ſeparate from any medium of communication ; or at leaſt ſuppoſing it not already formed. If every perſon were left to form his own claſſifications, language, in very many inſtances, would be of little utility ; becauſe the ſame features of reſemblance would not operate in the ſame way upon different individuals. But the proceſs of the mind, when language is formed, is ſomewhat different ; becauſe in this caſe it is reſtrained, and has not the ſame unbounded liberty of forming its aſſociations. The mind of the child is not left to claſſify objects ; but theſe objects are preſented to it already claſſed, owing to the ſame word being uſed to expreſs them, and it is very intereſting to obſerve the efforts of the young mind in finding out ſome features of reſemblance between the objects which had previouſly been preſented to it with the ſame name. The two following facts will explain our meaning ; and perhaps contribute to illuſtrate the ſubject. A boy of about two years and a half old, who was remarkably fond of looking at watches, was ſhewn a hunting watch, and told what it was. He repeatedly looked at both ſides with great attention, and appeared very greatly perplexed. Some features of reſemblance to other watches which he had ſeen muſt have ſtruck him ; but he could not find the *face*, which appeared hitherto to have been his chief criterion. At laſt he put it to his ear ; and perceiving that the ſound was the ſame as in other watches, he was ſatisfied. If he had then left it, the *ticking* would probably have been the only feature of reſemblance which would have ſatisfied him, at leaſt till he had ſeen a watch when down ; but the face was ſhewn him, and he would doubtleſs have that feature of reſemblance fixed ſtill more ſtrongly in his mind than it was before. This fact was noticed ſeveral years ago : the following we have juſt obſerved, and we ſtate it without comment. A child between ſix and ſeven years of age had been told, while looking over the plates in Chandler's Hiſtory of Perſecutions, that *perſecution* means, " putting perſons to death, or doing any other harm to them, becauſe they do not believe the ſame as we do." Some days after, while again looking at the plates, (which have in many inſtances, we doubt not, furniſhed the rudiments of the abhorrence of perſecution and love of religious liberty, ſeldom, however, without adding a tinge of Proteſtant bigotry,) ſhe aſked what perſecution meant. Her father, who had been preſent at the former explanation, expreſſed ſome ſurpriſe at her inattention or forgetfulneſs : ſhe made no reply, but ſome minutes after, ſhe ſaid, " Papa, on the beach at ——— it is ſaid, 'Whoever throws any rubbiſh on the beach, ſhall be *proſecuted* as the law directs." It did not require a father's obſervation to ſee that the defect of memory and attention was merely imaginary, and that the little girl's mind had been puzzled by a *verbal* ſimilarity, where ſhe perceived no ſimilarity in the mode of application. It was more difficult to explain *proſecution ;* but it was attempted, and the circumſtance gave an opportunity of impreſſing the importance of attending to *words*, and obſerving the difference between them when ſpoken or written, or, in more familiar language, learning to *ſpell* well.

We had propoſed to enter at ſome length, in this diviſion, into the conſideration of Mr. Stewart's theory reſpecting the operation of the mind in thoſe actions, external or internal, which were once wholly or in part voluntary. But we are too much limited as to time and room to allow it ; and it is a theory which muſt fall to the ground when the nature of the mind is duly conſidered, and which confeſſedly derives no evidence from memory, and as far as we can ſee, can derive no known juſtification from *conſciouſneſs*. We beg our readers' attention to what we have ſaid on the ſubject in our firſt diviſion, and in other parts of this article, and ſhall here only ſubjoin a few additional facts and obſervations.

The following ſtatements we take as we find them in the Morning Chronicle of Dec. 27, 1813. " Shakſpeare ſays of lady Macbeth, when walking in her ſleep, her eyes are open, but her ſenſe is ſhut. This, it appears, is not always the caſe. Sometimes the eyes continue, even in ſleep, to preſent objects to the mind which engage its attention ; as in the caſe of Johannes Oporinus, a printer, who being employed one night in correcting the copy of a Greek book, fell aſleep as he read, and yet ceaſed not to read till he had finiſhed not leſs than a whole page, of which, when he awoke, he retained no recollection. Theory of Dreams, p. 62." We do not ſpeculate upon the fact, becauſe the particular points in queſtion are not detailed with ſufficient preciſion ; but they ſeem to us in no way at variance with the ſtatement of our great mental dramatiſt, if, as we take for granted, he meant that the lady's mind was *unconſcious* of the impreſſions made upon her ſenſes, though theſe might ſtill direct her bodily motions. The writer of this article has a perfectly diſtinct recollection of a fact which happened reſpecting himſelf when a boy. He was reading one evening to ſome friends, in a work which did not call for much attention, the words, modes of expreſſion, &c. being ſufficiently familiar. He remembers that his mind gradually wandered from the book, and by degrees he not only loſt all thought of what was going on, but fairly fell aſleep : his eyes were open, but his ſenſe was ſhut. He afterwards found, that he had for ſome time been reading indiſtinctly, but intelligibly, till at laſt ſleep ſo far overcame the muſcular action requiſite for the erect poſture, that he nodded and awoke. The fact amuſed him, and was fixed in his memory long before he began to reaſon about the proceſſes of the *mind* in ſuch caſes. He wiſhes to lead the attention of the reader to another fact. He has more than once obſerved, after glancing over a page in ſome book, for the purpoſe of reference, &c., that trains of thought and feeling have been begun in his mind, for which he could not account, till on more minutely examining the page, he has diſcovered ſome *ſingle* word, which he could have no doubt from the circumſtances of the caſe had, by its impreſſion on the external organ, excited the train he was conſcious of, though it had not itſelf excited the notice of the mind. It muſt, however, be added, that he has alſo been able at other times, to trace an indiſtinct recollection of having actually perceived the word in queſtion.

On referring to Dr. Reid's truly excellent Eſſay on the Will, which contains a great variety of important obſervations, with the value of which we were not before acquainted ; or we ſhould have referred to them in a more appropriate ſituation, we find that we agree with him on this queſtion more than Mr. Stewart does. " A man (he ſays, ch. 3.) *ſees not what is before his eyes, when his mind is occupied about another object.* In the tumult of a battle, a man may be ſhot through the body, without knowing any thing of the matter, till he diſcover it by the loſs of blood or of ſtrength." In the following paſſage (ch. 1.) we ſee the rudiments of what we would term the *doctrine of motives.* " If the mind were always in a ſtate of perfect indifference, without any incitement, motive, or reaſon, to act, or not to act, to act one way rather than another, our active power, having no end to purſue, no rule to direct its exertions, would be given in vain. We ſhould either be altogether inactive, *and never will to do any thing*, or our volitions would be perfectly unmeaning and futile, being neither wiſe nor fooliſh, virtuous nor vicious." The former we think would have been the caſe. We muſt add one more extract, from a former part of the chapter, which we think overturns

turns the foundation of his theory reſpecting the intellect. "Every act of the will muſt have an object. He that wills, muſt will ſomething; and that which he wills is called the object of his volition. *As a man cannot think without thinking of ſomething*, nor remember without remembering ſomething, ſo neither can he will without willing ſomething. Every act of will, therefore, muſt have an object; and the perſon who wills, *muſt have a conception*, more or leſs diſtinct, of what he wills." In writing this eſſay, Dr. Reid ſeems to have left himſelf to the guidance of his own ſound judgment, and accurate obſervation and reflection, qualities which his works often diſplay. In his theory about perception, &c. he was miſled by a miſtaken idea, that it was the *only* means of oppoſing opinions which his good ſenſe and moral and religious principles, convinced him were unfounded in truth and human nature, and which he perceived leading to dangerous conſequences. "The diſcovery (he himſelf ſays) was the birth of time, not of genius; and Berkeley and Hume did more to bring it to light, than the man who hit upon it." Life, p. xci. 8vo.

We have only farther to obſerve, that Condillac (Eſſai ſur l'Origine des Connoiſſances humaines, ſect. ii. ch. i. § 6—9.) in defending the opinion, that we have always a conſciouſneſs of external impreſſions, though often ſo ſlight that it does not affect the memory, brings forward two hypotheſes only beſides his own, to account for the phenomena on which it is founded. The firſt is, that when the mind is engroſſed with ſome intereſting object of perception, the brain is in ſuch a ſtate of general excitement, that this is not affected by the external impreſſions from other objects. The ſecond is, that though every impreſſion on the external organs of ſenſation is communicated to the brain, or common ſenſorium, and *conſequently* produces a *perception* in the mind, yet caſes may occur in which the mind does not notice them. The ſuppoſition is obviouſly abſurd; and the philoſopher adds, "I here declare in favour of Locke, for I can form no idea of ſuch a perception; I ſhould be as well pleaſed for any one to ſay, I perceive without perceiving." Of courſe the inſtant the mind becomes *conſcious* of the change in the ſenſorium, produced by any external impreſſion, the conſciouſneſs of it makes it a perception, or, more accurately, a ſenſation. But it is clear, that Condillac begs the queſtion, by uſing the term *perception*, which neceſſarily implies *conſciouſneſs*. (See PERCEPTION.) The opinion advanced in this article is altogether a diſtinct caſe, *viz.* that ſenſorial changes are *not* neceſſarily attended with conſciouſneſs; and this is we think the only other ſuppoſition, and is fully borne out by evidence. It may be eaſily made to appear ridiculous by half-ſtating it, or by over-ſtating it; and we doubt not Tucker would do it, as he has done with Hartley's doctrine of ſecondarily automatic motions, in an amuſing paſſage, which we cannot find to refer to, repreſenting a long train of aſſociated motions, originating in ſenſible vibrations, and going on without will or underſtanding. If Hartley had ſeen it, he would probably have merely ſaid, that his theory was unaffected by it. Such at leaſt is the fact.

3. *On Words, and the Ideas aſſociated with them.*—Words may be conſidered in four points of view; *firſt*, as impreſſions upon the ear; *ſecondly*, as the actions of the organs of ſpeech; *thirdly*, as impreſſions made upon the eye by characters; *fourthly*, as the actions of the hand in writing. We learn the uſe of them in this order; for children get an imperfect knowledge of the meaning of the words of others; then learn to ſpeak themſelves; then to read; and laſtly, to write. Now it is evident, that in the firſt of theſe ways, many ſenſible impreſſions, and external feelings, are aſſociated with particular words and phraſes, ſo as to give theſe the power of raiſing the correſponding ideas; and that the three following ways increaſe and improve this power, with ſome additions to the ideas and variations of them. The ſecond is the reverſe of the firſt, and the fourth of the third. The firſt aſcertains the ideas belonging to words and phraſes in a groſs manner, according to their uſage in common life. The ſecond fixes this, and makes it ready and accurate. The third has the ſame effect as the ſecond, and alſo extends the ſignifications of words and phraſes, by new aſſociations, and, in particular, by aſſociations with other words, as in definitions, deſcriptions, &c. The advancement of the arts and ſciences is chiefly carried on by new ſignifications given to words in this third way. The fourth, by converting the reader into a writer, helps him to be expert in diſtinguiſhing, quick in recollecting, and faithful in retaining, theſe new ſignifications of words. The action of the hand is not, indeed, an eſſential in this fourth method, compoſition by perſons born blind having nearly the ſame effect; it is, however, a common attendant on compoſition, and has a conſiderable uſe deducible from aſſociation, at the ſame time making the analogy between the four methods more conſpicuous and complete.

Hence it appears, that words and phraſes muſt excite ideas in us by aſſociation; and it further appears, that they can do it by no other means, ſince all the ideas which any word excites, are deducible from ſome of the ſources abovementioned, moſt uſually from the firſt or third; and becauſe words of unknown languages, terms of art not yet explained, barbarous words, &c. have either no ideas connected with them, or only ſuch as ſome fancied reſemblance, or prior aſſociation, ſuggeſts. It deſerves to be remarked here, that articulate ſounds are, by their variety, number, and ready uſe, peculiarly fitted to ſignify and ſuggeſt, by aſſociation, both our ſimple ideas, and our complexions formed from them.

We now proceed to deſcribe the manner in which ideas are aſſociated with words, beginning with childhood.

Firſt, then, the aſſociation of the *names of viſible objects*, with the impreſſions which theſe objects make upon the eye, ſeems to take place more early than any other, and to be effected in the following manner. The name of the viſible object, the mother for inſtance, is pronounced and repeated by the attendants to the child, more frequently when his eye is fixed upon his mother, than when upon any other objects, and much more ſo than when upon any particular one. The word *mamma* is alſo ſounded in an emphatical manner, where the child's eye is directed to his mother with earneſtneſs and deſire.

The aſſociation, therefore, of the ſound *mamma*, with the viſible impreſſion of the mother on the retina, will be far ſtronger than that with any other viſible impreſſion, and thus overpower all the other accidental aſſociations; and theſe will alſo themſelves contribute to the ſame end, by oppoſing one another. And when the child has acquired ſo much voluntary power over his motions, as to direct his head and eyes towards his mother, upon hearing her name, this proceſs will go on with accelerated velocity; and thus, at laſt, the word will excite the viſible idea readily and certainly. The ſame aſſociation of the viſible impreſſion of the mother with the ſound *mamma*, will by degrees overpower all the accidental aſſociations of this viſible impreſſion with other words; and, at laſt, be ſo cloſely confirmed, that the viſible impreſſion will excite the audible idea of the word. This, however, is not to our preſent purpoſe; but it is a proceſs which takes place at the ſame time with the other, and contributes to illuſtrate and confirm it. Both together furniſh a complete inſtance of one of the claſſes of connections. See Div. IV. 1.

Secondly: this aſſociation of words with viſible appearances, being made under many particular circumſtances, muſt affect the viſible ideas with a like particularity. Thus the mother's dreſs, and the ſituation of the fire in the child's nurſery, make part of the child's ideas of his mother and fire. But then as his mother often changes her dreſs, and the child often ſees a fire in a different place, and ſurrounded by different viſible objects, theſe oppoſite aſſociations muſt be leſs ſtrong than the part which is common to all; and conſequently we may ſuppoſe, that while his idea of that part which is common, and which we may call eſſential, continues the ſame, that of the particularities, circumſtances, and adjuncts, varies.

Thirdly: when the viſible objects impreſs other vivid ſenſations beſides thoſe of ſight, ſuch as pleaſant or unpleaſant taſtes or ſmells, warmth, or coldneſs, &c. with ſufficient frequency, theſe muſt leave relics or ideas, which will be aſſociated with the viſible ideas of the objects, and with the names of the objects, ſo as to depend upon them. Thus an idea, or naſcent perception, of the taſte of the mother's milk, will riſe up in the mind of the child, on hearing her name; and hence the whole idea belonging to the word *mamma* now begins to be complex, conſiſting of two ſets of ideas derived from different ſenſes: and theſe ideas will be aſſociated together, not only becauſe the ſame word raiſes both, but alſo becauſe the original ſenſations were often received together. The ſtronger idea will therefore aſſiſt the weaker. In common caſes, viſible ideas are the ſtrongeſt; or at leaſt occur the moſt readily; but in this caſe it appears to be otherwiſe. It would be eaſy to proceed to various other, and more complex caſes, in which the component ideas are united, and all made to depend on the reſpective names of viſible objects; but what has been ſaid is ſufficient to ſhew what ideas the names of viſible objects, proper and appellative, raiſe in us.

Fourthly: we muſt, however, obſerve, reſpecting *appellatives*, that ſometimes the *idea*, aſſociated with the term, *is the common compound reſult of all the ſenſible impreſſions received from the ſeveral objects compriſed under the general appellation;* but ſometimes it is, in a great meaſure at leaſt, *the particular idea of ſome one of theſe; viz.* when the impreſſions ariſing from ſome one of the claſs are more frequent and vivid than thoſe of the reſt.

Fifthly: the *names denoting ſenſible qualities*, whether ſubſtantive or adjective, ſuch as *whiteneſs*, *white*, &c. get their ideas in a manner which will be eaſily underſtood from what has been already ſtated. That viſible impreſſion which is common to all objects which have been frequently ſeen, having the name *white* applied to them, becomes the leading feature of the ideas belonging to them; and the word excites that moſt vividly and univerſally, while it excites only faintly, or at leaſt with great variation, the ideas of the peculiarities, circumſtances, and adjuncts; and ſo of the other ſenſible qualities.

Sixthly: the names of *viſible actions*, as walking, ſtriking, &c. raiſe the proper viſible ideas by a like proceſs. Other ideas may likewiſe adhere in certain caſes; as in thoſe of taſting, feeling, ſpeaking, &c. Senſible impreſſions, in which no viſible action is concerned, may alſo have ideas dependent upon words: ſome viſible ideas, however, generally intermix themſelves here. Theſe actions and perceptions are generally denoted by *verbs*, though ſometimes by *ſubſtantives*.

Seventhly: as children may learn to read words, not only in an elementary way, *viz.* by learning the letters and ſyllables of which they are compoſed, but alſo in a ſummary one, *viz.* by aſſociating the ſound of entire words with their viſible repreſentations; and muſt, in ſome caſes, be taught in this latter method, that is, whenever the ſound of the word differs from that of its elements, ſo *both children and adults often learn the ideas belonging to whole ſentences, in a ſummary way, and not by adding together the ideas of the ſeveral words in the ſentence.* And wherever words occur, which, ſeparately taken, have no diſtinct proper ideas, their uſe can be learned in no other way than this; and this will be the caſe where the words are extremely general, applying to a vaſt variety of viſible objects, and to circumſtances and relations which are not obvious to the uncultivated mind. Now, pronouns, and particles, and many other words, are of this ſort. Thus, *I walk*, is aſſociated at different times with the ſame viſible impreſſions as *mamma walks*, *brother walks*, &c. and therefore, for a long time, can ſuggeſt nothing permanently but the action of walking. However, the pronoun *I*, in this, and innumerable other ſhort ſentences, being always aſſociated with the perſon ſpeaking, as *thoſe* with the perſons ſpoken to, and *he* with the perſon ſpoken of, the frequent recurrency of this teaches the child the uſe of the pronouns; that is, teaches him what difference he is to expect in his ſenſible impreſſions, according as this or that pronoun is uſed; the vaſt number of inſtances making up for the very ſmall quantity of information which each, ſingly taken, conveys. Of the actual procedures of language reſpecting the pronouns, ſee Language, col. 8, in which we perceive the printer has unfortunately repreſented a Gothic verb in Greek characters. In like manner different particles, that is, adverbs, conjunctions, and prepoſitions, being uſed in ſentences where the ſubſtantives, adjectives, and verbs are the ſame; and the ſame particles, when theſe are different, in an endleſs recurrency, teach children the uſe of the particles in a groſs general way. For it may be obſerved that children are much at a loſs for the true uſe of the pronouns and particles for ſome years; and that they often repeat the proper name of the perſon, inſtead of the pronoun; which confirms the foregoing reaſoning.

Eighthly: the attempts which children make to expreſs their own wants, perceptions, pains, &c. in words, and the corrections and ſuggeſtions of the attendants, are of the greateſt uſe in all the ſteps that we have hitherto conſidered, and eſpecially in the laſt, reſpecting the particles and pronouns.

Ninthly: learning to read helps children much in the ſame reſpects; eſpecially as it teaches them to ſeparate ſentences into the ſeveral words which compoſe them; which thoſe who cannot read are ſcarcely able to do, even when they arrive at adult age.

Thus we may ſee how children and others are enabled to underſtand a continued diſcourſe, relating to *ſenſible* impreſſions only, and how the words, in paſſing over the ear, muſt raiſe up trains of viſible and other ideas, by the power of aſſociation. Our next inquiry muſt be concerning the words which denote either *intellectual* things, or *collections* of other words.

Tenthly: the words which relate to the ſeveral *paſſions*, love, hatred, fear, anger, &c. being applied to the child when he is under the influence of theſe paſſions, get the power of raiſing up the ideas of thoſe paſſions, and alſo the uſual aſſociated circumſtances. The application of the ſame words to others, helps alſo to annex the ideas of the aſſociated circumſtances to them, and even of the paſſions themſelves, both from the infectiouſneſs of our natures, and from the power of aſſociated circumſtances to raiſe the paſſions. It is, however, to be obſerved, that the words denoting the paſſions, do not, for the moſt part, raiſe up in us any degree of the paſſions themſelves, but only the ideas of aſſociated circumſtances. We are ſuppoſed ſufficiently to underſtand the continued diſcourſes into which theſe words enter, when we form true notions of the actions, particularly the viſible ones, attending the feelings denoted.

Eleventhly: the names of *intellectual* and *moral* qualities and operations, ſtand for a deſcription of theſe qualities and operations; and therefore, if dwelt upon, excite ſuch ideas as theſe deſcriptions in all their particular circumſtances do. But the common ſentences into which theſe words enter, paſs over the mind too quick, for the moſt part, to allow of ſuch delay. They are acknowledged as familiar and correct, and ſuggeſt certain aſſociated viſible ideas, and naſcent internal feelings, taken from the deſcription of theſe names, or from the words which are uſually joined with them in diſcourſes and writings.

Twelfthly: there are many *terms of art* in all the branches of learning, which are defined by other words, and which, therefore, are only compendious ſubſtitutes for them. The ſame holds in common life, in numberleſs inſtances. Such words ſometimes ſuggeſt the *words* of their definitions, ſometimes the *ideas* of theſe words, ſometimes a particular ſpecies comprehended under the general term, &c. But whatever they ſuggeſt, it may be eaſily ſeen that they derive the power of doing it from aſſociation.

Laſtly: there are words uſed in *abſtract ſciences* which can ſcarcely be defined or deſcribed by other words, ſuch as identity, exiſtence, &c. The uſe of theſe muſt therefore be learned, as that of the particles is. Indeed children learn their firſt imperfect notions of all the words conſidered in this and the laſt three paragraphs, chiefly in this way; and come to more preciſe and explicit ones only by means of books, as they advance to adult age, or by endeavouring to uſe them properly in their own deliberate compoſitions.

After the foregoing obſervations, which Mr. Stewart would hardly term *reveries*, Hartley adds the following remark, which may leave on the reader's mind a favourable impreſſion of his humility and caution; and we quote it verbatim.

"This is by no means a full or ſatisfactory account of the ideas which adhere to words by aſſociation. For the author perceives himſelf to be ſtill a mere novice in theſe ſpeculations; and it is difficult to explain words to the bottom by words; perhaps impoſſible. The reader will receive ſome addition of light and evidence in the courſe of this ſection; alſo in the next, in which I ſhall treat of propoſitions and aſſent. For our aſſent to propoſitions, and the influence which they have over our affections and actions, make part of the ideas that adhere to words by aſſociation; which part, however, could not properly be conſidered in this ſection." The term *idea* ſeems to be uſed here with too much latitude; and it is to ſuch caſes that Mr. Stewart, forgetful of his own excellent maxims on candour, ſeems principally to have attended. We do not wiſh to apply the term in any inſtance to *ſtates* or *operations* of the mind. Feelings, or complex ideas, produced by thoſe ſtates or operations either in the way of recollection, or of actual aſſociation at the time of paſſing, may, in the Hartleyan nomenclature, be termed ideas; and it is probably to theſe that Hartley really refers. But to proceed.

From the foregoing train of reaſoning, the following inferences may be drawn.

(1) Including under the head of *definitions*, deſcription, or any way of explaining a word by other words, excepting that by a mere ſynonimous term; and for the ſake of brevity, excluding for the preſent from the head of ideas, the viſible idea of the character of a word, and the audible one of its ſound, and alſo all ideas which are either extremely faint, or extremely variable; words may be diſtinguiſhed into the four following claſſes: 1, ſuch as have ideas only; 2, ſuch as have both ideas and definitions; 3, ſuch as have definitions only; 4, ſuch as have neither ideas nor definitions.

It is difficult to fix preciſe limits to theſe four claſſes, ſo as to determine accurately where each ends, and the next begins; and if we conſider theſe things in the moſt general way, there is perhaps no word which has not both an idea and a definition; that is, which is not occaſionally attended with ſome one or more internal feelings, and which may not be explained, in ſome imperfect manner at leaſt, by other words. However, the following are ſome inſtances of words which have the faireſt right to be placed in their reſpective claſſes.

The names of ſimple ſenſible objects are of the *firſt* claſs. Thus, *white*, *ſweet*, &c. excite ideas, but cannot be defined. Words of this claſs ſtand only for the ſtable parts of the reſpective ideas, not for the ſeveral variable particularities, circumſtances, and adjuncts, which here intermix themſelves.

The names of natural bodies, animal, vegetable, or mineral, are of the *ſecond* claſs; for they excite aggregates of ſenſible ideas, and at the ſame time may be defined by an enumeration of their properties and characteriſtics. Thus, likewiſe, geometrical figures have both ideas and definitions. The definitions, in both caſes, are ſo contrived, as to leave out all the variable particularities of the ideas, and alſo to be more full and preciſe, than the ideas generally are in the parts, which are of a permanent nature.

Algebraic quantities, ſuch as roots, powers, ſurds, &c. belong to the *third* claſs; and have definitions only. The ſame may be ſaid of ſcientifical terms of art, and of moſt abſtract general terms, moral, metaphyſical, and vulgar. However, mental feelings are apt to attend ſome of theſe even in paſſing ſlightly over the ear, and theſe feelings may be conſidered as ideas belonging to the reſpective terms. Thus the very words *gratitude*, *mercy*, *cruelty*, *treachery*, &c. even ſeparately taken, affect the mind; and yet, ſince all reaſoning upon them is to be founded on their definitions, it ſeems beſt to refer them to this third claſs. With the opinions given in this paragraph we cannot fully agree, as the reader will perceive from our remarks on generalization, VIII. 2.

Laſtly, the particles *the*, *of*, *to*, *for*, *but*, &c. have neither definition nor ideas, as thoſe terms have juſt been limited.

(2) It will eaſily appear, from the obſervations here made upon words, and the aſſociations which adhere to them, that the languages of different ages and nations muſt bear a great general reſemblance to each other, and yet have conſiderable particular differences; whence any one may be tranſlated into any other, ſo as to convey the ſame ideas in general, and yet not with perfect preciſion and exactneſs. They muſt reſemble one another, becauſe the phenomena of nature, which they are all intended to expreſs, and the uſes and exigencies of human life to which they miniſter, have a general reſemblance. But then, as the bodily make and genius of each people, the air, ſoil, and climate, commerce, arts, ſciences, religion, &c. make conſiderable differences in different ages and nations, it is natural to expect, that the languages ſhould have proportionable differences in reſpect of each other.

In learning a new language, the words of it are at firſt ſubſtituted for thoſe of our native language; that is, they are aſſociated, by means of theſe, with the proper objects and ideas. When this aſſociation is ſufficiently ſtrong, the middle bond is dropped, and the words of the new language become ſubſtitutes for, and ſuggeſt directly and immediately objects and ideas; alſo cluſters of other words in the ſame language.

In learning a new language, it is much eaſier to tranſlate from it into the native one, than back again; juſt as young children are much better able to underſtand the expreſſions of others, than to expreſs their own conceptions. And the reaſon is the ſame in both caſes. Young children learn at firſt to go from the words of others, and thoſe, who learn a new language from the words of that language, to the things ſignified. And the reverſe of this, *viz.* to go from the things ſignified to the words, muſt be difficult for a time from the nature of ſucceſſive aſſociations. It is to be added here, that the nature and connections of the things ſignified, often determine the import of ſentences, though their grammatical analyſis is not underſtood; and that we ſuppoſe the perſon, who attempts to tranſlate from a new language, is ſufficiently expert in paſſing from the things ſignified to the correſponding words of his own language. The power of aſſociation is every where conſpicuous in theſe remarks.

(3) It follows alſo from the foregoing reaſoning, that perſons, who ſpeak the ſame language, cannot always mean the ſame things by the ſame words, but muſt ſometimes miſtake each other's meaning. This confuſion and uncertainty ariſe from the different aſſociations transferred upon the ſame words, by the difference in the accidents and events of our lives. It is, however, much more common in diſcourſes concerning abſtract matters, (where the terms ſtand for collections of other terms, ſometimes at the pleaſure of the ſpeaker or writer,) than in the common and neceſſary affairs of life; for here frequent uſe, and the conſtancy of the phenomena of nature, intended to be expreſſed by words, have rendered their ſenſe determinate and certain. *However, it ſeems poſſible, and even not very difficult, for two truly candid and intelligent perſons to underſtand each other upon any ſubject.*

That we may enter more particularly into the cauſes of this confuſion, and conſequently be the better enabled to prevent it, let us conſider words according to the four claſſes above mentioned.

Now miſtakes will happen in words of the *firſt* claſs, *viz.* ſuch as have ideas only, where the perſons have aſſociated theſe words with different impreſſions. And the method to rectify any miſtake of this kind, is for each perſon to ſhew with what actual impreſſion he has aſſociated the word in queſtion. But miſtakes here are not common.

In words of the *ſecond* claſs, *viz.* ſuch as have both ideas and definitions, it often happens, that one perſon's knowledge is much more full than another's, and conſequently his idea and definition much more extenſive. This muſt cauſe a miſapprehenſion on one ſide, which yet may be eaſily rectified by recurring to the definition. It happens alſo ſometimes in words of this claſs, that a man's ideas are not always ſuitable to his definition; that is, are not the ſame with thoſe which the words of the definition would excite. If then this perſon ſhould pretend, or even deſign, to reaſon from his definition, and yet reaſon from his idea, miſapprehenſion will ariſe in the hearer, who ſuppoſes him to reaſon from his definition merely.

In words of the *third* claſs, which have definitions only and no immediate ideas, miſtakes generally ariſe through want of fixed definitions being mutually acknowledged and kept to. However, as imperfect fluctuating ideas, that have little relation to the definitions, are often apt to adhere to the words of this claſs, miſtakes muſt ariſe from this claſs alſo.

As to the words of the *fourth* claſs, or thoſe which have neither ideas nor definitions, it is eaſy to aſcertain their uſe by inſerting them in ſentences where their import is known and acknowledged; this being the method in which children learn to decypher them; ſo that miſtakes could not ariſe in the words of this claſs did we uſe moderate care and candour. And, indeed, ſince children learn the uſes of words moſt evidently without having any data,—any fixed point at all, it is to be hoped, that philoſophers and candid perſons may learn at leaſt to underſtand one another with facility and certainty; and get to the very bottom of the connection between words and ideas.

(4) When words have acquired any conſiderable power of exciting pleaſant or painful feelings, by being often aſſociated with ſuch things as do this, they may transfer a part of their pleaſures and pains upon indifferent things, by being at other times often aſſociated with ſuch. This is one of the principal ſources of the ſeveral factitious pleaſures and pains of human life. Thus, to give an inſtance from childhood, the words *ſweet, good, pretty, fine,* &c. on the one hand, and the words *bad, ugly, frightful,* &c. on the other, being applied by the nurſe and attendants, in the child's hearing, almoſt promiſcuouſly, and without thoſe reſtrictions that are obſerved in correct ſpeaking; the one ſet to all the pleaſures, and the other to all the pains of the ſeveral ſenſes; muſt by aſſociation raiſe up general pleaſant and painful feelings, in which no one part can be diſtinguiſhed above the reſt; and when applied by further aſſociations to objects of a neutral kind, they muſt transfer a general pleaſure or pain upon them.

All the words aſſociated with pleaſure muſt alſo affect each other by this promiſcuous application. And the ſame holds in reſpect of the words aſſociated with pains. However, ſince both the original and the transferred pleaſures and pains heaped upon different words are different, and in ſome caſes widely ſo, every remarkable word will have a peculiar internal feeling or ſentiment belonging to it; and there will be the ſame relations of affinity, diſparity, and oppoſition, between the internal feeling, belonging to words, as between the ſeveral genera and ſpecies of natural bodies, between taſtes, ſmells, colours, &c. Many of theſe ideas, though affording conſiderable pleaſure at firſt, muſt ſink into the limits of indifference; and ſome of thoſe, which afforded pain at firſt, into the limits of pleaſure. What is here ſaid of words, belongs to groups of them, as well as to ſeparate words. And the ideas of all may ſtill retain thoſe peculiarities, by which they are diſtinguiſhed from each other, after they have fallen below the limits of pleaſure into indifference, juſt as obſcure colours, or faint taſtes, do.

It is obſervable, that the mere tranſit of words expreſſing ſtrong ideas over the ears of children affects them; and the ſame thing is true of adults, in a leſs degree. However, the laſt have learnt from experience and habit to regard them chiefly, as they afford a rational expectation of pleaſure and pain.

(5) Since words thus collect ideas from various quarters, unite them together, and transfer them both upon other words, and upon foreign objects, it is evident, that the uſe of words adds much to the number and complexity of our ideas, and is the principal means by which we make mental and moral improvement. This is verified abundantly by the obſervations which are made upon perſons born deaf, and continuing ſo. It is probable, however, that theſe perſons

make uſe of ſome ſymbols to aſſiſt the memory, and fix the imagination; and they muſt have a great variety of pleaſures and pains transferred upon viſible objects from their aſſociations with one another, and with ſenſible pleaſures of all kinds; but they are very deficient in this, upon the whole, through the want of the aſſociations of viſible objects and ſtates of mind, &c. with words. Learning to read muſt add greatly to their mental improvement; yet ſtill their intellectual capacities cannot but remain very narrow.

Perſons blind from birth muſt proceed in a manner different from that before deſcribed, in the firſt ideas which they affix to words. As the viſible ones are wanting, the others, particularly the tangible and audible ones, muſt compoſe the aggregates, which are annexed to words. However, as they are capable of learning and retaining as great a variety of words as others, and can aſſociate with them pleaſures and pains from the four remaining ſenſes, and alſo uſe them as algebraiſts do the letters which repreſent quantities, they fall little, or nothing ſhort of others in intellectual accompliſhments, and may arrive even at a greater degree of ſpirituality and abſtraction in their complex ideas.

6. On the whole it follows, from the foregoing inveſtigation, that when children or others firſt learn to read, the view of the words excites ideas, only by the mediation of their ſounds, with which alone their ideas have hitherto been aſſociated. And thus it is that children and illiterate perſons beſt underſtand what they read by reading aloud. By degrees the intermediate links being left out, the written or printed characters ſuggeſt the ideas directly and inſtantaneouſly; ſo that perſons who are much in the habit of reading, underſtand more readily by paſſing over the words with the eye only; ſince this method, by being more expeditious, brings the ideas cloſer together. However, all are peculiarly affected by words pronounced in a manner ſuitable to their ſenſe and deſign; which is ſtill an aſſociated influence.

Such are the fundamental principles of Hartley reſpecting *words*. In the reſt of his inveſtigations on this ſubject, mixed with opinions which appear to us hypothetical, are many highly important obſervations, illuſtrative of his general theory, and of the procedures of language; but for theſe we muſt refer to p. 81—85 of his work.

3. *On Propoſitions and the Nature of Aſſent.*—Whatever be the preciſe nature of aſſent and diſſent, they muſt claſs with ideas, being only thoſe very complex internal feelings which are connected by aſſociation with ſuch groups of words as are called propoſitions in general, or affirmations and negations in particular.

Aſſent, and conſequently its oppoſite, diſſent, may be diſtinguiſhed into two kinds, rational and practical. *Rational aſſent* to any propoſition may be defined, a readineſs to affirm it to be true, proceeding from a cloſe aſſociation of the ideas ſuggeſted by the propoſition, with the idea or internal feeling belonging to the word truth; or of the terms of the propoſition with the word truth. Rational diſſent is oppoſite to this. *Practical aſſent* is a readineſs to act in ſuch a manner as the frequent vivid recurrency of the rational aſſent diſpoſes us to act; and practical diſſent the contrary.

Practical aſſent is, then, the natural conſequence of rational aſſent, when ſufficiently impreſſed. It muſt, however, be obſerved; *firſt*, that ſome propoſitions, mathematical ones for inſtance, admit only of a rational aſſent, the practical not being applied to them in common caſes: *ſecondly*, that the practical aſſent is ſometimes generated, and arrives at a higher degree of ſtrength, without any previous rational aſſent, and by methods which have little or no connection with it; yet ſtill is, in general, much influenced by it, and converſely exerts a great influence upon it: *thirdly*, practical aſſent may be in oppoſition to rational aſſent, and in conſequence of its having been long and firmly cultivated, may altogether prevent the latter from influencing the conduct.

Let us next inquire into the cauſes of rational and practical aſſent, beginning, 1, with that given to *mathematical concluſions*.—Now, the original cauſe that a perſon affirms the truth of the propoſition, *twice two are four*, is the entire coincidence of the viſible or tangible idea of *twice two* with that of *four*, as impreſſed upon the mind by various objects. We ſee every where that both are only different names for the ſame impreſſion; and it can only be in conſequence of aſſociation that the word truth, its definition, or internal feeling, becomes appropriated to this coincidence. Where the numbers are ſo large that we cannot form any diſtinct viſible ideas of them, as when we ſay that 12 times 12 are equal to 144, rational aſſent is founded, if not on the authority of a table or a teacher, on a coincidence of words ariſing from ſome method of reckoning up 12 times 12, ſo as to conclude with 144, and reſembling the coincidence of words which attends the before-mentioned coincidence of ideas in the ſimple numerical propoſitions. The operations of addition, ſubtraction, multiplication, diviſion, and extraction of roots, with all the moſt complex operations relating to algebraic quantities, conſidered as the denotements of numbers, are no more than methods of reducing this coincidence of words, founded upon, and riſing above, one another. And it is merely aſſociation again, which appropriates the word truth, &c. to the coincidence of the words or ſymbols which denote the numbers.

This coincidence of terms is conſidered as a proof that the viſible ideas of the numbers under conſideration would coincide as much as the viſible ideas of twice two and four, were the former equally diſtinct with the latter; and, indeed, the ſame thing may be fully proved, and often is ſo by experiments with counters, lines, &c. And hence, thinking perſons who make a diſtinction often unthought of, between the coincidence of terms and that of ideas, conſider the real and abſolute truth to be as great in complex numerical propoſitions as in the ſimpleſt. Now, as it is impoſſible to gain diſtinct viſible ideas of different numbers, where at leaſt they are conſiderable, terms denoting them are a neceſſary means of diſtinguiſhing them one from another, ſo as to reaſon juſtly reſpecting them. In geometry there is a like coincidence of lines, angles, ſpaces, and ſolid contents, to prove them equal in ſimple caſes. Afterwards, in complex caſes, we ſubſtitute the terms whereby equal things are denoted for each other, and then the coincidence of the terms to denote the coincidence of the viſible ideas, except in the new ſtep advanced in the propoſition; and thus we get a new equality, denoted by a new coincidence of terms; and this, in like manner, we employ in order to obtain a new coincidence of terms, and ſo on. This reſembles the addition of unity to any number in order to make the next; as of 1 to 20 in order to make 21. We have no diſtinct viſible idea of 20 or of 21; but we have of the difference between them, by fancying to ourſelves a heap of things, ſuppoſed or called twenty in number, and then further fancying one thing to be added to it. By a like proceſs in geometry we arrive at the demonſtration of the moſt complex propoſitions. The properties of numbers are applied to geometry in many caſes, as when we demonſtrate a line or ſpace to be half or double of any other, or in any other ratio to it. And as, in arithmetic, words ſtand for indiſtinct ideas, in order to help us to reaſon about them as accurately as if they were diſtinct; and as cyphers alſo ſtand for words, for the ſame purpoſe; and letters for cyphers, to render the concluſions leſs particular; ſo letters are put for geometrical quantities alſo, and the agreements of the letters for thoſe of the quantities.

Thus we ſee the foundation upon which the whole doctrine of quantity is built; for all quantity is denoted either by number, or by extenſion, or by letters denoting either one or the other. The coincidence of ideas is the foundation of rational aſſent in ſimple caſes; and that of ideas and of terms, or of terms alone in complex caſes. This is upon the ſuppoſition that the quantities are to be proved equal; but if they are to be proved unequal, the want of coincidence anſwers the ſame purpoſe. If they are in any numerical ratio, this is only introducing a new coincidence. Thus it appears that the uſe of words, either as viſible or as audible ſymbols, is neceſſary for geometrical and algebraic reaſonings, as well as for arithmetical. We may ſee alſo that aſſociation prevails in every part of the proceſſes hitherto deſcribed.

But theſe are not the only cauſes of giving rational aſſent to mathematical propoſitions. The recollection of having once examined and aſſented to each ſtep of a demonſtration, the authority of an approved writer, &c. are often ſufficient to gain our aſſent, though we underſtand no more than the import of the propoſition; nay, even though we do not proceed ſo far as this. Now this again is a mere transfer of aſſociation; the recollection, authority, &c. having been in a great number of caſes aſſociated with the before-mentioned coincidence of ideas and terms.

But here a new circumſtance ariſes; for memory and authority are ſometimes found to miſlead; and the recollection of ſuch experience puts the mind into a ſtate of doubt, ſo that ſometimes truth, ſometimes falſehood, will recur and unite itſelf with the propoſition under conſideration, according as the recollection, authority, &c., in all their peculiar circumſtances, have been, on the whole, aſſociated with truth or falſehood.

Thus the idea belonging to a mathematical propoſition, with the rational aſſent or diſſent ariſing in the mind, as ſoon as it is preſented to it, is nothing more than a group of ideas, united by aſſociation, and forming a very complex idea. And this idea is not merely the ſum of the ideas belonging to the terms of the propoſition, but alſo includes the motions or feelings, whatever they be, which belong to the words *equality*, *coincidence*, and *truth*, and in ſome caſes thoſe of *utility*, *importance*, &c. For mathematical propoſitions are, in ſome caſes, attended with a practical aſſent, in the proper ſenſe of theſe words; as when a perſon takes this or that method of executing a projected deſign, in conſequence of ſome mathematical propoſition aſſented to from his own examination, or from the authority of others. Now the train of voluntary actions, here denoting the practical aſſent, is produced by the frequent recurrency of ideas of utility and importance. Theſe operate by aſſociation, and though the rational aſſent be a previous requiſite, yet the degree of the practical aſſent is proportional to the vividneſs of thoſe ideas; and in moſt caſes they ſtrengthen the rational aſſent by reaction.

(2) Propoſitions concerning *natural bodies* are of two kinds, vulgar and ſcientifical. Of the firſt kind are *milk is white, gold is yellow, a dog barks*, &c. Theſe are evidently nothing more than forming the terms denoting the whole or ſome component parts of a complex idea, into a propoſition, or employing thoſe denoting ſome of its common adjuncts in the ſame way. The aſſent given to ſuch propoſitions ariſes from the aſſociations of the terms as well as of the ideas denoted by them.

In ſcientifical propoſitions concerning natural bodies, a definition having been made of the body from its properties, another property or power is joined to them as a conſtant or common aſſociate. Thus gold is ſaid to be ſoluble in the nitromuriatic acid. Now to perſons who have made the proper experiments a ſufficient number of times, theſe words ſuggeſt the ideas which occur in thoſe experiments, and, converſely, are ſuggeſted by them, in the ſame manner as the vulgar propoſitions above-mentioned, ſuggeſt and are ſuggeſted by common appearances. But then, if they be ſcientific perſons, their readineſs to affirm that gold is ſoluble in this acid univerſally, ariſes alſo from the experiments of others, and from their own and other perſons' obſervations on the conſtancy and tenor of nature. They find it to be a general truth, that almoſt any two or three remarkable qualities of a natural body infer the reſt, being never found without them; and hence ariſes a readineſs to affirm reſpecting all bodies poſſeſſing thoſe two or three leading qualities, whatever may be affirmed of any one body.

The propoſitions formed reſpecting natural bodies are often attended with a high degree of practical aſſent, ariſing chiefly from ſome ſuppoſed utility and importance, and which is no way proportional to the foregoing or ſimilar acknowledged cauſes of rational aſſent. And in ſome caſes the practical aſſent takes place before the rational, but there, after ſome time, the rational aſſent is generated and cemented moſt firmly by the prevalence of the practical. This proceſs is particularly obſervable in the regards paid to medicines; that is, in the rational and practical aſſent to the propoſitions concerning their virtues.

The influence of the practical aſſent over the rational ariſes from their being united in ſo many caſes. And the vividneſs of the ideas ariſing from the ſuppoſed utility, importance, &c. produce a more ready and cloſer union of the terms of the propoſitions.

(3) The evidences for *paſt facts* are a man's own memory, and the authority of others. Theſe are, under proper reſtrictions, the uſual aſſociates of true paſt facts, and therefore produce the readineſs to affirm a paſt fact to be true, that is, the rational aſſent. The integrity and competency of the witneſſes being the principal reſtriction or requiſite in the account of paſt facts, become principal aſſociates to the aſſent to them; and the contrary qualities to diſſent.

If it be aſked how a narration of an event ſuppoſed to be certainly true, or to be doubtful, or to be entirely fictitious, differs in its effect upon the mind in theſe circumſtances reſpectively, the words in which it is related being the ſame in each,—it may be replied, *firſt:* in having the terms *true, doubtful*, or *fictitious*, with a variety of ideas uſually aſſociated with them, and the correſponding internal feelings of reſpect, anxiety, diſlike, &c. connected with them reſpectively; whence the whole effects, exerted by each upon the mind, will differ conſiderably from one another. *Secondly:* if the events be of a very intereſting nature, the related ideas will recur oftener, and thus agitate the mind the more, in proportion to the ſuppoſed truth of the event. And it confirms this, that the frequent recurrence to the mind of an intereſting event, ſuppoſed to be doubtful, or even fictitious, by degrees makes it appear like a real one. This affection of the mind, which may be called the practical aſſent to paſt facts, often produces the rational aſſent, as in the other caſes before ſpoken of.

(4) The evidence for *future facts* is of the ſame kind with that for the propoſitions concerning natural bodies, being

like it taken from induction and analogy. This is the foundation of the rational aſſent. The practical depends upon the recurrency of the ideas, and the degree of agitation produced by them in the mind. Hence reflection makes the practical aſſent grow for a long time after the rational is ariſen to its height; or, if the practical aſſent ariſes in any conſiderable degree without the rational, which is often the caſe, it will generate the rational. Thus the ſanguine are apt to believe and aſſert what they hope to be true; and the timorous what they fear.

(5) There are many ſpeculative abſtract propoſitions in logic, metaphyſics, ethics, controverſial divinity, &c. the evidence for which is the coincidence or analogy of the abſtract terms, in certain particular applications of them, or as conſidered in their grammatical relations. This cauſes the rational aſſent. As to the practical aſſent or diſſent, it ariſes from the ideas of importance, reverence, piety, duty, ambition, jealouſy, envy, ſelf-intereſt, &c. which intermix in theſe ſubjects, and thus, in ſome caſes, add great ſtrength to the rational aſſent, in others deſtroy it, and convert it into its oppoſite.

On the whole it appears that rational aſſent has different cauſes in propoſitions of different kinds, and practical aſſent in like manner: that the cauſes of rational are different from thoſe of practical: that there is, however, a great affinity and general reſemblance in all the cauſes: that rational and practical aſſent exert a perpetual reciprocal influence on each other: and, conſequently, that the ideas belonging to aſſent and diſſent, and their equivalents and relatives, are highly complex, unleſs in the caſes of very ſimple propoſitions, ſuch as mathematical ones. For beſides the coincidence of ideas and terms, they include, in other caſes, ideas of utility, importance, reſpect, diſreſpect, ridicule, religious affections, hope, fear, &c. and bear ſome groſs general proportion to the vividneſs of theſe ideas.

From the preceding ſtatements the following inferences may be deduced. *Firſt:* when a perſon ſays, 'I ſee and approve of what is right, I follow what is wrong,' it ſhews that the rational and practical aſſent are at variance; that they have oppoſite cauſes; and that neither of theſe has yet deſtroyed the other. *Secondly:* the rational and practical faith in religious matters are excellent means of producing each other. *Thirdly:* vicious men, that is, all perſons who want practical faith, muſt be prejudiced againſt the hiſtorical and other foundations for rational faith in revealed religion. *Fourthly:* it is impoſſible any perſon ſhould be ſo ſceptical as not to have the complex ideas denoted by the words aſſent and diſſent aſſociated with a great variety of propoſitions in the ſame manner as in other perſons; juſt as he muſt have the ſame ideas in general affixed to the words of his native language, as other men have. An univerſal ſceptic, therefore, is no more than a perſon who varies from the common uſage in his application of a certain ſet of words, *viz.* truth, certainty, aſſent, diſſent, &c.

We ſhall cloſe this diviſion with the remarks on evidence, given by Hartley, in propoſition 87; referring to the original thoſe readers who wiſh to ſee how he illuſtrates or proves them, by the employment of ſimple mathematical expreſſions, and who are diſpoſed to enter into his highly important and intereſting obſervations reſpecting the aſcertainment of truth, and the advancement of knowledge; and alſo the application of his principles to the ſeveral branches of ſciences.

Firſt: if the evidences adduced for any propoſition, fact, &c. be dependent on each other, ſo that the firſt is required to ſupport the ſecond, the ſecond the third, and ſo on; that is, if a failure of any one of the evidences renders all the reſt of no value, the ſeparate probability of each evidence muſt be very great in order to make the propoſition credible, and this holds the more, in proportion as the dependent evidences are more numerous.

Second: if the evidences of any propoſition, fact, &c. be independent on each other; that is, if they be not neceſſary to ſupport each other, but concur, and can, each of them, when eſtabliſhed upon its own proper evidences, be applied directly to eſtabliſh the propoſition, fact, &c. in queſtion; the deficiency in the probability of each muſt be very great, in order to render the propoſition perceptibly doubtful; and this holds ſo much the more, as the evidences are more numerous.

Third: the reſulting probability may be ſufficiently ſtrong in dependent evidences, and of little value in independent ones, according as the ſeparate probability of each evidence is greater or leſs. Thus the principal facts of ancient hiſtory are not leſs probable practically now, than ten or fifteen centuries ago; nor leſs ſo then, than in the times immediately ſucceeding, becauſe the diminution of evidence in each century is imperceptible. And for the ſame reaſon a large number of weak arguments proves little.

Fourth: it appears likewiſe, that the inequality of the ſeparate evidences does not produce much alteration in theſe remarks. In like manner, if the number of evidences, dependent or independent, be great, we may make great conceſſions as to the value of each. Again, a ſtrong evidence in dependent ones can add nothing, but muſt weaken a little; and after a point is well ſettled by a number of independent ones, all that come afterwards are in one ſenſe uſeleſs, becauſe they do no more than remove the imperceptible remaining deficiency; on the other hand, however, as evidence produces different effects on different minds, it is of great moment, in all points of general importance, to have as many ſatisfactory independent evidences as poſſible into view; that if one fail in its effects, from peculiar circumſtances, another may ſupply its place. And it will be of great uſe to purſue theſe and ſuch like deductions, both mathematically and by applying them to proper inſtances ſelected from the ſciences, and from common life, in order to remove certain prejudices, which the uſe of general terms and ways of ſpeaking, with the various aſſociations with them, is apt to introduce and fix upon the mind. It cannot but aſſiſt us in the art of reaſoning, thus to analyſe, recompoſe, and aſcertain our evidences.

The length of this article, (for which the importance of the ſubject, and the variety of topics diſcuſſed in it, will we hope obtain the reader's excuſe,) renders it neceſſary, for the convenience of reference, to ſubjoin a brief outline of its leading ſubjects.

Introductory Remarks.

Definition of mental philoſophy.
Motives to the ſtudy of it.
Object of this article.
Proper conduct of our inveſtigations in this branch of ſcience, and the mental requiſites for ſucceſsfully purſuing it.
The leading principle of Dr. Reid's philoſophy inconſiſtent with fact.
Conſideration of ſome of Reid's ſtrictures on Locke.
Platonic and Ariſtotelian ſyſtems reſpecting ideas.
Reid's arguments againſt the ſuppoſed ſyſtem of Locke, do not militate againſt the principles of this article.
Reid's principles, founded on mere verbal diſtinctions, are inefficacious againſt Berkeley's hypotheſis, or altogether groundleſs.

The doctrines of innate ideas and inſtincts, appeals to ignorance.
How far univerſal belief is a teſt of truth.
The Berkleyan hypotheſis inconſiſtent with ſound philoſophy.
Principles taken for granted in this article.
I. *General View of the Faculties of the Mind.*
Meaning of the term *Mind.*
Nomenclature occaſionally employed here reſpecting the objects of conſciouſneſs.
Senſorial changes not always attended with conſciouſneſs. See alſo VIII. 2.
Mr. Stewart's theory on the ſubject untenable.
Extent of the *mechaniſm* of the mind.
The ſtudy of Stewart's writings recommended.
Introductory courſe of reading on mental philoſophy.
Tucker's Light of Nature purſued.
II. *Of the Senſitive Power.*
Bodily organs of ſenſation.
The nature of the changes in them occaſioning or accompanying mental phenomena unknown.
Diſtinction between *ſenſations* and *perceptions.*
Senſations derived from each ſenſe, with their influence in the formation of our notions and feelings.
General obſervations on ſenſation: grand law of ſenſible pleaſures and pains.
III. *Of the Retentive Power.*
Ocular ſpectra.
Remarks on the Darwinian theory of ideas.
IV. *Of the Aſſociative Power.*
Hiſtory of the doctrine of aſſociation: progreſs of it in South and in North Britain.
Diſtinction between *connection* and *compoſition.*
1. *Claſſes of Connections.*
2. *Laws of Connections.*
(1) *The Strength of Connections.*
(2) *The Diſunion of Connections.*
(3) *The Law of Transference.*
Inſtinctive, implanted, natural, feelings.
Some phenomena of belief conſidered.
Diſintereſted affections.
(4) *Habitual Biaſes.*
3. *Compoſition of Ideas.*
4. *Vividneſs of Complex Ideas.*
5. *Of the Affections,* &c.
Dr. Cogan's claſſification of our mental feelings with occaſional remarks on it.
Objections to his arrangement.
Hartley's arrangement of the "general paſſions" of human nature.
6. *Of the Will.* See alſo VIII. 2.
Objections againſt Hartley's theory.
Hartley's practical remarks highly important.
7. *Claſſes of the Intellectual Pleaſures and Pains,* with an account of the origin of ſome genera.
(1) *Pleaſures and Pains of Imagination.*
(2) *Of Ambition.*
(3) *Of Self-intereſt.*
(4) *Of Sympathy.*
(5) *Of Theopathy.*
(6) *Of the Moral Senſe.*
8. *Ideas of Conſciouſneſs.*
V. *Of the Motive Power.* See alſo IV. 1.
Progreſs of muſcular motion from automatic to voluntary.
From voluntary to ſecondarily automatic.
Imitation.
VI. *Of Memory.*
VII. *Of Imagination.*
VIII. *Of the Underſtanding.*
1. *General Obſervations on the Operations of the Underſtanding.*
Conſciouſneſs, attention, abſtraction, obſervation, reflection, thinking, meditation, contemplation.
Intellectual perception.
Judgment.
Differences in the power of intellectual perception.
Propoſitions do not always imply an act of judging.
Difficulty of ſeparating the proceſſes of thought from thoſe of communication.
Mr. Stewart's definition of judgment inadmiſſible.
Act of the mind accompanying the *thoughtful* ſtatement of a propoſition.
Popular acceptation of *judgment.*
Reaſoning, inveſtigation, invention.
Hartley eminently ſucceſsful on this point.
Defence of Hartley and the Hartleyan philoſophy againſt the leading ſtatements and remarks of Mr. Stewart.
Condillac referred to and recommended.
2. *Of Attention, Abſtraction, and Generalization.*
Formation of general or abſtract ideas.
Power of *communication* not neceſſary to their formation.
Of *Conception.*
Generalization affected by language: inſtances.
Farther evidence of the principle that the mind is not always conſcious of the changes in its organs; in oppoſition to Mr. Stewart's theory.
Dr. Reid's eſſay on the will quoted in favour of that principle.
Conſideration of ſome of Condillac's obſervations in ſupport of an opinion coinciding with the principles of Mr. Stewart.
3. *On Words and the Ideas aſſociated with them.*
4. *On Propoſitions and the nature of Aſſent.*

In the preceding ſketch and defence of the Hartleyan philoſophy, our ingenious coadjutor, though very ardently attached to this ſyſtem, has very prudently omitted ſome of its moſt exceptionable parts, and touched others with ſo gentle a hand, as to guard, in a conſiderable degree, againſt the concluſions in favour of Materialiſm and the neceſſity of human actions, which other modern admirers of this ſyſtem have deduced from it. The editor, profeſſing his entire diſapprobation of ſuch concluſions, and his firm conviction of the exiſtence of *mind* in the human frame as a ſubſtance eſſentially diſtinct from matter, and alſo of the freedom of the will, or the proper *agency* of man, muſt of courſe renounce thoſe premiſes, reſpecting the mechaniſm of the mind, from which ſuch inferences are drawn by a legitimate train of reaſoning. His coadjutor's candour will require no apology for his annexing this declaration to the article, with which he has favoured him, and which, under certain limitations and reſtrictions, the judicious and diſcriminating reader will approve. Sentiments concerning the nature, faculties, and operations of the human mind, which the editor conceives to be no leſs true than important, will preſent themſelves to the reader under the appropriate terms in different parts of this Cyclopædia; from which it will appear to be his aim to do ample juſtice to thoſe writers, who have diſtinguiſhed themſelves in the department of mental philoſophy: claiming for himſelf the privilege of forming his own judgment after due examination, though he may happen to differ from thoſe who are held by their peculiar admirers
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and partizans in the higheſt eſtimation. "Audi alteram partem," and "Nullius addictus jurare in verba magiſtri," are the general maxims to which he has endeavoured to conform in the compilation of the Cyclopædia.

PHILOSOPHY, *Moral*, is that ſcience which teaches men the nature and obligation of duty; in other words, it is "that ſcience which teaches men their duty, and the reaſons of it." This laſt definition is from archdeacon Paley; and it is only objectionable as including rather too much. The *precepts* of duty do not, as ſuch, come under the head of moral *philoſophy:* this is concerned with the *principles* from which the precepts are derived. The inveſtigation of theſe principles, and the conſideration of their mutual connections, will often lead the philoſopher to ſtate the rules of duty; but the preceptive part more properly falls under the head of ethics, or morals.

Paley does indeed ſay, that "*moral philoſophy*, *morality*, *ethics*, *caſuiſtry*, *natural law*, mean all the ſame thing, *viz.* that ſcience which teaches men their duty, and the reaſons of it;" but he is undoubtedly wrong. *Moral philoſophy* is the *ſcience* of morals: it inveſtigates the grounds and reaſons of duty; it traces that quality of actions and diſpoſitions which renders them obligatory upon a reaſonable being like man; it ſhews what claſs of actions and diſpoſitions poſſeſſes this quality; it aſcertains by this means the beſt rule of life; and it lays down thoſe principles, by the aid of which the rule of life may be moſt ſucceſsfully applied. The terms, *ethics* and *morals*, though correctly applied to the *ſcience*, are more appropriate to the *art* of *morality*, (underſtanding by the word *art*, as oppoſed to ſcience, a ſyſtem of rules for the proper attainment of any end;) and, in this ſenſe, the terms are not applicable to inveſtigations reſpecting the grounds and reaſons of duty, as ſuch, though the *art* of morals can ſcarcely fail to include ſome reaſoning reſpecting its foundation and principles, juſt as the *ſcience* of morals can ſcarcely fail to include in ſome meaſure the preceptive part. *Morality* commonly refers to the quality of an action or diſpoſition, which makes it the ſubject of reward or puniſhment; but it is alſo uſed, as when we ſpeak of a ſyſtem of morality, in reference to the art of morals. *Caſuiſtry* has for its ſole object the *difficulties* of duty; and claſſes ſometimes with the *ſcience*, and ſometimes with the *art* of morals. It often requires ſubtle inveſtigations, and nice and refined diſtinctions; and when it is not regulated by invariable attention to the grand principles of morality, it often leads to great intricacy and perplexity. Such diſcuſſions have indeed not unfrequently led, through the ſophiſtry of vanity or ſelf-juſtification, to opinions which confound all moral diſtinctions. The moral reaſoner muſt have ſome fixed points of duty; and when he has ſeen that theſe have a ſolid foundation in the nature of the human mind, and the circumſtances of man, he ought on no account to give them up. If any opinions are in clear oppoſition to them, the principles on which thoſe opinions are founded ſhould be regarded as abſurd, if not practically dangerous. The term *natural law* denotes that ſyſtem of duty, which is derived from conſiderations independent, or ſuppoſed to be independent, of divine revelation.

Great as the merits of Paley indiſputably are, which lead us to rank him among the moſt uſeful writers whoſe works are now commonly read, preciſion is not one of his ſtriking excellencies. If with his happy talent of illuſtration, his uncommon ſkill in ſelecting the leading and moſt impreſſive features of his ſubject, his general neatneſs of arrangement, perſpicuity of expreſſion, and animation and occaſionally even playfulneſs of manner, he had united greater correctneſs of thought, and preciſion in the uſe of words, and if he had never ſuffered himſelf to lower the ſtandard of duty, in accommodation to the practice of thoſe around him, his writings could ſcarcely have been improved. But all excellencies are not to be expected together; and what Paley has done entitles him to the reſpect and gratitude of the religious world. His work, entitled "Horæ Paulinæ," diſplays moſt originality and depth of inveſtigation. His View of the Evidences of Chriſtianity marks the ſoundneſs and clearneſs of his judgment. The Natural Theology has leſs preciſion and correctneſs, and often ſhews a want of acquaintance with the actual ſtate of phyſical ſcience, and natural hiſtory; and it has one important defect, it derives none of its evidence from mental philoſophy, though this ſcience affords to the reflecting mind numerous and ſtriking proofs of the wiſdom and goodneſs of God. But, with all its faults, it is a work of great intereſt and value, and deſerves a ſeries of notes for the purpoſe of illuſtration and correction, accompanied with unexpenſive delineations of the leading objects of anatomy and natural hiſtory, which he refers to. As to his Moral Philoſophy, the writer of this article, though not inſenſible of its real value, which is delineated in Paley's moſt happy manner in his preface, feels obliged to place it below the reſt of his works. He has enlivened and familiarized his ſubject perhaps beyond example; he has made really profound inveſtigations often appear ſimple, and even attractive; he has employed Chriſtian ſanctions and Chriſtian principles, before too much neglected by the moral philoſopher; and his morality is, in general, ſound and comprehenſive, and the explication of it alike intereſting and impreſſive. But his ſyſtem, in our opinion, is fundamentally wrong; and this error in the baſis has, in ſome important caſes, led the author himſelf to erroneous concluſions, and has produced this effect ſtill more among his readers. Though we ſhall not have occaſion to enter into any minute diſcuſſion of his ſyſtem, this article will, we think, furniſh the intelligent reader with principles, which will prevent the ill effects of his errors; and we ſhall, in ſeveral inſtances, have to acknowledge our own obligations to him.

In the ſtatement which we made near the beginning of the ſecond paragraph, reſpecting the objects of moral philoſophy, we have, we perceive, given the baſis of the plan which we ſhall follow in this article. After having offered a few more introductory obſervations, and ſome remarks reſpecting the neceſſity of moral inveſtigation, we ſhall,

I. Conſider the nature of moral obligation, and ſhew the ultimate obligation of duty.

II. We ſhall give a view of thoſe concluſions reſpecting the primary purſuits of man, which are derived, under the guidance of divine revelation, from the laws of our frame, and the uſual courſe of Providence.

III. We ſhall ſhew what criterion of virtue and principle of duty we deem, from the views in the ſecond diviſion, to be moſt ſuitable to the condition of human nature, and moſt likely to lead to its higheſt excellence. And,

IV. We ſhall offer ſome concluſions, which may ſerve in part as a baſis for a ſyſtem of practical morality.

We have already ſaid (ſee MORAL *Education*, col. 4.), that our ſyſtem of morality is Chriſtian morality; and we truſt that the influence of Chriſtian principles will be traced throughout. If any one thinks he ſees reaſon for the opinion, that the evidence of the divine origin of Chriſtianity is not ſufficiently ſtable; yet if he believes in the exiſtence of a wiſe and benevolent Firſt Cauſe, in his moral adminiſtration, and in a future ſtate of retribution, he may ſtill go along with us in almoſt all our concluſions: for though we deem divine revelation a moſt important means of knowing our duty, and the ſanctions with which it is attended of ineſtimable value, (even to thoſe who might have been able to ſatisfy themſelves of a future life by conſiderations ſolely derived from the frame of man, and the common courſe of providence,) yet our own conviction, confirmed by every re-examination of the ſubject, is, that the moral principles of the ſcriptures are preciſely ſuch as would have been eſtabliſhed, independently of revelation, by an accurate and enlightened acquaintance with the laws of the human frame, and a judicious and comprehenſive view of the conſequences of human actions. Not that it is at all probable, that ſuch a moral ſyſtem as the Hartleyan rule of life, for inſtance, would have been deviſed by unaided human inveſtigation. There is a wide difference between the *perception* and judicious *application* of a truth, and the *diſcovery* of that truth; and though it is comparatively eaſy for the enlightened underſtanding, ſetting out with a ſatisfactory conviction of an important moral truth, to ſhew its foundation and importance, ſo as to ſatisfy the leſs rigorous and comprehenſive mind, yet, without that conviction, the effort would ſeldom be made; and the doubts and difficulties attending the inquiry would often damp the ardour and perſeverance of the philoſopher, or the intricacies of it would miſlead him, and bring him to concluſions in direct oppoſition to the principle from which he ſet out. The moſt acute philoſophers of antiquity were conſtantly at a loſs, when they came to inquire into the grounds and obligations of virtue; and they repeatedly derived from their ſpeculations, opinions which were hoſtile to the ſoundeſt views of human nature; and we have not been without inſtances in later times, where men of vigorous minds, unfettered, as they believed, by any prejudices, and daring to embrace what they ſuppoſed to be truth, even if they found her in the haunts of vice, and decked out in all her harlotry;—men, too, whoſe writings indicate an ardent love of virtue, and prove their obligations (little acknowledged, and perhaps ſcarcely perceived by themſelves,) to the Chriſtian ſyſtem of duty;—having purſued their ſpeculations without the reſtraint of any fixed points of morality, have derived, even from principles wearing the marks of true excellence, and only erroneous by their extravagant extenſion, concluſions alike hoſtile to the precepts of the goſpel, to the plain ſenſe of mankind, and to the actual condition of human nature. On one of theſe concluſions we ſhall have occaſion hereafter to offer ſome remarks; and we ſhall only add in this connection, that even if the philoſopher were himſelf ſucceſsful in aſcertaining the grounds, obligations, and extent of any moral principle, yet he would ſeldom ſucceed in caſes of any intricacy, and eſpecially in oppoſition to the ſelfiſh paſſions, to convince the leſs comprehenſive mind, unleſs it were under the general influence of the belief that the principle itſelf, or thoſe which are directly affected by it, are certainly true, becauſe they are ſanctioned by the authority of God.

If there be ſatisfactory reaſons for the conviction, that the frame of nature owes its origin to a Being infinitely wiſe, powerful, and good, *he* muſt act moſt wiſely, who, in his inveſtigations into the reaſons of what he ſees, preſumes that it has a wiſe and good end, if he could but find it out, and ſets himſelf with humility and caution to diſcover it: and if that conviction be a good one, then muſt ſuch a mode of enquiry be moſt conducive (as Hartley has well remarked) to the diſcovery of truth. And following up the ſame principle of inveſtigation, we may add, that if the moral philoſopher ſee reaſon for the conviction, that the Chriſtian ſyſtem of duty has the expreſs ſanction of divine authority, he will act moſt wiſely, if he preſume that its precepts have a ſolid foundation and wiſe and good ends, and by the aid of his own experience and obſervation, and that of others, and by the light which a judicious acquaintance with our mental frame affords, aims to find out their foundation and tendency, and to trace their application: and if his conviction be a juſt one, he will neceſſarily be more ſucceſsful in the aſcertainment of important truth, than he could poſſibly be, if he purſued his ſpeculations without ſuch fixed points or fundamental principles, even if he brought to the inquiry an equal degree of vigour of mind and clearneſs and ſoundneſs of underſtanding, and, what is not leſs important, equally juſt and comprehenſive views of human nature, and equal love of truth and duty. We muſt ſtate it, however, as our full and decided conviction, that ſuch juſt and comprehenſive views of human nature would never have been aſcertained, *à priori*, from the known laws of our frame; and that it was only a *religious* philoſopher who would have traced out what Hartley has done, from the experience of other religious perſons and from his own.

Such is our foundation; if any philoſophical enquirer who does not poſſeſs the conviction of the wiſdom, goodneſs, and moral adminiſtration of the Supreme Being, ſhould look into theſe pages, we apprehend he will ſee little to ſatisfy him. To enter into the proof of thoſe principles is out of our preſent province; and to the real philoſopher, we can, with complete ſatisfaction, recommend the firſt, and, if he chooſe to go further, the ſecond chapter of the ſecond volume of the Obſervations on Man. If the ſtudy of that work, and of Paley's Natural Theology, do not remove his doubts and difficulties, we can only adviſe him to act upon the *poſſibility*, to ſay no more, that there may be a ſtate of endleſs exiſtence hereafter, and if ſo, a ſtate of retribution; and to bear in mind, that ſince the nature of that exiſtence muſt be of infinitely greater importance than any preſent good or evil, it is the part of true wiſdom ſo to regulate his conduct and diſpoſitions, that ſhould he enter into that new ſtate of being, though through the weakneſs of the human underſtanding (for which gracious allowance will aſſuredly be made by Him who "knoweth our frame,") he has widely erred on ſubjects of the higheſt moment, he may obtain the approbation of having faithfully uſed his lower degree of intellectual and moral light.

It may be expected by ſome, that becauſe we have repreſented our moral views as Chriſtian morality, we ſhould enter into the conſideration of the duties peculiarly Chriſtian, ariſing from the poſſeſſion of the Chriſtian ſyſtem of faith and practice, and derivable from no other ſource; this, however, we ſhall not do: not that we think it *altogether* out of our province, but becauſe the preceptive part of morals is not our immediate object; becauſe the duties which are peculiarly Chriſtian, (though they may be ſhewn to be accordant with the frame of the mind and the circumſtances of man,) can be aſcertained only from the ſcriptures; and becauſe the conſideration of thoſe duties would involve diſcuſſions of a directly controverſial nature, which are unſuitable to the deſign of this work. We are not among thoſe who think the diſtinctions of Chriſtian belief unimportant. Religious error in its direct, or its indirect effects, on ourſelves or on others, muſt be prejudicial: religious truth, taken in all its bearings, (the whole truth, and nothing but the truth,) muſt be beneficial; and we are fully ſatisfied, that indifference as to the peculiarities of religious belief, moſt commonly leads to indifference to religious truth altogether. But, in our apprehenſion, there is ſomething beyond and above them; ſomething in which every Chriſtian who underſtands his religion muſt agree with every other: and it is this which is the baſis of our moral inveſtigations. If in the eſtimation of any we do not go far enough, we ſhall be ſatisfied if the ſerious and liberal inquirer ſhall ſee reaſon to admit, that we are right as far as we do go. As to the bigot, whoſe narrow mind can allow the worth of no motives which are not immediately founded upon his own peculiar creed, and do not directly imply its truth, we are unfeignedly ſorry for him, but cannot in the leaſt go out of our way on his account.

For the ſatisfaction of the more candid, however, we will add, that we do not leave out of our practical ſyſtem of morals, the regards due to the great "Mediator between God and man:" and we are fully ſatisfied, that the baſis of the duty which we owe to him is laid down in the following pages. If he were, as to nature, truly God, whatever concluſions are derived from the ſcriptures, and from the laws of the human frame, reſpecting the affections and ſervice due to God, will apply, with little variation, to him: if he were one of the creatures of God, and (whatever his rank in the ſcale of being), deriving all his powers from him, and in every way dependent upon him, but appointed by him to fill a moſt important ſtation in his moral adminiſtration towards mankind, then the regards due to him are derived from our ſocial and pious affections united; aſſuming, from that union, a directly religious character. *Faith* in him will then depend upon the proofs of his divine authority: ſubmiſſive *obedience,* upon the principle of religious obedience to his God and Father; *reverence,* upon the impreſſive teſtimonies which he received of the peculiar favour of God, upon the importance of his work while on earth, and the high dignity and power to which he has been exalted: *eſteem* and *veneration* will be founded on the moral likeneſs he bore to the Supreme object of veneration: affectionate and moving *gratitude* upon the contemplation of the bleſſings in the communication of which he was the agent, and of his labours and ſufferings to aſſure and extend them. Except, on the one hand, in the external ſervice due to him, and, on the other, in the affections founded upon the nature of his ſufferings, there is leſs difference in the complex feelings termed love to Chriſt (if at all regulated by ſcriptural repreſentations,) than is generally imagined; and in all their practical reſults, (provided again, theſe are guided by the plain declarations of the ſcriptures,) they completely agree. We hope we ſhall not be ſuppoſed to have forgotten our object. To what we have ſaid in this paragraph, we have been led by the deſire of removing unneceſſary prepoſſeſſions from the mind of any ſerious Chriſtian enquirer.

To conclude theſe preliminary obſervations; ſince much of the happineſs of this life, and of our ability to benefit others, and ſince the happineſs of a boundleſs exiſtence, on the whole, depends upon the proper regulation of our conduct and affections, ſurely it muſt be an object of the firſt importance that we ſhould learn the regulation to which they ſhould be ſubmitted. To know our duty, and to practiſe it, are indeed two diſtinct things, but to practiſe our duty well, certainly requires that we ſhould know it well.

How ſhall we know it? Shall we conſult the law of the land, or make the general conduct of mankind our guide? Shall we bend our actions implicitly and conſtantly to the rules of holy writ, or follow invariably the dictate of our conſciences? All theſe are of uſe in their degree, ſome are of ineſtimable value; but they do not ſuperſede the neceſſity of moral inveſtigation.

The *law of the land,* to adopt the ideas of Paley, labours under two defects, conſidered as a rule of life. *Firſt:* human laws omit many duties, becauſe they are not objects of *compulſion;* ſuch as, piety to God, bounty to the poor, forgiveneſs of injuries, education of children, gratitude to benefactors. The law never ſpeaks but to command, nor commands but where it can compel: conſequently thoſe duties which, by their nature, muſt be voluntary, are left out of the ſtatute book, as lying beyond the reach of its operation and authority. *Secondly:* human laws permit, or, which is much the ſame thing, leave unpuniſhed many crimes, becauſe they cannot be ſettled by any previous deſcription; ſuch as luxury, prodigality, partiality contrary to the good of others, &c. For it muſt either ſettle the crime to be puniſhed, or leave it to the magiſtrate to ſettle it: which is in effect leaving the magiſtrate to puniſh or not to puniſh at his pleaſure. (See Paley, book i. chap. 3.) Beſides, as Mr. Belſham adds, (Elements, p. 418.) if the law of the land require any thing which the law of God forbids, diſobedience is not only innocent, but our duty.

The *general conduct of mankind* cannot, to any great extent, be a ſafe guide. Scarcely is there a vice for which we may not find a juſtification in the general conduct of large ſocieties; ſcarcely a diſpoſition, however pernicious to individual happineſs, which may not receive confirmation from its allowed indulgence among whole nations. The bulk of mankind do not poſſeſs thoſe advantages which enable perſons of cultivated minds to ſee, almoſt at a glance, the path of duty. What culture they have is often unſkilfully applied, and therefore bad habits gain ſtrength, and falſe notions of honour, pleaſure, and intereſt, occupy their minds: they think leſs of what is right than of what will not expoſe them to puniſhment; and their conſcience is ſeldom conſulted, even where its deciſions would be right. Nevertheleſs, a rule of life founded upon the general practice of mankind in the aggregate, would on the whole be favourable to virtue. It would indeed exclude all eminent degrees of virtue as well as of vice; but it would alſo lay ſome reſtraint upon that violence and exorbitancy of paſſion and appetite, which is one chief ſource and occaſion of vice. The *opinions* of mankind are, on the whole, more favourable to virtue than their practice, being, in general, formed from experience, and often upon mature deliberation, when free from the violent impulſes of their appetites and paſſions. Like their practice, the opinions of mankind in the aggregate would exclude all eminent virtues, but in a weaker manner; and it would exclude the great vices in a ſtronger manner. (See Hartley, vol. ii. prop. 46—49.) In the laſt he argues, that the Rule of Life, drawn from the practice and opinions of mankind, corrects and improves itſelf perpetually, till at laſt it determines entirely for virtue, and excludes all kinds and degrees of vice. The whole of the propoſitions referred to, eſpecially the 48th, we recommend to the conſideration of thoſe who give themſelves up to vicious courſes, under the plea of "cool rational ſcepticiſm, and uncertainty in religious matters."

To the *rules of the ſcriptures* we may indeed implicitly ſubmit. He who ſteadily cultivates the diſpoſitions which Chriſtianity enjoins, and conforms his conduct to its ſacred precepts, cannot fail to mount high in the ſcale of moral worth. But this does not prevent the value of moral inveſtigation. For in the *firſt* place, it gives greater promptitude to our obedience, to perceive that the Chriſtian principles and precepts are in perfect conſiſtency with the laws of human nature; and that an acquaintance with thoſe laws leads us to the concluſions forced upon us by the ſcriptures, that it is our duty to make the love of God, the love of our neighbours, and the law of our hearts, the guide of our actions,

tions, and of our affections. But, *ſecondly*, the precepts of Chriſtianity are very general. This is abſolutely neceſſary to render them of uſe as the guide of life. Were they as voluminous as the laws of England, and the deciſions of the ſupreme courts of juſtice, (which are ſaid to fill at leaſt fifty folio volumes,) they could not contain all the caſes that would occur; for "it is not once in ten attempts, that you find the caſe you look for in any law book whatever; to ſay nothing of thoſe numerous points of conduct, concerning which the law profeſſes not to preſcribe or determine any thing." (*Paley*.) Were the rules of ſcripture equally particular, they would be uſeleſs from their extent; and they would be injurious too, becauſe they would prevent the reference of our actions to the general principle, and we ſhould be ſatiſfied if our caſe were not ſtated in the Chriſtian ſyſtem of morals. Again, *thirdly*, it follows from the Chriſtian precepts being ſo general, and principally regarding diſpoſitions, that it not unfrequently requires ſome conſideration to aſcertain where they are directly applicable, and ſtill more whether they altogether coincide with one another in their direction. The virtuous diſpoſitions may dwell together without oppoſition; a man may be generous, grateful and juſt: but the actions to which each prompts, may not have that conſiſtency with one another, which would permit their being brought into exerciſe together; thus an external action which generoſity and gratitude may ſolicit, juſtice may forbid. Hence it is of great importance to be able to form ſuch a ſet of deciſions, or ſtill better ſuch principles for deciſion, as might preſent themſelves when called for, and prevent us from giving each claſs of virtuous actions a diſproportionate attention;—ſuch as ſhould enable us to decide, when circumſtances required it, to which claſs of virtuous actions our preference ſhould be given, where we ought to reſtrain the impulſe of feeling, and where to allow it to be our unheſitating guide. Beſides, *fourthly*, again to uſe the words of Paley, "the ſcriptures commonly pre-ſuppoſe in the perſons to whom they ſpeak, a knowledge of the principles of natural juſtice; and they are employed, not ſo much in teaching *new rules* of morality, as in enforcing the practice of it by *new ſanctions*, and by a *greater certainty*: which laſt ſeems to be the proper buſineſs of a revelation from God, and what was moſt wanted." See Paley, b. i. chap. 4.

But it may be thought that there is a principle in the human mind, which altogether ſuperſedes the neceſſity of moral inveſtigation; which infallibly directs us to our duty even in the moſt minute circumſtances. We know of no ſuch principle. We know that there is a principle which ſprings up, more or leſs, in the mind of every human being, and which approves of, and prompts to, certain actions and diſpoſitions, and diſapproves of, and urges to ſhun, the contrary actions and diſpoſitions; but we ſee no ground to imagine that the conſcience is to be regarded in the light of a blind inſtinct, or a mere ſenſe: this would degrade the moral actions of man to a level with the inſtinctive actions of the brute, or with mere appetite; and it is unneceſſary to reſort to the ſuppoſition; the exiſtence of the conſcience, its variations, and its effects, can be accounted for without it. See PHILOSOPHY, *Mental*, IV, 7 (6), and MORAL *Education*, III.

But in whatever light we regard the *conſcience*, one thing is indiſputable, that its dictates are not uniformly the ſame in any one, and that they are exceedingly variable in different individuals, even with reſpect to the grand principles of duty, and ſtill more with reſpect to the application of thoſe principles. It is indiſputable that the moral principle grows to maturity from a ſmall ſeed. It is indiſputable that it is ſuſceptible of culture; that, if neglected, its judgments become wavering and impotent; that if its dictates be made to undergo reviſion, if corrected by the means of the knowledge we poſſeſs, if its defects are ſupplied by the more extended views of duty, its deciſions proportionally become more firm, and in general more efficacious. See Paley, b. i. ch. 5.

Even an ardent deſire to keep with exactneſs the beſt rules of duty, will not render attention unneceſſary to the cultivation of the conſcience; ("*I verily thought with myſelf*," ſaid the apoſtle Paul, "that *I ought* to do many things contrary to the name of Jeſus of Nazareth;") and an enlightened love of duty muſt, therefore, urge to ſuch cultivation. Dr. Cogan, in his Philoſophical Treatiſe on the Paſſions (p. 348.), adduces as an example "of the influence of perverted principles," "the conduct of a pious mother, towards a moſt excellent and dutiful ſon, who, from a principle of conſcience, in oppoſition to his intereſts, renounced the religious ſyſtem in which he had been educated, for another which he deemed more conſonant to truth. She told him, that 'ſhe found it her duty, however ſevere the ſtruggle, to alienate her affections from him, now he had rendered himſelf an enemy to God, by embracing ſuch erroneous ſentiments.' My friend added, that ſhe was completely ſucceſsful in theſe pious endeavours; and that the duty which ſhe enjoined upon herſelf, was ſcrupulouſly performed during the remainder of her days." The ſame philoſophic writer mentions another inſtance of the irregularity of the moral principle in a child, in whoſe character mildneſs and compaſſion were pre-eminent features. "I was once paſſing through Moorfields," he ſays, "with a young lady, aged about nine or ten years, born and educated in Portugal, but in the Proteſtant faith; and obſerving a large concourſe of people aſſembled around a pile of faggots on fire, I expreſſed a curioſity to know the cauſe. She very compoſedly anſwered, I ſuppoſe it is nothing more than that they are going to burn a Jew."

It is ſurely unneceſſary to ſay more on theſe points. It is a truth, as indiſputable as that we are living for a purpoſe beyond mere preſent gratification, "that moral excellence is the true worth and glory of man, and that therefore the knowledge of our duty is to every man, in every ſituation of life, the moſt important of all knowledge." Reid.

The leading queſtions in morals may be reduced to the three following: 1. What is that quality of conduct and affections, or character, (the ſum total of the moral habits of feeling and action,) which render them obligatory upon a reaſonable being conſtituted like man? 2. What are thoſe affections, and claſſes of conduct, which poſſeſs this quality? 3. What are the beſt means for the culture of thoſe affections, and the proper direction of our conduct? The firſt of theſe we ſhall now proceed briefly to conſider.

1. *Moral obligation.*—The term *obligation* reſpects *voluntary* actions only. We uſe the word *actions* as Mr. Stewart does (Outline, p. 76.), to include every mental or corporal exertion conſequent on volition. We ſay we are *obliged* to walk, if we wiſh to have health; we are *obliged* to uſe regular exertion, if we wiſh to acquire valuable mental habits; and, generally, we are *obliged* to perform certain actions, in order to attain certain ends. The uſe of the term in this and ſimilar ſituations, ſhews its true import. *Obligation* expreſſes the *neceſſity of certain voluntary actions as means*, in order to obtain certain ends. Thus, if the end be the poſſeſſion of health, a *neceſſary* means is that we take exerciſe. If the end be the formation of valuable mental habits, a regular ſeries of exertions is the *neceſſary* means; and, in ſhort, in whatever caſe we wiſh to expreſs that certain ends can *only* be obtained by certain voluntary actions as the means,

we ſay we are *obliged* to uſe theſe means in order to obtain theſe ends. This ſimple and truly excellent view of obligation is taken, with a little alteration, from Mr. Belſham's Elements, ſect. 4. It ſeems to have been derived from Gay's Preliminary Diſſertations, ſect. 2; but with great improvement. In its preſent form it beſt accords with our object.

Obligation differs from *compulſion*. The former reſpects *voluntary* actions, the latter *involuntary*. Compulſion always implies ſome external force. Thus a man is obliged in honour to pay his debts, and if he do not he will be compelled by the law; that is, if to ſatisfy the laws of honour be the end, the payment of his debts is the neceſſary means; if this obligation do not operate with ſufficient ſtrength as a *motive*, he will be compelled to do it, againſt his will, by the law.

Obligation by no means implies an *obliger*. I may be obliged by reaſon, by intereſt, by convenience, by honour, by conſcience, &c. as well as by the authority of another. Authority is one, but not the only, ſource of obligation. Paley's opinion, that "a man is ſaid to be obliged, when he is urged by a violent motive reſulting from the command of another," (ſeparate from the very objectionable expreſſion *a violent motive*,) is by far too limited an account of obligation.

Moral obligation reſpects thoſe actions which are denominated virtuous or vicious; we are *obliged* to perform the one, and to abſtain from the other, becauſe this is the *neceſſary means*, in order to effect a certain end. That is to ſay, unleſs we do practiſe virtue and abſtain from vice, we cannot obtain the end which wiſdom points out as deſerving purſuit.

As has been remarked of obligation in general, there may be *various ſources* of moral obligation; thus, a perſon may be obliged to the performance of his duty, by the laws of God, the dictates of his conſcience, his greateſt happineſs on the whole, and ſo on. Whatever can be ſhewn to be the *ultimate* obligation, that is, that to which all others may be reduced, will then furniſh the moſt general *criterion* of duty; we do not ſay the *beſt*, for that we think a different one. (See Div. III.) Thus, if it appear that the *ultimate* obligation to virtue is the agent's *greateſt happineſs on the whole*, then we ſhould ſay, that *virtue* is that quality of an action, or affection, or of the characters by which it tends to the greateſt happineſs of the agent on the whole. In other words, a certain character of action or diſpoſition, is a neceſſary means to a certain end; that end may be various, according as we go back more or leſs remotely; ſuppoſe the remoteſt end to be the greateſt happineſs of the agent on the whole, then it follows, that the *tendency* to produce that end, is, philoſophically ſpeaking, the moſt general criterion by which we are to aſcertain whether or not it is *obligatory*; and to this tendency may be given the denomination of virtue.

Many ſources of obligation have been pointed out by different philoſophers. That is, to the queſtion, Why ought I to act in a certain way, which we call virtuouſly, many anſwers have been given. Some of the moſt important are the following.

It is agreeable, ſay ſome, to the *eternal and neceſſary fitneſs of things*. This, in a great meaſure, leaves the diſtinction between virtue and vice, indefinite and arbitrary; for it depends upon the *perception* of a fitneſs or unfitneſs, which can only be aſcertained by inveſtigations, whoſe concluſions will neceſſarily, and often widely, differ in different individuals. Beſides, as it has with ſome juſtice been aſked, what are thoſe moral fitneſſes fit for? If the fitneſs or unfitneſs of actions mean any thing different from their tendency to produce happineſs or miſery, the expreſſion is unintelligible. We may ſafely uſe the expreſſion, for there are certainly a beauty and propriety in virtue, a ſuitableneſs to the nature and condition of man, which increaſe in our eſtimation as virtue itſelf gains an influence in our breaſts; but ſtill, when we ſpeak of it as a ſource of moral obligation, 'we find the queſtion returning, Why ought I to act agreeably to the fitneſs of things?' The principal ſupporters of this view of moral obligation are, Grotius, Balguy, and eſpecially Clarke. To a certain extent, it is alſo defended by the advocates of the next opinion.

Some whoſe own confirmed habits of virtue probably were in ſome meaſure the cauſe of the opinion, have maintained, that virtue carries in itſelf its own obligation,—that *the underſtanding at once perceives* a certain action, *to be right*, and that *therefore* it *ought* to be performed. It is objected with great juſtice to this ſyſtem, that it leaves the matter where it found it; for the queſtion recurs, why am I obliged to perform an action which my underſtanding repreſents to me as right? Again you tell me, my underſtanding repreſents ſuch an action as right, that is, obligatory; and therefore I am obliged to perform it. I may aſk, *why* does your underſtanding repreſent this as right? If you ſay, becauſe the mind is ſo conſtituted by its Maker, you refer me to a kind of infallible judge within, whoſe dictates, nevertheleſs, are very different in different perſons.—Beſides, if the *perception* of right conſtitutes obligation, we muſt admit that perſons ſometimes do right in performing wrong actions. Felton believed that he did what was right, that in ſhort he performed an action which was highly meritorious, when he murdered the duke of Buckingham; according to this theory, he was really under an obligation to do it. There cannot be a doubt, that it is the part of true wiſdom to endeavour to cultivate the moral powers, and then leave the actions entirely, (except in extreme caſes,) to their ſuggeſtions. But to ſtate that an action is obligatory, *becauſe* the underſtanding, or the moral ſenſe, (for it comes to the ſame thing,) repreſents it as right, is to ſanction, as virtuous, ſome of the moſt injurious actions; for ſome of the moſt injurious actions have been performed by thoſe who thought it right to perform them. The fact appears to be, that the advocates for this ſyſtem, having ſpent much of their lives in cultivating their moral perceptions, and finding them, in their preſent ſtate, always correct, have acquired the habit of acting implicitly upon them, and hence (not remembering their leſs perfect ſtate) have judged, that becauſe certain actions were repreſented by the moral perception as right, *therefore* they were obligatory. This is a ſufficient obligation, where perſons have done their beſt to enlighten their conſciences, generally, and in the particular point of difficulty, but not otherwiſe; and the queſtion ſtill recurs, *why* is this action obligatory? This ſource of moral obligation was maintained by Cudworth, Butler, Adams, and Price; men whoſe writings diſplay talents of the firſt order for profound inveſtigation; and whoſe errors are the errors of confirmed moral worth, viewing their own minds rather than the actual condition of human nature, and unacquainted with ſome of the grand principles of the mind, which would have led them to different concluſions. Perhaps the works of Butler and Price do not ſuit the taſte of the preſent age; but the intelligent reader can ſcarcely riſe from the ſtudy of them, without moral and intellectual benefit.

An action is obligatory, ſay others, becauſe it is agreeable to the *moral ſenſe*. The obſervations under the laſt head have anticipated what might be made here. When we analyſe the grounds of our moral feelings and ſentiments, (ſee Philosophy, *Mental*,) we cannot but perceive, that they cannot be ſafely made the infallible rule of our conduct; ſtill leſs can they furniſh the ground of obligation. It cannot, however, be too ſtrongly impreſſed upon the mind, that correct dictates, and the exaction of implicit obedience to thoſe dictates, conſtitute the perfection of the conſcience. Enlighten and obey it, is a maxim of true wiſdom. Lord Shafteſbury and Dr. Hutcheſon are the principal ſupporters of this theory. Adam Smith's hypotheſis nearly coincides with it. See Belſham's Elements, p. 428.

It is clear, then, that we do not reach the ultimate obligation by ſaying that it is agreeable to the eternal fitneſs of things, to the perceptions of the underſtanding, to the dictates of the moral ſenſe; but when we add, it is agreeable to the will of God, we ſeem incapable of advancing further. We ſurely are obliged to perform the will of God, by every conſideration. Moſt true, and yet we are not come to the remoteſt obligation. Even, in the ſentence we have juſt uſed, we have, without intending it, referred to one beyond it. Under the moral adminiſtration of an all-wiſe and gracious being, there cannot be a doubt, that obedience to his commands is the higheſt wiſdom: but why? It is a queſtion that admits of an anſwer, and may therefore be put, though reverently: why am I *obliged* to do the will of God? And the anſwer is obvious. Obedience to the commands of a benevolent God muſt be productive of the agent's greateſt happineſs on the whole. Not that it is neceſſary frequently to take this into conſideration; for when we have aſcertained that we are walking ſurely, we may walk ſafely without that degree of attention which, before ſuch aſcertainment, might have been neceſſary. To obey the will of God in all things is the higheſt point of wiſdom; and the conſequences of obedience we may leave to him with perfect ſecurity. It muſt be well with thoſe who fear him. For references to the writers who have deduced all moral obligation from the Deity alone, ſee Thomas Cooper's Tracts, Eſſay on Moral Obligation, where will be found an acute examination of the foregoing and other views of moral obligation. See alſo Belſham's Elements at the end. Mr. Belſham has extended the examination to the moral ſyſtems of Paley, Giſborne, and Godwin.

Every queſtion, Why is any one obliged to perform a certain action? gives us an ultimate anſwer; becauſe it tends to the agent's greateſt happineſs on the whole. When we arrive at this point, it is obvious that we can go no further. And though, as will hereafter appear, true wiſdom undoubtedly directs, that in order to attain the higheſt degree of moral excellence, we ſhould leave our own happineſs out of conſideration,—and though the human mind is ſo conſtituted, that diſintereſted benevolence, founded upon and ſupported by piety, would lead an individual who has attained it, to obey the will of God and ſeek to promote the welfare of mankind, even if his underſtanding were convinced that he ſhould thereby entail upon himſelf conſequences highly prejudicial to, or deſtructive of happineſs on the whole,—yet it does not appear that there could be any proper *obligation* to any conduct in oppoſition to the agent's happineſs on the whole. If ſelf *muſt* be annihilated, it is becauſe ſelf-annihilation, or ſelf-oblivion, is neceſſary for the attainment of the higheſt poſſible happineſs. It has been remarked in favour of this as the *ultimate* obligation to virtue, that no nearer obligation could ever be admitted, which cannot at laſt be reſolved into this moſt remote one: that no one, if he had his choice, would accept of exiſtence but upon condition of a preponderance of happineſs; that happineſs is the end of the whole creation, though the means by which it is to be obtained are not always in themſelves conſidered productive of happineſs; and that revelation aſſumes this as the ultimate ſanction of all its requiſitions. This view of moral obligation is ably defended by T. Cooper in the firſt of his tracts: his ſtatements, however, are ſometimes deficient in that reverence which ſhould ever be maintained to the Supreme Being; there is an occaſional vagueneſs, or rather inaccuracy, in his expreſſions; and in ſome inſtances we ſee more indications of acuteneſs than of ſolidity. It is leſs exceptionably and more compendiouſly conſidered and maintained in Mr. Belſham's Elements. It is ſtated by Cooper (p. 86.) to have been entertained by Cumberland, Puffendorf, Gay, Law, Turnbull, Rutherforth, Clayton, Johnſon, and others; Belſham adds Browne and Giſborne; and Paley (ſee b. ii ch. 2.) may evidently be arranged among them. On this and every other point of morals, however, our deciſion muſt be founded on ſomething more ſecure and ſatiſfactory than human *authority*.

Here, then, we come to the ultimate, or (as we ſhould prefer ſaying) the *remoteſt* obligation of virtue; and from this point we ſhall proceed, till it appears that the ends of human exiſtence will be beſt anſwered by reſting at a ſomewhat nearer and equally ſtable ground of obligation. And we cannot forbear anticipating the concluſions from the next diviſion, by obſerving, that it will clearly appear, from carefully conſidering the laws of our mental frame and the circumſtances of mankind, that the love of God, of man, and of duty, (in other words, the affections of piety and benevolence, and a regard to conſcience,) ſhould be our primary aim, ſince he will be moſt happy, in whom thoſe principles exiſt with the greateſt ſtrength and vigour. The *ultimate obligation*, the *beſt rule*, and the *immediate motive*, of duty, are three diſtinct conſiderations. If it appear that to make the will of God our *rule* of duty, is the *beſt* way to promote our own worth and happineſs, as well as the worth and happineſs of others, this muſt be our *beſt rule*: we may, nevertheleſs, be acting in perfect conſiſtence with this rule, when we are exerting ourſelves for the good of others, or impoſing reſtraints upon our ſelfiſh inclinations, with an explicit intention to promote the welfare of others, or to follow the dictates of conſcience, without, for the time, any direct reference to the will of God as ſuch; benevolence, or a ſenſe of duty, is in this caſe our *immediate motive*. The remoteſt obligation in this caſe, is the ſame as before; but we can ſeldom find it neceſſary, even in theory, to revert to it as the ultimate obligation; for if God is juſt and good, obedience to his will muſt be productive of our greateſt good on the whole. He is perfectly juſt and good, and therefore, in the actual ſtate of the caſe, and we need think of no other, the will of God may, with the utmoſt propriety, be aſſumed, not only as the nobleſt *motive*, and the beſt *rule*, but alſo as the *foundation*, and even (with very little departure from logical correctneſs, and with greater accordance with the feelings of the man who is accuſtomed to employ this rule) as the *ultimate obligation* of duty. He perhaps perceives, when he comes to diſcriminate nicely, that he *may* go one very ſhort ſtep farther; but religious obedience and his greateſt good, appear to him ſo inſeparably connected as cauſe and effect, that they make a part of one complex idea; ſo that when he is acting under a ſenſe of religious obligation, he feels a ſecurity, if he think at all about it, that he is effectually promoting his own greateſt happineſs on the whole. But he wiſhes to feel and act as little as may be with an explicit regard even to this higheſt ſpecies of ſelf-intereſt, as a primary conſideration; and therefore when he has come to the will of God, he cheerfully reſts with that, as *his* fartheſt obligation.

II. *Conſideration of the Primary Purſuits of Man.*—According to the plan propoſed near the beginning of this article, we ſhall now proceed to conſider what ſhould be made our primary purſuits in life, in order to obtain the greateſt degree of happineſs on the whole; in other words, according to the ſecond inquiry at the end of our introductory obſervations, what are thoſe affections and claſſes of conduct which poſſeſs the quality which renders them obligatory upon a reaſonable being like man. In anſwering this inquiry, the third will, alſo, in a conſiderable degree, receive an anſwer, *viz.* what are the beſt means for the culture of thoſe affections, and the proper direction of our conduct.

In this diviſion we ſhall make a free and almoſt continual uſe of Hartley's Rule of Life. We do not think it neceſſary to make any point of ſtating where we extract or abridge from him, or where we leave him; thoſe who are acquainted, or who may be led by what we here ſtate to an acquaintance with that part of his Obſervations, will eaſily perceive what we owe to him; and to others it would be uſeleſs. We do ourſelves pay no regard to his authority, farther than where it appears to us he has reached moral truth; and we aſk for no one's adoption of any ſtatement he may find here, *becauſe* it is Hartley's; but we ſhall deem ourſelves happy, if our preſent labours ſhould lead any to cultivate an intimate acquaintance with that invaluable treaſury of moral principles.

Hartley's Rule of Life follows the arrangement of the pleaſures and pains in the firſt part of his Obſervations; and we ſhall purſue the ſame order. It was greatly with a view to this, that we entered ſo much into his analyſis of the mental pleaſures and pains in our preceding article (PHILOSOPHY, *Mental*, IV. 7.), and we muſt beg the reader to refer, under each claſs, to the correſponding ſection there. The primary diviſion of the pleaſures and pains is into the ſenſible and the mental or intellectual; and theſe laſt are divided by Hartley into thoſe of 1. IMAGINATION; 2. AMBITION; 3. SELF-INTEREST; 4. SYMPATHY; 5. THEOPATHY; and 6. Thoſe of the MORAL SENSE.

1. *Eſtimate of the Pleaſures of Senſation.*—The firſt pleaſures and pains of the human being are obviouſly thoſe of ſenſation, and they form one ſource of enjoyment, and ſtill more of ſuffering, during the whole of life. It is from theſe that the whole round of mental or intellectual pleaſures and pains is compoſed. (See PHILOSOPHY, *Mental*, II. IV.) To eſtimate the value of theſe pleaſures in their uncompounded ſtate, take the extreme caſe, that any one purſued them as a primary object, laying aſide all reſtraint from the virtues of temperance and chaſtity; he would ſoon deſtroy his bodily faculties, thus rendering the objects of the ſenſible pleaſures uſeleſs; and he would precipitate himſelf into pain, diſeaſes, and death, evils of the firſt magnitude in the eyes of the voluptuous. This is a plain matter of obſervation, verified every day by the ſad example of loathſome, tortured wretches, that occur which way ſoever we turn our eyes in the ſtreets, in private families, in hoſpitals, in palaces. Poſitive miſery, and the loſs even of ſenſible pleaſure, are too inſeparably connected with intemperance and lewdneſs, to leave room for doubt even to the moſt ſceptical. The ſenſual appetite muſt therefore be regulated by, and made ſubſervient to, ſome other part of our natures, elſe we ſhall miſs even the ſenſible pleaſure which we might have enjoyed, and ſhall fall into the oppoſite pains, which are, in general, far greater, and more exquiſite than the ſenſible pleaſures.

The ſame concluſion alſo follows from the fact, that inordinate indulgence in ſenſual gratifications, deſtroys the mental faculties, expoſes to external inconveniences and pains, is totally inconſiſtent with the duties and pleaſures of benevolence and piety, and is all along attended with the ſecret reproaches of the moral ſenſe, and the horrors of a guilty mind. Such is the conſtitution of our frame, that the formation of mental feelings and affections cannot be altogether prevented; but an inordinate purſuit of ſenſible pleaſures converts the mental affections into a ſource of pain, and impairs, and cuts off, the intellectual pleaſures.

The ſame thing may be inferred from the fact, that the ſenſible pleaſures are formed firſt, and the mental pleaſures from them, by the aſſociative power. Now it is a general principle in the order of nature, that the prior ſtate, or means, is leſs perfect and important than the poſterior ſtate, or the end. Hence the ſenſible pleaſures cannot be of equal value and dignity with the mental, to the generation of which they are made ſubſervient. This inference may be drawn from the analogy of nature, without reference to the infinite benevolence of the Supreme Being, which, however, makes it more ſatisfactory.

Further, the mental pleaſures are more conſiſtent with the gentle gradual decay of the body, than the ſenſible pleaſures, becauſe, as they are formed from the combination and coaleſcence of many ſenſible pleaſures, they more affect the ſenſible ſyſtem at large; while the ſenſible pleaſures principally affect the particular parts of the ſyſtem to which they belong, and therefore, when indulged to exceſs, they injure or deſtroy their reſpective organs, before the whole body comes to a period.

Laſtly, the duration of mere ſenſible pleaſure is neceſſarily very ſhort, and cannot, even when free from guilt, afford any pleaſing recollections; whereas one of the principal pleaſures of our nature, is, and muſt be, the pleaſures of reflection and conſciouſneſs. In like manner the evident uſe and reſtriction thereto of one of the chief ſenſible pleaſures to preſerve life and health, with all the conſequent mental faculties, and executive bodily powers; of the other to continue the ſpecies, and to generate and enlarge benevolence, make the ſubordinate nature of both manifeſt in an obvious way.

2. *Regulation of the Purſuit of the Pleaſures of Senſation.*—The foregoing remarks prove that the pleaſures of ſenſation ought not to be made the primary purſuit of life, but require to be regulated and reſtrained by ſome foreign regulating power. That they ſhould be ſubmitted to the precepts of benevolence, piety, and the moral ſenſe, may be proved by ſhewing, that by this means they will contribute both to their own improvement, and to that of other parts of our nature.

Now benevolence requires that the pleaſures of ſenſe ſhould be made entirely ſubſervient to health of body and of mind, ſo that each perſon may beſt fill his place in life; beſt perform the ſeveral relative duties of it; and as far as in him lies, prolong his days to their utmoſt period free from great diſeaſes and infirmities. All gratifications, therefore, which tend to produce diſeaſes of body or irregularities of mind, are forbidden by benevolence; and the moſt wholeſome diet, as to quantity and quality, enjoined by it. It alſo moſt ſtrictly forbids all gratifications by which the health or virtue of other individuals is injured, or by which encouragement is given to others to depart from the rules of chaſtity and temperance. The precepts of piety are to the ſame purpoſe, whether they are deduced from our relation to God, as our common Father and Benefactor, who wills that all his children ſhould uſe his bleſſings ſo as to promote the common good; or from the natural manifeſtations of his will in the immediate pleaſures and advantages ariſing from moderate refreſhment, and the manifeſt inconveniences and injuries cauſed by exceſs in quantity or quality; or from his revealed will, by which temperance in all ſenſible pleaſures is commanded, and intemperance ſeverely threatened. In like manner the moral ſenſe abſolutely directs to the ſame moderation, whether it be derived explicitly from the foregoing rules of benevolence and piety, or from ideas of decency, rational ſelf-intereſt, the practice of wiſe and good men, the diſguſting nature of the diſeaſes conſequent on intemperance, the odiouſneſs and miſchief of violent paſſions, &c. It is evident, therefore, that all theſe guides of life lead to the ſame end, *viz.* great moderation in ſenſible enjoyments, though they differ ſomewhat in their motives, and in the commodiouſneſs of their application, as a rule in the particular occurrences of life.

By this ſteady adherence to moderation, we are no loſers, even with reſpect to ſenſible pleaſures themſelves; for by theſe means our ſenſes and bodily powers are preſerved in their beſt ſtate, and as long as is conſiſtent with the neceſſary decay of the body; and this moderation, and its beneficial conſequences, directly tend to inſpire the mind with perpetual ſecurity, cheerfulneſs, and good will, and with gratitude to the Giver of all good. In the common intercourſe of life, aſſociated circumſtances add greatly to the pleaſures of ſenſation: thus the pleaſure of receiving a thing from a friend, or ſharing it with a friend, ſociality and mirth at the time of enjoyment, &c. greatly enhance the gratifications of taſte. Much more then will the pure and exalted pleaſures of piety and benevolence increaſe theſe pleaſures.

We are then great gainers on the whole, by religious moderation as to ſenſible pleaſures; ſtill more ſo as to the ſenſible pains and ſufferings which the intemperate bring on themſelves. Theſe are of the moſt exquiſite kind, and often of long duration, eſpecially when they give intervals of reſpite; they impair the bodily and mental powers ſo as to render moſt other enjoyments inſipid and imperfect; they diſpoſe to peeviſhneſs, paſſion, and murmuring againſt Providence; and are attended with the pangs of a guilty mind.

On the whole, the proper method of avoiding the ſenſible pains, whether the reſult of exceſs, or ſuch as occur in the daily diſcharge of the duties of life, and of obtaining the ſenſible pleaſures in their beſt and moſt laſting ſtate, is not to aim at either directly, but in every thing to be guided by the dictates of benevolence, piety, and the moral ſenſe. It is evident that luxury, ſelf-indulgence, and an indolent averſion to perform the duties of a man's ſtation, not only bring on groſs bodily diſeaſes, but previouſly to this, often produce ſuch a degree of anxiety and fearfulneſs in minute affairs, as to make perſons inflict upon themſelves greater torments than the moſt cruel tyrants could inflict. There are caſes, however, in which perſons are obliged, from a ſenſe of duty, from benevolence, from adherence to true religion, &c. to forego pleaſure, and to endure pain; and this where there is no probability of a recompence in this life. Here the hopes of futurity lend their aid, and the preſent pleaſure which theſe afford, is in ſome caſes ſo great, as to overpower, and almoſt to annihilate, the oppoſite pains.

3. *Rules reſpecting the Pleaſures of Senſation.*—"The only rule with reſpect to our diet," ſays Dr. Prieſtley in his Inſtitutes, "is to prefer thoſe kinds, and that quantity, of food, which moſt conduce to the health and vigour of our bodies. Whatever in eating or drinking is inconſiſtent with, and obſtructs this end, is wrong, and ſhould carefully be avoided; and every man's own experience, aſſiſted with a little information from others, will be ſufficient to inform him what is nearly the beſt for himſelf in both theſe reſpects, ſo that no perſon is likely to injure himſelf through mere miſtake."

It is ſufficiently obvious, that it is the benevolent affections which give the chief value and higheſt intereſt to the ſenſible pleaſures, ariſing from the intercourſe of the ſexes; and it alſo appears that theſe pleaſures were deſigned by the great Author of our frame to be one chief means of transferring our affection and concern from ourſelves to others. If, therefore, this great ſource of benevolence be corrupted or perverted, the ſocial affections depending on it will alſo be perverted, and degenerate into ſelfiſhneſs or malevolence. Theſe conſiderations, of themſelves, point to marriage as the only juſtifiable mode of indulging the ſocial paſſions.

Unreſtrained promiſcuous intercourſe would produce the greateſt evil public and private. By being unreſtrained, it would deſtroy the health and prevent the propagation of the ſpecies; by being promiſcuous, it would be ineffectual to promote the tender and benevolent charities, either between the individuals themſelves, or towards their offspring, and would produce endleſs contentions among mankind. Now though ſcarcely any known nation has allowed of ſuch entire licentiouſneſs, yet the evils ariſing from any great degree of it are ſo abundantly obvious and important, that they have almoſt univerſally led to ſome ſuch regulation of ſexual intercourſe as that of marriage, and prove its neceſſity for the well-being of ſociety.

Further, to uſe the words of Paley, already cited under the article MARRIAGE, whoſe excellent remarks on this ſubject we ſhall freely employ as ſuits our purpoſe, the public uſe of marriage inſtitutions alſo conſiſts in their promoting the production of the greateſt number of healthy children, their better education, and the making of due proviſion for their ſettlement in life; and their promoting the private comfort of individuals, and particularly of the female ſex. It may be true, all are not intereſted in this laſt reaſon; nevertheleſs it is a reaſon to all for abſtaining from any conduct, which tends in its general conſequence to obſtruct marriage: for whatever promotes the happineſs of the majority is binding upon the whole.

Theſe conſiderations prove that the reſtraint of marriage inſtitutions is an eſſentially important obligation. It may be violated by vagrant concubinage, or by cohabitation limited to a ſingle individual. The former will be the object of the next paragraph; the latter cannot be placed upon the ſame footing with it in ſeveral reſpects: but as it can anſwer the primary public ends of marriage in only a few caſes, as it tends to annihilate the individual advantages which are naturally derived from it, both as to moral welfare and to comfort; and as it decidedly diſcountenances marriage, and conſequently in the preſent ſtate of ſociety countenances fornication, it follows that it is immoral. "Laying aſide the injunctions of the ſcriptures," ſays Paley, "the plain account of the queſtion ſeems to be this: it is immoral, becauſe it is pernicious that men and women ſhould cohabit, without undertaking certain irrevocable obligations, and mutually conferring certain civil rights; if, therefore, the law has annexed theſe rights and obligations to certain forms, ſo that they cannot be ſecured or undertaken by any other means, which is the caſe here, (for whatever the parties may promiſe to each other, nothing but the marriage ceremony can make their promiſe irrevocable,) it becomes in the ſame degree immoral, that men and women ſhould cohabit without the interpoſition of theſe forms."

With reſpect to the crime of fornication, it is to be obſerved that promiſcuous concubinage tends greatly to diſcourage marriage, and therefore to defeat the ſeveral beneficial purpoſes ſpoken of in the preceding paragraph. The reader will learn to comprehend the magnitude of this miſchief, by attending to the importance and variety of the uſes to which marriage is ſubſervient, and by recollecting that the malignity and moral quality of each crime are not to be eſtimated by the particular effect of one offence, or of one perſon's offending, but by the general tendency and conſequence of crimes of the ſame nature. If one inſtance of licentious indulgence be innocent or allowable, why ſhould not more? and if allowable in one, why ſhould not licentiouſneſs become general? and if it were ſo, what dreadful conſequences would follow? Every inſtance of licentious conduct has the direct and decided effect of leading to thoſe dreadful conſequences, which none but a purely malevolent being could contemplate without horror; and every inſtance is therefore criminal, altogether independent of its individual effects and tendencies.

Again: fornication ſuppoſes proſtitution, and proſtitution brings and leaves the victims of it to almoſt certain miſery. It is no ſmall quantity of miſery in the aggregate, which between want, diſeaſe, and inſult, is ſuffered by thoſe outcaſts of human ſociety who infeſt populous cities; the whole of which is a general conſequence of fornication, and to the increaſe and continuance of which every act and inſtance of fornication contributes.

Further: fornication produces habits of ungovernable lewdneſs, which introduce the more aggravated crimes of ſeduction, adultery, violation, &c. Of this paſſion it has been truly ſaid, that irregularity has no limits; that one exceſs draws on to another; that the moſt eaſy, therefore, as well as the moſt excellent way of being virtuous, is to be ſo entirely. However it be accounted for, the criminal intercourſe of the ſexes corrupts and depraves the mind and moral character, more than any ſingle ſpecies of vice whatſoever. That ready perception of guilt, that prompt and deciſive reſolution againſt it, which forms one grand feature in a virtuous character, is ſeldom found in perſons addicted to theſe indulgences. They prepare an eaſy admiſſion for every ſin that ſeeks it; they are, in low life, uſually the firſt ſtage in men's progreſs to the moſt deſperate wickedneſs; and, in high life, to that lamented diſſoluteneſs of principle, which manifeſts itſelf in a profligacy of public conduct, and a contempt of the obligations of religion and moral probity. Add to this, that habits of libertiniſm incapacitate and indiſpoſe the mind for all intellectual, moral, and religious pleaſures, which is a great loſs to any man's happineſs.

Laſtly: fornication perpetuates a diſeaſe, which may be accounted one of the soreſt maladies of human nature, and the effects of which are ſaid to viſit the conſtitution of even diſtant generations. The paſſion being natural, proves that it was intended to be gratified; but under what reſtrictions, or whether without any, muſt be collected from ſuch conſiderations as the foregoing. And we muſt hint here, that the gratification of it in *any* way but by ſexual intercourſe, is not only directly and expreſsly forbidden by the laws of God, (and even, in ſome inſtances, of man,) and by general conſent branded with ſhame and infamy, but leads to conſequences in the bodily and mental ſyſtem alike miſchievous and irremediable. See § 2.

If fornication be criminal, all thoſe incentives which lead to it are acceſſaries to the crime, and, as ſuch, are criminal, independently of their injurious effects upon the mind, which, however, are very great: for inſtance, laſcivious converſation, whether expreſſed in obſcene, or diſguiſed under modeſt, phraſes; alſo wanton pictures, ſongs, and books, the writing, publiſhing, and circulating of which, whether out of frolic, or for ſome pitiful profit, is productive of ſo extenſive a miſchief, from ſo mean a temptation, that few crimes, within the reach of private wickedneſs, have more to anſwer for, or leſs to plead in their excuſe.

Though the ſexual deſires are very ſtrong, yet there is abundant reaſon to believe that they are not originally much diſproportionate to their end; and that if due care were taken, they would not ariſe in youth much before the proper time for this end. But the violence and unſeaſonableneſs of theſe paſſions are ſo manifeſt in the generality of young perſons, that one cannot but conclude the general education of youth to be groſsly erroneous and perverted; and, upon examination, this will appear very evident in fact. The diet of children and young perſons is not ſufficiently plain and ſparing; a proper regulation of which would lay a better foundation for health and freedom from diſeaſes, and put ſome check upon theſe paſſions. They are brought up in effeminacy, and neglect of bodily exertion, which would materially aſſiſt to prepare both body and mind for the diſcipline of life, and would reſtrain the ſexual paſſion. The due culture of the mind, eſpecially in reſpect of religion, is very generally neglected; ſo that the young are uſually left without employment for their thoughts, and deſtitute of the chief armour, that of religious motives, whereby to oppoſe temptation. Laſtly: the converſation which they hear, and the books which they are allowed to read, (and even to employ as a part of their learning,) are ſo corrupt in this reſpect, that it is a matter of aſtoniſhment how a parent, who has any ſerious concern for his child, can avoid ſeeing the immediate deſtructive conſequences, or think that any conſideration relating to this world can be a balance to them.

4. *Eſtimate of the Pleaſures of Imagination.*—It does not appear from actual experience, that thoſe who devote themſelves to the ſtudy of the polite arts, or of ſcience, or to any other pleaſure of mere imagination, as their chief end and aim, do attain any greater degree of happineſs than the reſt of the world. The frequent repetition of theſe pleaſures cloys, as in other caſes; and though the whole circle is extenſive, yet no one can graſp the whole, and as a matter of fact few apply themſelves to more than one or two conſiderable branches. From the manner in which the feelings of imagination are uſually generated, and transferred upon their ſeveral objects, it might be expected that deformity would be often mixed with beauty, ſo as to produce an unpleaſing diſcordancy of opinion, even in the ſame individual; and, as a matter of fact, it is not uncommon for men, after a long and immoderate purſuit of one claſs of beauty, natural or artificial, to deviate into ſuch by-paths and ſingularities, that the objects excite rather pain than pleaſure; their limits for excellence being narrow, and their rules abſurd, and all that falls ſhort of theſe being condemned by them as deformed and monſtrous. Eminent votaries of this kind are generally remarkable for ignorance and imprudence in the common affairs of life; thus ſubjecting themſelves to ridicule and contempt, and to real, great, and laſting inconveniencies. Vanity, moroſeneſs, and envy, are too generally the painful and injurious concomitants of an overweening attention to the purſuit of theſe pleaſures. And ſcepticiſm in religious matters is a frequent attendant here, which, if it could be ſuppoſed free from danger as to futurity, is at leaſt very uncomfortable as to the preſent. This almoſt neceſſary conſequence of ſuch confined attention is, that too high a degree of importance is given to the object, and the ſuperiority which is ſuppoſed to be poſſeſſed in it, is ſuppoſed alſo to extend to other caſes in which the individual is perhaps uncommonly ignorant; and thus he either becomes dogmatical or ſceptical; qualities which,

though apparently different from each other, are, in reality, to be conſidered as antecedent and conſequent, dogmatiſm being frequently followed by ſcepticiſm. And as religious knowledge, to be properly cultivated, requires that the ſoil ſhould be prepared by the benevolent and pious affections, and no kind of learning being of itſelf ſufficient to give this preparation, if attention to the purſuit of literature or of ſcience be ſo inordinate as to ſuppreſs the growth of theſe affections, religion itſelf will be treated as incomprehenſible, abſurd, uncertain, or incredible.

It is, however, difficult to repreſent juſtly, what is the genuine conſequence of the purſuit of the mere pleaſures of the imagination; their votaries being alſo generally actuated by motives of ambition; but, as will be ſeen hereafter, this does not invalidate any of the foregoing remarks.

It is juſtly obſerved by Dr. Percival, that the endleſs progreſſion of knowledge, is apt to give the love of it an inordinate aſcendancy over every other principle; and as this paſſion does not, like the love of virtue, temper its particular exertions, by preſerving a due ſubordination of the powers which it calls into action, the wildeſt extravagancies of emotion and of conduct, have been diſplayed by thoſe who have ſubmitted to its uncontrouled dominion.

Further, we have reaſon to ſuppoſe that the pleaſures of imagination ought not to be made our chief end and aim, becauſe in general they are the firſt of the intellectual pleaſures, come to their height early in life, and decline in old age. There are ſome few, indeed, who continue devoted to them through life; ſo there are ſome to the pleaſures of ſenſation; but both are irregularities which cannot be conſidered as indications of the deſigns of Providence reſpecting theſe pleaſures. Hence the analogous argument reſpecting ſenſation, § 1, is applicable to theſe pleaſures alſo. Like every other part of the great machine, they have their uſe, but it is a ſubordinate one; they tend to the improvement and perfection of our nature, but eminence in them is not that perfection. They teach a love of regularity, exactneſs, truth, ſimplicity: they lead to a knowledge of many important truths reſpecting themſelves, the world in general, and its Author: they habituate to invent and to reaſon; and when the ſocial, moral, and religious affections begin to be generated in us, we may make a much quicker progreſs towards the perfection of our natures by having a due ſtock, and no more than a due ſtock, of knowledge in natural and artificial things, of a reliſh for natural and artificial beauty.

5. *Regulation of the Pleaſures of Imagination.*—As the pleaſures of imagination are manifeſtly intended to aſſiſt in generating and augmenting the higher orders of benevolence, piety, and the moral ſenſe, ſo theſe laſt may be made to perfect and improve the former.

(1) Thoſe parts of the *arts and ſciences* which inſpire us with devout affections, and enable us to be moſt uſeful to others, abound with the moſt and greateſt beauties. Thus the ſtudy of the ſcriptures, of natural hiſtory, and natural philoſophy, of the frame of the human mind, &c. when undertaken with pious and benevolent intentions, lead to more intereſting and ſurpriſing truths, than any ſtudy intended for mere private amuſement.

Further, ſince the world is a ſyſtem of benevolence, and conſequently the Author of it is the object of unbounded love and adoration, benevolence and piety are the only true guides in our inquiries into it, the only clues which will lead through the labyrinths of nature. In the purſuit of every branch of valuable knowledge, let the inquirer take for granted that every thing is right on the whole, that is, let him with a pious confidence ſeek for benevolent purpoſes, and he will find the right road, and by a due continuance in it, attain to ſome new and valuable truth; whereas, every other principle and motive for examination, being foreign to the great plan upon which the univerſe is conſtructed, muſt lead to endleſs mazes, errors, and perplexities. Again, it is to their tendency to the increaſe of happineſs, that almoſt all truths owe their luſtre. Hence thoſe whoſe minds are under the influence of benevolence, will have the higheſt gratification which the perception of thoſe truths can produce.

Laſtly, the pleaſures of the imagination point to devotion in a particular manner, from their unlimited nature. All the pleaſures derived from beauty, both natural and artificial, begin to fade and languiſh after a ſhort acquaintance with it: novelty is a never-failing requiſite; we look down with indifference upon what we comprehend eaſily, and feel the wiſh to aim at ſuch things as are but juſt within the compaſs of our preſent faculties. To what inference does this tendency to preſs forwards, this endleſs graſping after infinity, neceſſarily lead us? Is it not that the infinite Author of all things has ſo formed our faculties, that nothing leſs than himſelf can be an adequate object for them: that nothing finite, however great and glorious, can afford full and laſting ſatisfaction: that as nothing can give us more than a tranſitory delight, if its relation with God is excluded, ſo every thing, when conſidered as the production of his infinite wiſdom and goodneſs, will gratify our utmoſt expectations, ſince, in this view, we may reſt ſatisfied that every thing has numerous uſes and excellencies, and that in the courſe of nature the leaſt and vileſt, according to common apprehenſion, bear a proper part, as well as thoſe whoſe preſent ſuperiority over them appears indefinitely great.

In fine, then, and then only, is ſcience a worthy object of purſuit as a leading object, when it is purſued with juſt views; when it is valued for its tendency to form valuable mental habits, and to cultivate moral ones; when we appreciate its value by its enlarging our capacity of uſefulneſs to our fellow men, and by its enabling us to raiſe our minds from ſenſe to intellect, when we make it the path to religious and moral worth. As a means, it is highly conducive to the purification and perfection of our nature: purſued as an end, it will engroſs the affections, and more honourable and more faſcinating than the ſordid or ſenſible pleaſures, it will by degrees become a more dangerous and obſtinate evil than thoſe.

The foregoing remarks more particularly reſpect the pleaſures ariſing from the purſuit of the objects of the underſtanding; and we think it will be deſirable to offer ſome obſervations on thoſe ariſing from the elegancies and amuſements of life, from wit, mirth, and humour, and from the polite arts. A great part of theſe we ſhall collect from Hartley's 57th and following propoſitions on thoſe ſubjects.

(2) By the *elegancies of life* are to be underſtood, the artificial beauties of houſes, gardens, furniture, dreſs, &c. There is in them, as in moſt other things, a certain middle point, which coincides with our duty and our happineſs; while all great deviations from it incur the cenſure of criminality, or at leaſt of unſuitableneſs and abſurdity. It is impoſſible for any one exactly to judge for another on theſe points; but a few general principles may be of uſe reſpecting them.

Againſt the immoderate purſuits of the elegancies of life it may be urged; 1. That vanity and oſtentation, and the *unlawful* pleaſures of property, are almoſt inſeparable from the purſuit of thoſe elegancies, and often engroſs all to themſelves. 2. The profuſion of expence attending them is inconſiſtent with charity to thoſe who are in want of our ſuperfluities. 3. The beauties of nature are far ſuperior to all artificial ones: they are open to every one, and therefore rather reſtrain than feed the deſire of property; and they lead to humility, devotion, and the ſtudy of the ways of Providence. We ought, therefore, much rather to apply ourſelves to the contemplation of natural than of artificial beauty; and even the ſources of the former ſhould not be made our ultimate object.

On the other hand, that ſome attention may lawfully, and even ought to be paid to artificial beauty, will appear from the following conſiderations. 1. Convenience and utility are certainly lawful ends; nay, we are even ſent hither to promote theſe publicly and privately. But theſe coincide for the moſt part with, and are promoted by, ſimplicity, neatneſs, regularity, and juſtneſs of proportion; that is, with ſome of the ſources of artificial beauty; though not with all; ſuch as grandeur, ſumptuouſneſs, and the profuſe variety and accumulation of natural beauty and ſplendour. 2. The ſtudy of artificial beauty draws us off from the groſs ſenſual pleaſures; refines and ſpiritualizes our deſires; and, when duly limited, teaches us to transfer and apply our ideas of ſimplicity, uniformity, and juſtneſs of proportion, to the heart and affections. 3. In this ſtate of trial it is neceſſary to be occupied in innocent purſuits, leſt we fall into ſuch as are miſchievous and ſinful. It is therefore, in its proper place and degree, as great a charity to mankind to employ the poor in improving and ornamenting external objects, rewarding them generouſly and prudently for their labour, as to give alms; and as uſeful for the rich, at proper times, to be employed in contriving and conducting ſuch deſigns, as to read, meditate, or pray at others. Our natures are too feeble to be always ſtrained to the pitch of an active devotion or charity: ſo that we muſt be content, at ſome intervals, to take up with employments that are merely innocent, ſitting looſe to them, and purſuing them without eagerneſs or exceſſive devotement of mind.

Theſe and ſimilar reaſons, for and againſt the purſuit of the elegancies of life, hold, in various degrees, according to the ſeveral circumſtances of particular perſons. And it will not be difficult for thoſe who are really in earneſt, endeavouring to do their duty, to balance them againſt one another in every caſe, ſo as to approach nearly to that medium wherein our duty and happineſs coincide.

(3) "The practice *of playing at games of chance or ſkill*, is one of the principal amuſements of life; and it may be thought hard to condemn it as abſolutely unlawful, ſince there are particular caſes of perſons infirm in body or mind, where it ſeems requiſite to draw them out of themſelves, by a variety of ideas and ends in view, which gently engage the attention. But this reaſon takes place in very few inſtances. The general motives to play are, avarice, joined with a fraudulent intention, explicit or implicit, oſtentation of ſkill, and ſpleen, through the want of ſome ſerious uſeful occupation. And as this practice ariſes from ſuch corrupt ſources, ſo it has a tendency to increaſe them; and, indeed, may be conſidered as an expreſs method of begetting and inculcating ſelf-intereſt, ill-will, envy, &c. For, by gaming a man learns to purſue his own intereſt ſolely and explicitly, and to rejoice at the loſs of others as his gain; grieve at their gain as his own loſs; thus entirely reverſing the order eſtabliſhed by Providence for ſocial creatures, in which the advantage of one meets in the ſame point as the advantage of another; and their diſadvantages likewiſe. Let the loſs of time, fortune, reputation, ſerenity of temper, &c. be conſidered alſo."

We have quoted the above paſſage in Hartley's own words; becauſe we do not quite accord with him in every reſpect, and yet think his ſtatement deſerving of ſerious attention. Our principal objection to it is, that it does not take in a ſufficient number of caſes. His remarks are truly forcible againſt playing for money; and it can ſeldom be allowable, and never more. But we may conſider them independently of this connection. The only caſe in which games of mere *chance* can be juſtifiable, Hartley has well laid down. The habit of gaming is ſo infatuating, and ſo deſtructive in its conſequences to moral worth and happineſs, that the mind ſhould be kept from all tendencies to it, and impreſſed with a great horror of it, by all proper means. And the ſame reaſon excludes all games in which chance is the chief ſource of intereſt. Games of mere *ſkill* (ſuch as cheſs) may be of conſiderable ſervice, eſpecially in the early part of life, in exerciſing attention, ſagacity, activity, and forethought; and we ſhould be diſpoſed to encourage ſuch among the young, particularly the volatile and thoughtleſs. As the plans of one muſt often depend upon the unforeſeen determinations of another, involving many points of conſideration, they call into play the qualities which are neceſſary in the buſineſs of life. To employ ſkilfully the unforeſeen conjunctures of events, is often one of the greateſt exerciſes of human wiſdom. For this reaſon we do not think that games of ſkill, in which what we call chance has ſome ſhare, are without their uſe; for thoſe unforeſeen conjunctures are, as far as reſpects ourſelves, of the ſame character as thoſe which occur in the mixed games we are ſpeaking of; but we would not encourage them among the young, eſpecially from their tendency to lead on to direct gaming, and to habits of wild ſpeculation, by producing the practical belief that the valuable objects of human attention are to be obtained by ſome eaſier means than the ſtraight-forwards path of uprightneſs and patient perſevering exertion. For reaſons which correſpond with thoſe already ſtated, all betting and lottery ſpeculations ſhould be carefully avoided and diſcouraged; and theſe laſt in particular, becauſe the injury done to the morals of ſociety by the lotteries is great, almoſt beyond calculation, and it cannot therefore be right to encourage them.

With reſpect to theſe and recreations in general, if they clearly contribute to the bodily, intellectual, or moral health, then, ſo far, they are wiſe and uſeful; if the uſe of them tend to cultivate ſelfiſh purpoſes, (ſuch as thoſe of avarice, ill-will, vanity, envy, eagerneſs for ſuperiority, &c.), or excite deſires which cannot be gratified conſiſtently with virtue, then they are wrong, either in themſelves, in their degree, or in the mode of their employment: and it is the part of wiſdom and duty to obſerve their effects, and the degree in which theſe are neceſſary, and to regulate, reſtrain, or altogether exclude them, accordingly.

We wiſh it to be conſidered, however, by thoſe ſerious perſons, who, penetrating deeply into the poſſible, but remote conſequences of actions, leave the immediate effects and the actual ſtate of human nature too much out of view, whether the intereſts of religion and virtue would not be more promoted among the young and inexperienced, by their giving their ſanction to pleaſures in themſelves conſidered innocent, while innocently purſued, (that is with moderation, and without abuſe to wrong purpoſes,) than by their marking the gaiety of youth and healthful activity with too ſevere an eye: and whether, by keeping altogether aloof from the common amuſements of life, they do not remove an important reſtraint on the abuſe of them. In the preſent circumſtances of mankind, ſuch amuſements are neceſſary to keep men from actual vice: and the great object is to reſtrain them within due bounds, and to leſſen their unavoidable evils as much as poſſible. If the good left them entirely, the bad would ſoon make them twofold more injurious than they are at preſent. Extreme rigour, we would farther ſuggeſt to them, with reſpect to amuſements which are wrong only when carried to exceſs, tends to confound moral diſtinctions in the minds of the young, to weaken their own influence in their minds, and to render the ſtrict diſcharge of duty unamiable and unpleaſant.

(4) With reſpect to *mirth*, *wit*, and *humour*. 1. It is neceſſary to avoid all ſuch as leſſen our reverence to God and religious ſubjects, injure our diſpoſitions, or excite in ourſelves improper and corrupt inclinations. From Hartley's analyſis of this ſpecies of the pleaſures of the imagination, (Obſ. vol. i. p. 439.) it can ſcarcely fail to appear to the reflecting mind, that the greateſt part of what paſſes under theſe names, and that, too, which is in general eſtimation moſt ſtriking, have a wrong tendency; and it is therefore neceſſary to be moderate and cautious in our mirth, and in our attention to wit and humour, and our endeavours after them. 2. However innocent mirth may be, and even if kept within narrow limits, it has a great tendency to produce a degree of levity and diſſipation of mind, little conſiſtent with the views of Chriſtian duty reſpecting this life and its connection with another. 3. Wit and humour, by ariſing for the moſt part from fictitious contraſts and coincidences, have a direct tendency to diſqualify the mind from the purſuit after truth, and attention to the uſeful practical relations of things. 4. Wit and humour too commonly generate an exceſſive love of admiration and applauſe; and the diſplay of them, as it ariſes from it, ſo it contributes powerfully to increaſe it. See hereafter, § 6, 7.

A due attention being paid to theſe and ſimilar cautions, it appears not only allowable, but even requiſite to aim at a ſtate of perpetual cheerfulneſs, and to permit ourſelves to be amuſed and diverted by the innocent pleaſantries of our friends and acquaintance, contributing alſo ourſelves thereto, as far as is eaſy and natural to us. This temper of mind flows from benevolence and ſociality, and in its turn produces them: it relieves the mind, qualifies us for the diſcharge of ſerious and afflicting duties, when the order of Providence lays them upon us: and it helps to correct, in ourſelves and in others, many little follies and abſurdities, which though they ſcarcely deſerve a ſevere chaſtiſement, yet ought not to be overlooked entirely.

(5) Reſpecting the *polite arts*, particularly thoſe of *muſic*, *painting*, and *poetry*, the reader of the Obſervations can ſcarcely fail to infer, either that Hartley carried his views too far, or that there is conſiderable improvement among us with reſpect to public taſte ſince his time; that it is, on the whole, decidedly more accordant with virtue. We think the latter. Except among the gay and licentious, who lay themſelves under no reſtraints of duty, we ſee no reaſon to believe that there is a greater regard than in the former part of the laſt century, to decency of manner: and if ſomething is loſt in the way of creative genius, in conſequence of the reſtraint which this improvement lays upon the imagination, there is no doubt that a great deal of much more conſequence is gained. To a certain extent, however, Hartley's rules appear ſtill to be too well founded, and we ſhall accommodate the ſpirit of them to what appears to us the preſent ſtate of things among thoſe who have ſome principle of duty, and add ſome other remarks. In the way of caution reſpecting them, we obſerve, 1. It is evident that, to leave out of view the avowedly licentious kinds of muſic, painting, and poetry, there are many which have a cloſe connection with vice; particularly with the vices of intemperance and lewdneſs, repreſenting them in gay and pleaſing colours, or at leaſt taking off from the abhorrence due to them. 2. Great ſkill in theſe arts requires an extenſive conſumption of time upon them; they are very apt to excite vanity and ſelf-conceit in their votaries; and in many caſes, the expences with which they are attended are too great to be reconciled with charity to the poor, and other duties of a man's ſtation and relations in life. 3. The pleaſures ariſing from theſe ſources are of that faſcinating nature, and tend to excite the feelings ſo much in various ways, that, when the purſuit of them is carried to exceſs, it unfits the mind for the active and ſerious employments and duties of life; making them appear inſipid, and at the ſame time, by the conſtant effects of over-excitement, weakening the mind itſelf for attention to them. This is a great and ſerious evil, and it particularly reſpects the arts of poetry and muſic, including under the former all the claſſes of works in the production of which the imagination has the chief ſhare. We ſay leſs reſpecting the pleaſures derivable from the art of painting, becauſe they are either of comparatively rare occurrence, or, if otherwiſe, as in the caſe of the artiſt, are attended with an exerciſe of the habits of patience, attention, and ingenuity, yet without, in a general way, any exceſſive excitement of mind. In this connection we ſolicit the reader's attention to the remarks which we have offered in MORAL *Education*, III. 11, 12. col. 51, 52.

Nevertheleſs it is to be obſerved, on the other hand, 1. That the polite arts in general, when purſued with innocence and moderation, have, in a great meaſure, the effects pointed out at the end of § 4, and do ſtrongly contribute to raiſe the mind one ſtep at leaſt above the pleaſures of mere ſenſation. 2. They alſo contribute in no inconſiderable degree, but, as is obvious, in different proportions, to the pleaſures of ſociality; and ſimilar remarks to thoſe which were made reſpecting wit and humour, may be applied with reſpect to the arts, where the application of them is conſiſtent with virtue. 3. The art of painting, and others related to it, are of eminent uſe in the promotion of ſcience, and in the application of it to various practical purpoſes of life: and they cultivate the habits of obſervation, and the taſte for natural beauty. 4. Works of imagination, when under the guidance of good ſenſe and obſervation, and of ſound principles of morality, have often a beneficial effect, in refining the mind, raiſing it above the more ſordid purſuits of ſelfiſhneſs, inſpiring it with generous and noble ſentiments, and communicating to it a knowledge of human nature, which may not unfrequently aſſiſt in ſupplying the want of experience, or at leaſt in extending what we poſſeſs. (On this point, ſee INTELLECTUAL *Education*, XII.) 5. Of the art of muſic there is probably room to be the moſt ſuſpicious, through its peculiarly powerful effects on the phyſical and mental ſenſibilities. It can be directly licentious, only through its aſſociated circumſtances; but from theſe and its phyſical effects, it has great influence in preparing for the admiſſion of looſe deſires and conceptions. Muſical ſkill among young men too commonly leads to ſocial intercourſe of a pernicious kind; and among females to vanity and oſtentation. Nevertheleſs it muſt be allowed by all, that its pleaſures do eſſentially contribute to the innocent pleaſures of ſociality; and where it is employed to enliven the domeſtic circle, or to afford recreation to the fatigued and haraſſed mind, and theſe always reſtrained within the bounds of moderation, it is not only agreeable but uſeful. But, 6. All theſe arts are capable of being directly devoted to the intereſts of religion and virtue: and when ſo devoted, they not only improve and exalt the mind, but are themſelves improved and exalted to a much higher degree than when employed upon ſubjects unconnected with, or in oppoſition to them. The dignity and importance of the ideas derived from religion, add a peculiar force and luſtre to them.

Here this cultivation may be made an excellent means of awaking and alarming our affections, and transferring them upon their true objects.

With reſpect to all the pleaſures appropriate to the imagination, (conſidered as diſtinct from thoſe of the underſtanding, which Hartley might, perhaps, with great advantage, have made a ſeparate claſs,) the true principles are, that they ſhould always be purſued in complete ſubſerviency to the great ends of life, without interfering with the duties of piety and benevolence, or with the proper employments of our ſtation; that where they are derived from the mere recreations of life, they ſhould be carefully kept within the limits of innocence and moderation; employed lawfully, and for lawful ends; ſo as not only to be free from injury at the time, but from injurious effects afterwards; and that all the pleaſures of the imagination ſhould, as much as poſſible, be aſſociated with the purſuits of benevolence and religious duty, ſo that they may contribute to increaſe the tendencies of the mind to thoſe purſuits.

Upon moſt of the ſubjects of this ſection, and upon others connected with them, if the writer's recollection is accurate, the reader will find many important obſervations in the firſt volume of Clarkſon's Portraiture of Quakeriſm.

6. *Eſtimate of the Pleaſures of Ambition.*—That the pleaſures of honour ought not to be made a primary object of purſuit, appears from the following conſiderations. An eager deſire of the pleaſures of honour, and an earneſt endeavour to obtain them, has a manifeſt tendency to diſappoint itſelf. The merit of actions, that is, that property for which they are approved and admired, and the agent loved or eſteemed, is, that they proceed from benevolence, or ſome other moral or religious conſideration; whereas, if the deſire of praiſe form any conſiderable part of the motive, we cenſure rather than commend. But if praiſe be ſuppoſed the greateſt good, the deſire of it will prevail over other deſires; and vanity, ſelf-conceit, and pride, qualities which all regard as cenſurable, will be neceſſary conſequents. Again, if praiſe be conſidered as the ſupreme good of the ſpecies, what is there which ſhall be ſelected as the greateſt ſubject of encomium. What is there which ſhall be the univerſal object of praiſe, as well as within the reach of every one. External advantages, riches, beauty, ſtrength, &c.? Theſe are neither in the power of all, nor univerſally commended. Great talents, wit, ſagacity, invention? Theſe, though more the ſubjects of encomium, fall to the lot of very few only. In ſhort, virtue alone is both univerſally eſteemed, and in the power of all who are ſufficiently deſirous to attain it. But virtue cannot conſiſt with the direct purſuit of praiſe; much leſs with its being made a primary object. Hence it ought not to be made ſuch. Even thoſe who poſſeſs the advantages which are made the ſubject of praiſe, can ſeldom purſue praiſe with ſucceſs. Praiſe cannot be the lot of many, becauſe it ſuppoſes ſomething extraordinary in the thing praiſed; ſo that he who purſues it muſt either have a very good opinion of himſelf, which is a dangerous quality in the ſeeker of praiſe, or allow that there are many chances againſt him. The ſame concluſion is drawn, if we conſider the *progreſs* of the pleaſures of honour. Children are pleaſed with encomiums upon *any* advantageous circumſtances which relate to them; but this wears off by degrees; and as we advance in life we learn more and more to confine our pleaſures of this kind, to things within our own power, and to virtue. In like manner, the judicious part of mankind, that is, thoſe whoſe praiſe is moſt valued, give it only to virtue, and to thoſe feelings and habits of which virtue is the baſis. Here, again, is a manifeſt ſubſerviency of theſe pleaſures to virtue; they not only tell us that they cannot be our ultimate end, but ſhew us what is.

If we ſuppoſe a perſon to be perpetually feaſting his mind with the praiſes that already are, or which he hopes will be hereafter, given to him, we at once perceive ſomething extremely abſurd and ridiculous in his conduct. And yet, unleſs a man do this, which beſides would incapacitate him for deſerving or obtaining praiſe, how can he fill up a thouſandth part of his time with the pleaſures of ambition. Further, men who are much commended, are apt to think themſelves above the level of the reſt of the world; and it is evident, that praiſe from inferiors wants much of the high reliſh thoſe expect who make praiſe an object; it is even uneaſy and painful to a man to hear himſelf commended, though he may think it his due, by a perſon whom he does not think qualified to judge. And in this view of things, a mind which has acquired truly philoſophical and religious notions ſees immediately, that all the praiſes of mankind are comparatively of no value, becauſe no man can be a thoroughly competent judge of the actions and motives of others. Laſtly, the deſire of praiſe carries us from leſs to greater circles of applauders, at greater diſtances of time and place; hence it neceſſarily inſpires us with an eager hope of a future life. Now all reflections upon a future life, the new ſcenes which will be unfolded there, the diſcoveries which will then be made of the ſecrets of all hearts, muſt caſt a damp upon every ambition, except a virtuous one, and produce diffidence even in thoſe who have the beſt teſtimony of their conſcience.

7. *Regulation of the Pleaſures of Honour.*—We have already ſeen ſufficient ground for the poſition, that it is a law of our natures, that the inferior ſources of happineſs are moſt productive of happineſs, when not made the primary objects of purſuit, but ſubmitted to the direction of the higher means. This is eminently the caſe with reſpect to the pleaſures of honour. They may undoubtedly be obtained in their higheſt degree, and in their greateſt perfection, by paying a ſtrict regard to the precepts of benevolence, piety, and the moral ſenſe. Theſe precepts lead to the attainment of thoſe qualities, and the performance of thoſe actions, whoſe value is univerſally felt, and univerſally admitted; and, at the ſame time, they preſerve from that oſtentatious diſplay of them, or of other ſuppoſed grounds of honour which would make their poſſeſſor ridiculous or contemptible. Honour is certainly affixed, by the bulk of mankind, to actions of *benevolence*, ſuch as acts of generoſity, compaſſion, public ſpirit, &c.; and the encomiums beſtowed upon ſuch actions are one principal ſource of the feelings of the moral ſenſe. The maximum of honour, therefore, muſt coincide with benevolence, and the moral ſenſe, and, conſequently, with piety alſo, which is cloſely connected with them. It muſt, however, be admitted, that direct acts of *piety* are by no means calculated to gain the honour of the world in general; but, on the contrary, they expoſe to the reproach of enthuſiaſm, ſuperſtition, &c.; on the other hand, however, it muſt alſo be admitted, that humility, which is the principal of all the qualifications which recommend men to the world, cannot be obtained in any high degree without piety. Hence piety indirectly leads to the honour of men; and at the ſame time in proportion as piety increaſes in its efficacy on the mind, the fear of their cenſure gradually diminiſhes.

The grand ſource of honour, directly or indirectly, is the tendency of an action or diſpoſition to happineſs of ſome kind or other, occurring to a man's ſelf, or to the world by his means. He, therefore, who is moſt happy in himſelf, and contributes moſt to the happineſs of others, muſt, in the end, from the very law of our natures, have the greateſt quantity of honourable aſſociations conferred upon him. But it has already appeared, in part, that benevolence, piety, and the moral ſenſe, are the only true and laſting ſources of *private* happineſs; and that the greateſt *public* happineſs ariſes from them cannot be doubted by any one: hence he in whom theſe qualities are prevalent, will, as far as his character is known and underſtood, obtain the applauſe of all, both good and bad. The eſteem of the good he will firſt obtain; becauſe they can moſt eaſily eſtimate his worth; and it is this alone which is valuable and uſeful, in exciting to honourable attainments.

In proportion as the views extend, and the comprehenſion of the mind increaſes, the deſire of honour and eſteem will require higher ſources of gratification than that of men, even of the wiſe and good; it riſes even to the throne of the Moſt High, and from him to whom all hearts are open, humbly hopes for approbation. This greateſt of all honours can, undeniably, be obtained only by a regard to piety, benevolence, and the moral ſenſe. If the deſire of it be not the deſire of our mind, it muſt ariſe from ſuch inattention to the moſt important relations in which we ſtand, as is totally inconſiſtent with our true happineſs; and if it become a ruling principle of our minds, all encomiums will derive their value from their conſiſtency with this the higheſt ſtandard of honour.

8. *On Pride and Vanity.*—Before we offer a few conſiderations on this point, it may be requiſite that we explain in what manner we uſe our terms, ſince they are employed (particularly *pride*) with a latitude which ſerves to throw great diſcredit on the repreſentations of the moraliſt on the ſubject; and by the transference of the aſſociations connected with what is called *honeſt* or *laudable*, or even *virtuous* pride, to a quality of the mind which in every ſhape of it is vicious, that abhorrence of real pride is diminiſhed, which its obvious ill conſequences ſhould always produce.

By *pride* we underſtand, an *unjuſt feeling of ſuperiority over others*, or (without direct compariſon with others) *of elevation in the ſcale* by which the individual eſtimates *honour*: by *vanity* we mean, an *exceſſive deſire of the praiſe or good opinion of others.* The former indicates an *unfounded opinion* as to the *title to honour*; the latter is generally accompanied with ſome opinion of that kind, but it does not neceſſarily imply more than an *eager deſire* of honour. This paragraph the reader will find, with a little variation, in Moral *Education*, II. remark 5, where there are ſome obſervations reſpecting the *comparative* effects of pride and vanity, and the employment of the ſtimulus of praiſe, which would have been introduced in this ſection, if they had not been inſerted then; and we beg leave to refer the reader to them.

Pride may exiſt almoſt ſingly in the mind; altogether, or at leaſt, almoſt independent of vanity. There may be thoſe to whom their own good opinion (independently of the approbation of God) is every thing; and who find the ſympathy of others totally unneceſſary for the nurture of their own pride. In the preſent ſtate of ſociety this is not common; the good opinion of others is productive of too many important conſequences, ever to permit pride to be thus foſtered; except where it is the effort of a ſtrong, but ill-directed mind, to counterbalance the diſappointments of vanity. He who has made the good opinion of others the primary object of purſuit, having met with its ſure conſequence,—diſappointment in his wiſhes,—if he have not loſt all his ſtrength of mind by the weakening effects of vanity, will endeavour to riſe above it; and if he have no religious principles, or but little religious culture, will dwell with gratification upon all the fancied excellencies of his own character, till they have acquired in his eſtimation an importance to which they are little, if at all, entitled. Then moroſeneſs muſt be the predominant feature in his temper; for he cannot bear that others ſhould treat him with leſs reſpect than he thinks he has a right to claim: till at laſt an almoſt total unconcern for the opinion of others is forced upon his mind, and having no higher principle of action he becomes a miſanthrope. It is probably doing no injuſtice to the character of Swift, when we mention him as having in a great meaſure gone this round. But this is an extreme caſe: pride leads a man to ſet too high a value upon himſelf, but it is only that ſtrength of mind which, when well directed, would have led to the higheſt attainments in moral worth, that will permit him to reſt ſatisfied without the ſympathy which he ſuppoſes is his due. Hence his pride muſt meet with a conſtant mortification; for where will be found thoſe who will be willing to reſtrain their conduct continually by the rules to which he would bind them? where even are thoſe who can enter into his views and feelings? Pride then, even in a leſs extreme caſe, cannot be productive of happineſs. But its ill effects are not thus limited. Blind to his own deficiencies, keen-ſighted to obſerve the marks of merit in his own mind, the proud man throws continual impediments in his own progreſs towards worth of character. He ſees not his deficiencies; how can he ſupply them? He imagines his excellencies have mounted high in the ſcale of worth; how ſhall he purify them, when that which preſents their eminence is foſtered by every compariſon which he draws?

It has been ſaid by one who appears to have poſſeſſed ſome knowledge of the world, that pride has at leaſt this valuable effect, - it tends to exclude all other failings; for the proud man places his ſtandard ſo high, that he never feels his regard to his own dignity ſatisfied, till all inferior feelings are extirpated: this is undoubtedly erroneous. It is ſuppoſing a mixture of pride and humility, which will never appear in that mind in which pride is the ruling feature. The man who is proud of his own excellencies ſeldom ſees that they are defective: and beſides, a deſire of ſelf-approbation is not pride, though too ſtrong and unchaſtened a deſire may tend to produce pride, becauſe ſelf-approbation is eaſily gained when made independent of higher ſources. There may be anomalies here, as in every other caſe of the operation of moral cauſes; but they are not ſufficient to lead to the concluſion, that pride has a tendency to raiſe the mind above all other failings. Pride will operate differently on different minds; and the deſire of ſelf-approbation is, and ought to be, a primary motive in all the earlier ſtages of the moral progreſs: but if the mind reſt ſatisfied with this approbation, that progreſs will ſoon be impeded; the ſtandard will be lowered rather than the conduct exalted; compariſon with others will ſuggeſt numerous ſources of ſelf-gratulation; and the mind, unable to riſe to the heights which once appeared in view, now rather looks down upon the advances ſhe has made, than upon the cliffs which tower very far above her. Here, then, is a ſtop to improvement; the deſire which ſtimulated to improvement is gratified: and he, who, had he looked beyond himſelf, might have riſen almoſt to the ſummit of excellence, now reſts contented on the little pinnacle which his imagination has raiſed, looks with contempt on the crowds below, but, wrapt in the veil of imaginary ſuperiority, ſees not that numbers whom he once ſaw below him have riſen, and are riſing, while he is himſelf loſt to all improvement.

In minds poſſeſſed of ſome ſtrength, pride may exiſt with little or no tendency to vanity. Firmly convinced of their own worth, they need not the ſympathy of others; and if that reſpect which they deem their due is not given, it is the laſt ſuggeſtion that would occur to their minds that they had miſtaken their due. But in thoſe whoſe pride is leſs confirmed, or whoſe minds are more dependent, that pride leads them on to vanity; their high ideas of their own powers and attainments, require the ſympathy of others to render them ſteady. Preciſely as pride or vanity has the predominance, the want of ſuch gratification will lead to greater independence, or greater ſubmiſſion; in the one caſe leaving the mind to the wayward wanderings of its own feelings, in the other fixing more firmly the ſhackles which bind it to the world. Happy they who have learnt from various diſcipline and inſtruction, that higher approbation is to be ſought for, than the approbation of the world, or even than their own; and that neither poſſeſs permanent value, except where ſanctioned by that which, when once the ruling object of the mind, will make all others comparatively inſignificant!

We ſtated that pride may exiſt in the mind almoſt independently of vanity: from what we have advanced it appears, that this can be the caſe only in a vigorous mind: vanity, we would add, will be found independently of pride only in a weak mind. He who cannot reſt ſatisfied without the praiſe or approbation of others, muſt be ever varying in his ideas, and fickle in his conduct. Without it, he will poſſeſs no firmneſs; and with it, no deciſion. The approbation which pride claims as its due, vanity ſeeks as a favour: if it receive it not, the vain mind deſponds, for it has not learned to truſt in itſelf.

[Here we would requeſt the reader to turn to the obſervations referred to near the beginning of this ſection. See MORAL *Education*, col. 38.]

The virtue of humility is the moſt difficult to acquire of all the train, yet it is this which gives the true grace to the character. It is the characteriſtic of Chriſtianity, and it is in this reſpect that the Chriſtian ſo far excels the ſtoical ſyſtem of morality in its beſt ſtate. The whole ſtructure of the latter was laid upon the foundation of human pride; and though frequently captivating to the imagination, which loves to view the elevated mind, yet it often affords a poor ſhelter to the children of humanity. Humility does not direct us to eſtimate ourſelves lower than impartiality requires; but it is ſeldom that we need fear wandering into this extreme, except where it ariſes from that ſelf-diffidence, which diſtruſts merely becauſe vanity has not yet lent its ſupport. This exceſs of diffidence is not unfrequently the cauſe of vanity: for the mind, in conſequence of it, often feels the more eager deſire to be well in the eſtimation of others; and, when their good opinion is obtained, foſters the thoughts and pleaſures of it with too great intereſt. Still however the frequent mortifications it meets with tend to lower it in its own eſtimation, unleſs, by degrees, it learns to ſet a value upon its own approbation, independently of the capricious applauſe of others; and then it deviates into the oppoſite extreme of ſelf-ſufficiency and pride. Here a ſtrong mind, not under religious culture, will reſt; a weak one will probably be again driven to that ſupport on which it originally reſted its ſelf-approbation. If it do not return to its former ſtate, the attentions which vanity received as a favour, pride claims as its right: and in both caſes endleſs inquietude, envy, and reſentment, are the almoſt neceſſary attendants. On the ſubject of this ſection, ſee Cogan's Philoſophical Treatiſe on the Paſſions, p. 70, &c.

9. *Cultivation of Humility.*—In order to cultivate the tender plant of genuine humility, we muſt clear away the high ideas we have of our own excellencies. All thoughts which pleaſe are apt to recur frequently; and their contraries to be kept out of ſight: hence, by dwelling upon theſe excellencies, they will be magnified; by keeping our imperfections out of view, they are diminiſhed. And the ſame cauſes too frequently lead to keep in view the defects of others, and neglect the conſideration of their excellencies; and thus pride, that is, too high an opinion of ourſelves, and, as a general conſequence, too low an opinion of others, muſt be generated. Now the only way to obtain a juſt opinion of ourſelves is to reverſe this operation, and, by expreſs acts of volition, dwell upon the excellencies of others and our own defects, and to paſs by, with little notice, the defects of others and our own excellencies.

To cultivate humility we muſt farther learn not to ſeek the applauſe of the world, but to acquieſce in the reſpect it pays us, however diſproportioned this may be to the merit of the action under conſideration. We ſhould remember, that however beautiful the productions of nature and art which paſs under our notice, it would be abſurd to ſay, till long experience and accurate examination juſtified it, that they are unequalled in their kind: much leſs ſhould we ſuppoſe this of thoſe ſources of honour which happen to be our lot, which are certainly magnified beyond the truth in our own eyes from the intereſt we take in ourſelves. On the other hand, humility will be cultivated by receiving with readineſs the cenſures and ſhame which we have deſerved; and by acquieſcing under them where we have not deſerved them; in this laſt caſe always ſuſpecting our own judgment.

Laſtly: the frequent recollection that all our valuable qualities proceed from God, that we have nothing which we did not receive from him, and that there could be no reaſon in ourſelves why he ſhould ſelect us to perform the particular part he hath aſſigned us; and the application of this important truth to the real occurrences of our lives, muſt greatly accelerate our progreſs to humility and ſelf-annihilation.

10. *Eſtimate of the Pleaſures of Self-intereſt.*—We ought not primarily to purſue the means of obtaining the pleaſures of ſenſation, imagination, or ambition; becauſe theſe pleaſures themſelves, from what we have already ſeen, ought not to be made a primary object of purſuit. The means borrow all their value from their end by aſſociation; and if the original value of the end be not ſufficient to juſtify our making them our primary object, the borrowed value of the means cannot.

Groſs ſelf-intereſt, or the treaſuring up of the means of happineſs from theſe ſources of ſenſation, imagination, and ambition, bears a very near relation to ambition. Thoſe who deſire great degrees of riches, power, learning, &c. deſire alſo that their acquiſition ſhould be known to the world: *to be thought* happy often conſtitutes a ſtronger motive for action, than *to be* happy. The reaſon, therefore, which excludes ambition as a primary purſuit, excludes ſelf-intereſt alſo.—Groſs ſelf-intereſt has a manifeſt tendency to deprive us of the pleaſures of ſympathy, and to expoſe to its pains. Rapacioufneſs extinguiſhes all ſparks of good will and generoſity, and produces endleſs reſentments and jealouſies: and indeed great part of the contentions and mutual injuries, which we ſee in the world, ariſe becauſe either one or both of the contending parties deſire more than an equitable ſhare of the means of happineſs. Beſides, groſs ſelf-intereſt has a moſt painful and peculiar tendency to increaſe itſelf, by the conſtant recurrence, and conſequent augmentation, of the ideas and deſires that relate to ſelf, and the excluſion of thoſe which relate to others. This inconſiſtency of groſs ſelf-intereſt with ſympathy would be an argument againſt it, barely upon the ſuppoſition that ſympathy was one neceſſary part of our nature, which ought to have an equal ſhare with ſenſation, imagination, and ambition; but as it now begins to appear, from the excluſion of thoſe as primary objects, that more than an equal ſhare is due to ſympathy, the oppoſition between them is a ſtrong argument againſt ſelf-intereſt. There is, in like manner, an evident oppoſition between groſs ſelf-intereſt and the pleaſures of theopathy, and the moral ſenſe. Hence, if theſe be admitted as eſſential parts of our nature, and eſpecially if it appear that they ought to be made primary objects of purſuit, an inſuperable objection ariſes againſt our making the pleaſures of ſelf-intereſt our primary objects. Groſs ſelf-intereſt, when indulged, deſtroys many of the pleaſures of ſenſation, and moſt of thoſe of imagination and ambition; that is, many of thoſe pleaſures from which it takes its riſe. This is peculiarly true and evident in the love of money, and it holds in a conſiderable degree with reſpect to other ſelfiſh purſuits. It muſt, therefore, deſtroy itſelf in part, as well as the pleaſures of ſympathy, theopathy, and the moral ſenſe, with the refined ſelf-intereſt founded upon them: and thus it happens, that in very avaricious perſons, nothing remains but a ſenſual ſelfiſhneſs, and an uneaſy hankering after money, which is a more imperfect ſtate than that in which they were at their firſt ſetting out in infancy.

Men, in treaſuring up the means of happineſs without limit, ſeem to go upon the ſuppoſition that their capacity for enjoying particular ſpecies of happineſs is infinite, and conſequently that the power of enjoyment depends upon the ſtock of means which they amaſs. But our capacity for enjoying happineſs is confined and fluctuating; and there are many periods during which no object, however grateful to others, can afford any pleaſure, owing to the diſeaſed ſtate of our minds or of our bodies.

Further: it is evident in part, that ſelf-intereſted men are not more happy than others, whatever means of happineſs they may poſſeſs. Experience appears to confirm the reaſoning already adduced, but it certainly confirms this concluſion. Thoſe who are continually aiming to treaſure up the means of happineſs, are in general remarkably miſerable. The covetous man ſubjects himſelf to hardſhip, cares, fear, ridicule, and contempt; and thus undergoes greater evils than what falls to the ſhare of mankind upon an average.

Some degree of *refined ſelf-intereſt* is the neceſſary conſequence of the power of receiving the pleaſures of ſympathy and theopathy. He who has had a ſufficient experience of the pleaſures of friendſhip, generoſity, devotion, and ſelf-approbation, cannot avoid the deſire to have a return of them, when he is not under the particular influence of any one of them, merely on account of the pleaſure which they have afforded; and if he have not advanced into very conſiderable purity of motives, will ſeek to excite thoſe pleaſures, by treaſuring up the means of them; and to keep himſelf in a diſpoſition to uſe them, not from any particularly vivid love of his neighbour, or of God, or from a ſenſe of duty, but entirely from the view of private happineſs. Refined ſelf-intereſt is neither ſo common, nor ſo conſpicuous in real life as the groſs ſelf-intereſt. It riſes late, and is never in any great magnitude in the bulk of mankind, through the want of the previous pleaſures of ſympathy, religion, and the moral ſenſe; and in ſome it ſcarcely prevails at all: whereas groſs ſelf-intereſt riſes early in infancy, and arrives at conſiderable magnitude before adult age.

The objections which lie againſt making the purſuit of refined ſelf-intereſt our ultimate object, though leſs obvious, do not appear leſs weighty than thoſe which lie againſt groſs ſelf-intereſt. In the firſt place, the mind which has ſo far advanced towards perfection, as to make the means of obtaining the refined pleaſures of religion and virtue the primary object, will be more likely finally to ſtop at this point, than he who was guided by groſs ſelf-intereſt. There is leſs the appearance of deficiency, and leſs oppoſition between it and the claims of benevolence and piety; and as it leads to the performance of laudable actions, the conſcience is too apt to give approbation, where, if all that influenced the mind were brought into full view, nothing but ſelf would be ſeen. Hence there is little inducement to refine the motives, and purify them from their baſe alloy; and making ſelf continually the motive, checks the natural progreſs of the affections to complete diſintereſtedneſs.

To act with a direct view to the pleaſures of benevolence and piety, ſeems to carry with it a degree of ſelfiſhneſs little ſuperior to that of the refined ſenſualiſt, who chooſes from among the objects of his degraded taſte ſuch only as will give the leaſt alloyed pleaſures, and thoſe of the moſt continued duration. It differs from his ſelfiſhneſs, in producing to ſociety more valuable effects; but from what has been ſtated reſpecting the progreſs of the affections in the preceding article, and in Moral *Education*, it appears that it is very conſiderably below that ſtate in which the affection is perfect: and we have already ſeen that it ſtops its progreſs towards that perfection. It may fairly be admitted in the commencement of a virtuous courſe, as a ſtep towards improvement; but if the mind be ſuffered to reſt here, we cannot eſteem its progreſs great. In addition to theſe objections, ſome very forcible ones will appear among thoſe which lie againſt acting with an explicit view to our greateſt happineſs on the whole; making even the higheſt and leaſt debaſing, becauſe leaſt ſpecific kind of ſelf-intereſt, our ground of action.

Rational ſelf-intereſt is certainly to be put upon a very different footing from the groſs and refined: agreeably to which, the ſcriptures promiſe general hopes and fears, and eſpecially thoſe of a future ſtate, and inculcate them as good and proper motives; and they may, therefore, certainly be conſidered as auxiliary in our moral progreſs. But Chriſtianity holds out ſtill more refined motives, diſtinct from hope and fear,—the love of God and our neighbour, the law of our minds, &c.; that is, the motives of ſympathy, theopathy, and the moral ſenſe. Rational ſelf-intereſt will lead to the formation of theſe, and to the deſtruction of the impure motives to action; and preciſely as far as it does this, it may be reckoned a virtue. When it tends to cheriſh the impure motives, or ſimply to obſtruct the growth of the pure motives, then it muſt be conſidered as vice.

That we ought not to reſt ſatisfied with that ſtate in the moral progreſs, in which an explicit and direct view to the greateſt general happineſs or miſery is made the primary motive to action, may be argued from the conſideration, that a conſtant attention even to theſe moſt general hopes and fears would extinguiſh, by degrees, our love of God and our neighbour; and this eſpecially by augmenting the ideas and deſires which centre immediately in ſelf to an undue height. While our own happineſs, even the moſt refined and general, is the explicit motive, benevolence and piety will never acquire that diſintereſtedneſs, which will prompt to their reſpective courſe of conduct, without any exterior ſtimulus, ſimply by the impulſe of the affection. Rational ſelf-intereſt will at times be preſent to the mind, even of thoſe who have advanced higheſt in the ſcale of preſent excellence; and in the early ſtages of the moral progreſs, may be called in as a moſt uſeful auxiliary, and important ſupport: but even this muſt be made ſubordinate to the cultivation of thoſe affections, which are only perfect as they approach diſintereſtedneſs.

On the ſubject of this head, we wiſh to refer our readers to Dr. Prieſtley's ſermon on the duty of not living to ourſelves.

We ſhall conclude this head in the words of Dr. Reid, with a few alterations. Though a ſteady purſuit of our own real good may, in an enlightened mind, produce a degree of virtue which is entitled to ſome approbation; yet it can never, while the mind reſts with this explicit regard to ſelf, produce the nobleſt kind of virtue which claims our higheſt love and eſteem. We account him a wiſe man who is wiſe for himſelf; and if he proſecute his end through difficulties and temptations, his character is far ſuperior to that of the man who, having the ſame end in view, is continually ſtarting out of the road from an attachment to his appetites and paſſions, and doing every day what he knows he ſhall heartily repent of having done. Yet after all, this wiſe man, whoſe thoughts and cares are all centered ultimately in himſelf, who indulges even his ſocial and divine affections, only with a view to his own good, is not the man whom we cordially eſteem, nor who poſſeſſes the noble elevation of mind which commands our admiration. Our cordial eſteem and admiration are due, and are given only to him whoſe ſoul is not contracted within itſelf, but embraces a more extenſive object; who loves religion, not for her dowry only, but for her own ſake; whoſe benevolence is not ſelfiſh, but generous and diſintereſted; who, forgetful of himſelf, has the common good at heart, not as a means only, but as an end; who abhors what God and conſcience condemn, however attractive its appearance; who chooſes without heſitation what God and conſcience approve, though ſurrounded with tenfold dangers. Such a man we eſteem the perfect man, compared with whom, he who has no other aim than good to himſelf, is a mean and deſpicable character. To ſerve God, and be uſeful to mankind, without any concern about our own good and happineſs, is probably beyond the pitch of human nature. But to ſerve God, and be uſeful to men, merely to obtain good to ourſelves, or to avoid ill, is imperfect ſervice, and not of that liberal nature which true devotion and real virtue require.

Though we might be apt to think that he has the beſt chance for happineſs, who has no other end of his deliberate actions but his own good, yet a little conſideration will ſatisfy us of the contrary. A concern for our own good is not a principle that, of itſelf, gives any enjoyment; on the contrary, it is apt to fill the mind with fear, and care, and anxiety. And theſe concomitants of this principle often give pain and uneaſineſs, which counterbalance the good they have in view. We may compare in point of preſent happineſs, two imaginary characters; the firſt, that of the man who has no other ultimate end of his deliberate actions than his own good, and who has no regard to religion and duty, but as a means to that end; the ſecond, of the man who is not indifferent with regard to his own good, but has another ultimate end, perfectly conſiſtent with it, a diſintereſted love of goodneſs for its own ſake, or a regard to duty as an end. Comparing theſe two characters in point of happineſs, that we may give all poſſible advantage to the ſelfiſh principle, we ſhall ſuppoſe the man who is actuated ſolely by it, to be ſo far enlightened as to ſee it his intereſt to live ſoberly, righteouſly, and piouſly in the world, and that he follows the ſame courſe of conduct, from the motive of his own good only, which the other does, in a great meaſure, or in ſome meaſure, from a ſenſe of duty. The one labours for hire, without any love to the work, the other loves the work, and thinks it the moſt noble and the moſt honourable he can be employed in. In the firſt it is mortification and ſelf-denial to which he ſubmits only through neceſſity; to the other it is victory and triumph in the moſt honourable warfare. It ought further to be conſidered, that though wiſe men have concluded that virtue is the only road to happineſs, and the commands of a benevolent Creator neceſſarily lead us to conſider it as ſuch, yet he who follows it only as a means to an end, and who obeys God only for the ſake of the rewards he has attached to obedience, would, in all probability, be continually wandering from the direct path, and ſeeking for happineſs where it was not to be found. The road to duty is ſo plain, that the man who ſeeks it with an upright heart cannot greatly wander from it; but the road to happineſs, except where that confidence in the Supreme Being is formed, which ſuppoſes the pious affections to have become, in ſome meaſure, diſintereſted, would be found dark and intricate, full of thorns and dangers, and therefore not to be trodden without fear and care, and perplexity. The happy man, therefore, is not he whoſe happineſs is his primary care; but he who, with perfect reſignation, leaves the care of his happineſs to his Maker, while he purſues with ardour the road of his duty. This gives an elevation to his mind which is real happineſs; inſtead of care, and fear, and anxiety, and diſappointment, it brings peace and joy. It gives a reliſh to every good we enjoy; it ſmooths the brow of diſtreſs, calms the perturbed mind, and makes the pillow of ſuffering and of death the reſt of happineſs. See Active Powers, eſſ. iii. p. iii. ch. 4.

11. *Eſtimate of the Pleaſures of Sympathy.*—We have now proceeded through, and examined all the inferior ſources of happineſs. We have ſeen that if any of them be made the primary object of purſuit, happineſs cannot be obtained; and that the greateſt degrees of theſe pleaſures are to be obtained, not by making them our primary object, but ſubmitting ourſelves to the guidance of piety, benevolence, and the moral ſenſe. We might hence alone regard the inference a juſt one, that the affections of benevolence and piety, and thoſe actions to which they prompt, ſhould be made by us our primary object. We ſhall feel our ground more ſure, when we enter into the poſitive arguments for the concluſion; and we now proceed to aſcertain what rank the benevolent affections ſhould have, in our rule of life. And it will appear that the cultivation of theſe affections, and the conduct to which they prompt, ſhould be made a primary object of purſuit, from the following conſiderations.

Benevolence *improves the inferior pleaſures*, by limiting and regulating them, as we have already ſeen in the preceding ſections.

Again, the pleaſures of benevolence unite and *coincide with thoſe of piety and the moral ſenſe.* That benevolence unites with piety is obvious, for by the love of the good we are led to love the ſource of goodneſs; and back again from the love of God to the love of all that he has made. The pleaſures of benevolence are one principal ſource of the moral ſenſe, and the moral ſenſe in its turn improves and enforces them entirely.

The pleaſures of benevolence are *unlimited* in their extent. In order to ſhew that the pleaſures of ſenſation do not deſerve our primary attention, an extreme caſe was taken of a perſon who actually made them his primary object: in the ſame way ſuppoſe a perſon to take all opportunities of exerciſing his benevolent diſpoſitions, making it his ſtudy, pleaſure, and conſtant employment either to promote happineſs or to leſſen miſery. Now it is very obvious that he would have a very large field for exerciſe, no leſs than the whole round of domeſtic and ſocial relations. And if his benevolence were pure, and regulated by the dictates of piety and the moral ſenſe, he might in general expect ſucceſs. And from the experience of thoſe who have made the trial, it does not appear that the reliſh for its pleaſures languiſhes, as in other caſes, but gains ſtrength by gratification; and they continue to pleaſe in reflection. The reaſon of this is obvious from the law of aſſociation; for ſince they are, in general, attended with ſucceſs, and are conſiſtent with, and productive of, the ſeveral inferior pleaſures, when theſe are purſued in their due degree, and are alſo further increaſed by the moral and religious pleaſures, they receive freſh addition upon every gratification, and therefore increaſe perpetually, not perhaps in vividneſs, but in extent as well as ſteadineſs, when the affections are cultivated as they ought to be.

The pleaſures of benevolence are *ſelf-conſiſtent*. All may ſhare them without diminiſhing their mutual happineſs. Harmony and mutual co-operation prevail among the benevolent; and benevolent actions have a tendency to excite correſpondent actions indefinitely. By degrees, when benevolence has arrived at its due height, all the ſenſibilities of the individual for himſelf, will be more or leſs transferred upon others, by his benevolence and compaſſion for them. And in like manner, when our moral ſenſe is ſufficiently eſtabliſhed and improved, and we are capable of being influenced to perform what is fit and right, by the conſideration that it is ſo, our imperfect ſenſibility for others tends to diminiſh (by being compared with it) our exorbitant attachment to ourſelves; at the ſame time that compaſſion takes off our thoughts from ourſelves. And benevolence to a ſingle perſon may become equal to ſelf-intereſt by this tendency of ſelf-intereſt to increaſe benevolence, and reciprocally of benevolence to leſſen ſelf-intereſt, though originally ſelf-intereſt was indefinitely greater than benevolence; and thus we may learn to be as much concerned for others as for ourſelves, and as little concerned for ourſelves as for others. It is not often that benevolence is thus heightened: perhaps, in the ſtricteſt ſenſe, it can never reach this height in the preſent ſtate; but let us take the caſe where there is a decided preponderance of benevolence over every feeling which bears the character of malevolence. It is not, perhaps, capable of proof, but certainly has decided probability, that in the circle in which each moves, and in the circle of the race at large, happineſs greatly preponderates. If the benevolent individual, though he do not ſee this balance of happineſs clearly, yet has ſome comfortable general knowledge of it, he muſt be a great gainer in the whole by his benevolence, becauſe thus he has a ſource of conſtant gratification in the perception of ſuch a preponderance of happineſs among thoſe in whoſe happineſs he has learned to rejoice in ſome meaſure as in his own.

It will confirm our belief that the cultivation of benevolence ſhould be made a primary purſuit of life, if we recollect that *its pleaſures lie open to all* kinds and degrees of men; ſince every man has it in his power to benefit others, and ſince we all ſtand in need of each other's good offices. Unlike the brute creation, we are dependent upon each other from the cradle to the grave, for life, for health, for convenience, for pleaſures, for intellectual accompliſhments, and, in no ſmall degree, for moral culture; and we are unable to ſubſiſt with comfort ſingly, or even in very ſmall ſocieties, and this may be conſidered as a mark of the ſuperior excellence of man's ſocial pleaſures. All the tendencies of the events of life, ordinary and extraordinary, of the relations of life, of the various pleaſures which have been enumerated, to connect us together, to connect accidental aſſociations, and thoſe forced upon us by the common ſituation of man, and his ſituation in ſociety, into permanent affections, prove the ſame thing. So great, indeed, is this tendency, that two men without claims to the title of benevolent, can ſcarcely become familiarly known to each other, without receiving ſome good-will, complacency, compaſſion, and tenderneſs for each other. Further, we love, eſteem, and aſſiſt the benevolent more than others: ſo that a benevolent action not only excites the receiver to a grateful return, but alſo the by-ſtander to approve and reward: and benevolence receives a hundred fold even in this world. "But," ſays the excellent Hartley, "it would be endleſs to purſue this. Benevolence is, indeed, the grand deſign and purport of human life, of this probationary ſtate; and every circumſtance of human life, duly conſidered, muſt and does point to it directly or indirectly."

And as it is now eſtabliſhed that benevolence is a primary purſuit, it follows *that all the pleaſures of malevolence are excluded*, as direct obſtacles to our happineſs. The lower pleaſures may all be made conſiſtent with, and even ſubſervient to, benevolence, by its limitations and power; but thoſe of malevolence are quite incompatible with it. As far as malevolence is allowed, benevolence muſt be deſtroyed. There is, however, this exception; where wiſhing evil to ſome, diſpoſes us to be more benevolent on the whole, (as in the caſe of what is called a juſt indignation againſt the vicious,) it may ſomewhat aid the moral progreſs in the lower ſtages of benevolence. But it is exceedingly dangerous to encourage ſuch a diſpoſition of mind, by ſatire, invective, or diſpute, however unworthy the opponent may be; for foſtered, it will ſoon wear the features of ill-will, will ſoon become rank malevolence.

We muſt not only forego the pleaſures of malevolence, but patiently and reſolutely endure the *pains of benevolence*, particularly thoſe of compaſſion. But we ſhall not be loſers on either of theſe accounts. The pleaſures of the moral ſenſe which reſult from theſe virtues, will, in the firſt caſe, compenſate for what we forego; in the laſt over-balance what we endure. Beſides, mercy and forgiveneſs are in themſelves pleaſures; and, in the event, productive of many others: and compaſſion generally leads us to ſuch conduct as makes the afflicted to rejoice, and increaſes our diſpoſition to rejoice with them.

As benevolence is thus ſupported by many direct arguments, there are many ſimilar and oppoſite arguments to prove that *malevolence is the bane of human happineſs*; that it occaſions miſery to the agent as well as to the ſufferer; that it is indefinitely inconſiſtent with itſelf, and with the courſe of nature; and that, conſequently, it is impoſſible that it ſhould ſubſiſt for ever. Now all theſe become ſo many indirect arguments for benevolence, and urge us to make the cultivation and exerciſe of it, one of the ſupreme pleaſures and ends of our lives.

In order to make this appear more fully, we have only to take a ſurvey of human life, the reverſe of what we have already attended to. Injuries are increaſed by mutual injuries, till at laſt mutual ſufferings oblige both parties to deſiſt: the courſe and conſtitution of human nature give numberleſs admonitions to forbear; and the hand of every man, and the power of every thing, is againſt the malevolent. So that if we ſuppoſe a number of beings purely malevolent, and conſequently to have an indefinite number of enemies, they would firſt ceaſe from their enmity on account of their mutual ſufferings, and become purely ſelfiſh, each being his own ſole friend and protector, and afterwards, by mutual good offices, endear themſelves to each other ; ſo that at laſt each of them would have an indefinite number of friends, and thus would be indefinitely happy. This is, in part, mere ſuppoſition ; but its obvious correſpondence with what we ſee and feel in real life, is a ſtrong argument both of the infinite goodneſs of God, and conſequently of the tendency of all beings to unlimited happineſs through benevolence. For the beings whom we have ſuppoſed to ſet out with pure malevolence, could no more reſt at pure ſelfiſhneſs, or any other intermediate point, than they could at pure malevolence. And thus the arguments which exclude pure malevolence, united with the direct arguments for benevolence, neceſſarily lead us to infer that *pure unlimited benevolence ſhould be the ultimate object of man.*

12. *Culture of Benevolence.*—In order to augment the benevolent, and ſuppreſs the malevolent affections, we ſhould diligently practiſe all ſuch acts of kindneſs, of friendſhip, generoſity, and compaſſion, as our abilities of any kind extend to ; and rigorouſly refrain from all ſallies of anger, reſentment, envy, jealouſy, &c. For though our affections are not directly and immediately ſubject to the voluntary power, yet our actions are, and, conſequently, through them, our affections. He that at firſt practiſes acts of benevolence by conſtraint, and continues to practiſe them, will at laſt have aſſociated with them ſuch a variety of pleaſures, as to transfer a great inſtantaneous pleaſure upon them, and produce in himſelf the affections from which they naturally flow. In like manner, if we refrain from malevolent actions and expreſſions, we ſhall dry up the ill paſſions which are the ſources of them.

With the ſame objects in view, it will be of great uſe frequently to dwell upon the great pleaſures and rewards attendant on benevolence ; and alſo upon the many evils preſent and future, to which the contrary diſpoſition expoſes us. For thus we ſhall likewiſe transfer pleaſure and pain by aſſociation upon theſe diſpoſitions reſpectively ; and rational ſelf-intereſt will be made to produce pure benevolence, and to extinguiſh all kinds and degrees of malevolence.

Frequent and fervent prayer for others, friends, benefactors, ſtrangers, and enemies, has a very great and decided tendency to augment benevolence, and to extinguiſh malevolence. All exertions of our affections cheriſh them ; and thoſe made under the more immediate ſenſe of the divine attributes, have an extraordinary efficacy, in this reſpect, by mixing the love, awe, and other exalted emotions of the mind attending our addreſſes to God, with our affections towards man, ſo as to improve and purify them. Petitions for the increaſe of our benevolence, and the ſuppreſſion of our malevolence, have the ſame tendency. Again, all meditations upon the attributes of God, and particularly upon his infinite benevolence towards all his creatures, have a ſtrong tendency to refine and augment our benevolent affections. And, laſtly, the frequent conſideration of our own unworthineſs, our entire dependence upon God, &c. raiſes in us compaſſion for others, as well as concern and earneſt deſires and prayers for ourſelves. And compaſſion is, in this imperfect probationary ſtate, an eſſential and principal part of our benevolent affections.

13. *Rules for the Conduct of Men in Society.*—Having now eſtabliſhed the poſition, that benevolence ſhould be a *primary* purſuit of man, it follows that we ſhould aim to direct every action, ſo as to produce the greateſt happineſs and the leaſt miſery in our power. This is the rule of ſocial conduct, which univerſal unlimited benevolence inculcates.

But the application of this rule in real life is attended with conſiderable difficulties and perplexities. It is impoſſible for the moſt ſagacious and experienced perſons to make any accurate eſtimate of the future conſequences of particular actions, ſo as, in all the variety of circumſtances which occur, to determine juſtly which action would contribute moſt to augment happineſs and leſſen miſery. Inſtead, therefore, of this moſt general rule, we muſt ſubſtitute others leſs general, and ſubordinate to it, admitting of a more commodious practical application. Whatever rules are laid down for this purpoſe, it is obvious that their coincidence muſt add ſtrength to each ; and that when they differ, or are apparently oppoſite to each other, this difference or oppoſition muſt moderate or reſtrain their application. On the whole, however, the general reſult will prove the beſt direction for promoting the happineſs and leſſening the miſery of others.

Hartley lays down the ten following ſubordinate rules : 1. That we obey the ſcripture precepts, in the natural, obvious meaning of them. 2. That we ſhould pay great regard both to our own moral ſenſe, and to that of others. 3. That in all deliberate actions we ſhould take into account the probable conſequences on each ſide. 4. That we are not to be guided implicitly by the mere impulſe of compaſſion and good-will ; yet that great regard ſhould be paid to them in our conduct. 5. That we ſhould place ourſelves in the ſituation of all the perſons concerned. 6. That perſons in the near relations of life, benefactors, dependents, and enemies, ſeem to have, in moſt caſes, a prior claim to ſtrangers. 7. That benevolent religious perſons have, all other circumſtances being equal, a prior claim to the reſt of mankind. 8. That we ſhould contribute, as far as lies in our power, to the moral and religious improvement of others. 9. That we ought to pay the ſtricteſt regard to truth, both in our affirmations and in our promiſes. 10. That we ought to obey the civil magiſtrate and the laws of the community. Theſe rules we think truly unexceptionable ; and we ſhall follow the order of Hartley, enlarging on ſome of them as we proceed. Some conſiderations reſpecting the neceſſity of *general* rules of duty will be found in Div. IV. § 3.

(1) The firſt rule is, that we obey the ſcripture precepts in the natural, obvious meaning of them. The ſcripture precepts are indeed themſelves the rule of life. There is, however, the ſame kind of difficulty in applying them accurately to particular caſes, as in applying the abovementioned moſt general rule, by means of an eſtimate of the conſequences of actions. It is, from the nature of language, impoſſible, in many particular caſes, to determine preciſely the connection of the action with the precept. However, unleſs it would obviouſly lead a perſon to act in oppoſition to ſome or other of the following rules, it is the ſafeſt way, in the particular circumſtances of real life, to recollect the ſcripture precepts, and follow them in their firſt and moſt obvious ſenſe.

(2) Great regard muſt be paid, both to our own moral ſenſe, and to that of others. Among thoſe who have received a Chriſtian education, this rule muſt coincide in a great meaſure with the foregoing. They are together the chief ſupports of all that is good, even in the moſt refined and philoſophical, as well as in the vulgar ; and therefore muſt not be weakened or explained away. It is well remarked, by a judicious moraliſt, that, in a mind whoſe moral powers have been cultivated, ſecond thoughts are ſeldom the beſt. The firſt are the impulſe of well-regulated feeling, and are produced inſtantaneouſly, without attention to all

petty ſuggeſtions of ſelf, which crowd themſelves in various ways into our mind, and by leading to doubt, and then, aided by inclination, to diſobey, prevent the efficacy of the conſcience, and throw a miſt over the before clear directions of duty. (See Dr. Aikin's Letters to his Son.) With reſpect to the moral ſenſe of others, two motives ſhould induce us to pay great regard to its dictates. The one is purely benevolent; we ought not to throw any moral impediment in the way of others; the other is, that prudence and humility direct, that we uſe the experience and the feelings produced by great moral culture as guides of our own conduct.

(3) It is very proper, in all deliberate actions, to weigh, as well as we can, the probable conſequences on each ſide, and to ſuffer the balance to have ſome influence in all caſes, and the chief influence where the other rules do not interfere much, or explicitly. But to be determined by our own judgments as to conſequences, in oppoſition to the two foregoing rules, or to thoſe which follow, is too probably the dictate of pride or ſelf-intereſt. Though in ſome inſtances God ſpeaks as plainly by the conſequences of actions as he does by his revealed will, and though, without a doubt, if we were capable of ſeeing all, even the remoteſt conſequences, we ſhould, in all caſes, perceive that the precepts of revelation are in perfect conſiſtency with the courſe of Providence, yet it is a fact, that the wiſeſt of men cannot trace all the conſequences of any one moral or immoral action, and that in numerous inſtances we cannot ſee enough to enable us to form a decided idea as to the courſe of duty. Wherever the ſcripture precepts clearly apply to our own caſes, we ſhould be extremely cautious as to any inferences we may derive from the ſuppoſed conſequences of actions in oppoſition to them; and at any rate we may reſt ſatisfied that we cannot do wrong by obeying them. We are not anſwerable for the ill conſequences, if ſuch there be, of our obedience; but we are for thoſe of diſobedience; and in proportion to the ſtrength and correctneſs of our conſciences, will, moſt probably, be the conviction of our folly, and our regret for our pride and preſumption.

(4) The impulſe of the mere inſtantaneous emotions of good-will and compaſſion, will not always furniſh a ſufficient guide; at the ſame time they ought to have great regard paid to them, leſt we contract a philoſophic hardneſs of heart, by pretending to act upon higher and more extenſively benevolent views than thoſe of vulgar minds, or the more feeling ſex, &c. Some, however, carry this much too far on the other ſide, and encourage many public miſchiefs through a falſe, miſguided tenderneſs to criminals, perſons in diſtreſs through preſent vice, &c. Where feeling is thus made the guide of conduct, he who can beſt play upon the ſympathy, and beſt decorate his tale of woe, will meet with a reward for his ingenuity, due only to the modeſt merit, which ſhrinks from the public view, or at leaſt does not obtrude itſelf upon our notice. The injury done to ſociety at large by this ill-directed compaſſion, ſo generally prevalent becauſe it gratifies without trouble, is very great indeed; and while we have it in our power to cultivate compaſſion and ſympathy, by the view and the relief of real miſery and ſuffering worth, the deſire of ſuch cultivation will be ſcarcely ſufficient to exculpate us, (when our minds have acquired ſome degree of comprehenſion,) from the charge of preferring a ſelfiſh indolent gratification to the good of others. To uſe the words of the elegant Stewart, "the dictates of reaſon and conſcience inform us, in language which it is impoſſible to miſtake, that it is ſometimes a duty to check the moſt amiable emotions of the heart; to withdraw, for example, from the ſight of thoſe diſtreſſes which ſtronger claims forbid us to relieve, and to deny ourſelves that exquiſite luxury which ariſes from the exerciſe of humanity."

(5) The rule of placing ourſelves in the ſeveral ſituations of the perſons concerned, and inquiring what we ſhould then expect, is of excellent uſe for directing, enforcing, and reſtraining our actions, and for producing in us a ſteady conſtant ſenſe of what is fit and equitable. This rule is ſo comprehenſive, that it may be called the ſum and ſubſtance of Chriſtian morality, as it reſpects the ſocial duties. It has been objected by ſome that it teaches nothing, ſince it does not ſhew what juſtice is; and that it is even an improper rule, for we ought not to do to others what we ſhould wiſh them to do to us, but what we may juſtly expect them to do to us. But theſe objections have little or no force. The real object of the rule clearly is to ſerve as a criterion of duty which ſhould counteract the impreſſions of ſelf. We ſeldom need fear, leſt we ſhould carry our imaginary ſubſtitution to too great a length. Our only danger is, leſt we ſhould not go far enough; that we ſhould admit of exceptions to this principle, which, if circumſtances had been real, ought to have had no place. This rule of duty, ſays Dr. Reid, "comprehends every rule of juſtice without exception. It comprehends all the relative duties, ariſing either from the more permanent relations of parent and child, of maſter and ſervant, of magiſtrate and ſubject, of huſband and wife, or from the more tranſient relations of rich and poor, of buyer and ſeller, of debtor and creditor, of benefactor and beneficiary, of friend and enemy. It comprehends every duty of charity and humanity, and even of courteſy and good manners."—"He who acts invariably by this rule, will never deviate from the principle of his duty, but from an error of judgment. And, as he feels the obligation that he and all men are under, to uſe the beſt means in his power to have his judgment well informed in matters of duty, his errors will only be ſuch as are invincible." (Active Powers, Eſſ. v. ch. 1.) In order to apply this rule according to the obvious intention of the Chriſtian lawgiver, we are firſt to conſider what we ſhould wiſh done to us, if we were in the place of the other perſon, and at the ſame time poſſeſſed of all the knowledge which we ourſelves poſſeſs reſpecting the object under conſideration. For inſtance, ſuppoſe a child requeſts from a parent, a gratification which the parent knows would, in ſome way or other, be injurious to him; is the parent to grant his requeſt, becauſe, if in the child's place, he would himſelf wiſh to be ſo gratified? The anſwer is clear; and ſo in ſimilar inſtances. The fact is, in all ſuch caſes we are to conſider, not merely what we might wiſh if in the ſituation of another, ſo as to have all his fooliſh deſires, and his ignorance or miſguided opinions; but what we ſhould deſire with all the means of knowledge which we actually poſſeſs, and with all the views we have of the reaſonableneſs of the objects of deſire, when not ourſelves under the influence of paſſion or intereſt. The rule is not ſo much deſigned to *teach* us what is juſt and right, as to enable us to ſee and attend to what we do know; to make us think of the claims of others, and to overcome the promptings of ſelfiſhneſs. 2. We muſt farther conſider, not only what we ſhould wiſh for, and, as far as reſpects ourſelves only, might reaſonably wiſh for, if in the place of another, but alſo take into account what we ſhould wiſh for, if in the place of thoſe others whoſe conduct or happineſs will be affected. Suppoſe, for inſtance, that a favour is requeſted which in itſelf conſidered is right and reaſonable; we might

conſider the application of our Saviour's rule as neceſſarily directing us to grant it, becauſe, if in the ſituation of the individual ſoliciting it, we might reaſonably wiſh for ſucceſs. But it may ſo happen, that by attending to his requeſt, we may deprive ourſelves of the power of diſcharging more imperious duties to others: we may be prevented from paying our debts, or from contributing as we ought to the welfare of thoſe who have ſtronger claims upon us. Their claims muſt alſo be taken into account; but we muſt take care, that ſuch calculations be not made under the bias of ſelfiſhneſs; and that, under the pretence of juſtice, we do not ſtifle the feelings of compaſſion and good-will. The doublings of ſelf-love are ſo numerous and intricate, that he who has the ſincere and earneſt deſire to do his duty, will be cautious where the promptings of intereſt or indolence, or other perſonal feelings are concerned. "Charity begins at home" is an excellent maxim; and he who neglects his home in order to do good to others, may reaſonably expect that he will do more harm by ſuch neglect, than he can do good in other ways; but we ſhould alſo remember, that this maxim is often the prompting of ſelf-love, to excuſe our covetouſneſs or our indolence; and where the good to others is preſent and certain, and the good to our narrow circle of domeſtic relations is diſtant and uncertain, the latter is not to be placed in competition with the former. On *candour*, an important and perhaps too much neglected branch of juſtice, the reader will find an intereſting paſſage from Mr. Stewart's Outlines, in IV. § 1.

(6) Perſons in the near relations of life, benefactors, dependents, and enemies, ſeem to have, in moſt caſes, a prior claim to ſtrangers. General benevolence ariſes from the cultivation of the particular ſources of it. The root muſt therefore be cheriſhed, that the branches may flouriſh, and the fruit arrive at perfection. Some remarks on a theory directly oppoſing this rule, will be found in IV. § 2.

(7) Benevolent and religious perſons have, all other circumſtances being equal, a prior claim to the reſt of mankind. Natural benevolence itſelf teaches this, as well as the moral ſenſe. Two reaſons ſtrongly enforce this rule; in the firſt place, we thus contribute towards the promotion of goodneſs; we add ſomething to the ſtrength of the motives which there are, even in the preſent life, for ſteady adherence to the practice of duty. If it be our aim to remove miſery without diſcrimination, we ſhall in ſome inſtances break down the barriers of virtue; we cannot remove all; let our efforts, therefore, be ſo directed, that they may be as beneficial as poſſible; and it is obvious, that they will be moſt effectual, where they contribute to diſcourage vice in all its ſhapes. If indolence be ſecure of relief from that preſſure which it places upon itſelf, indolence will be increaſed; if the appearance of miſery be the only paſſport to our aſſiſtance, vice will be continually receiving encouragement. But it is not merely with a view to the relief of actual miſery that diſcrimination is important; it is equally important with reſpect to the extenſion of the means of doing good. We may confidently expect, that all the opportunities and powers we can commit to others, will be moſt ſerviceable in the hands of thoſe whoſe habits are formed upon the model of benevolent piety. In all caſes, however, eſpecially while our benevolence is in its infancy, we are in ſome meaſure to be guided by its mere impulſe. It is one important conſequence of doing good to others, that we do good to ourſelves, we cultivate our benevolence, and with it cultivate our happineſs. But that benevolence will be found to reſt upon the ſureſt footing, which is made to prompt to exertions which in no way interfere with the moſt extenſive intereſts of mankind.

(8) Since the concerns of religion, and a future ſtate are of infinitely more importance than thoſe which relate to this world, it ſhould be our moſt earneſt object to contribute, as far as in us lies, to the moral and religious improvement of our fellow creatures. In various ways we have this power; and this is a field in which all can, more or leſs, employ their talents. Here no effort can be altogether thrown away; at leaſt no effort will be prejudicial; and even if to others they ſhould be uſeleſs, their effects will return to our own boſoms.

(9) We ought to pay the ſtricteſt regard to truth, both in our affirmations and promiſes. There are very few inſtances where veracity of both kinds is not evidently conducive to the public good, and falſehood in every degree pernicious. It follows, therefore, that in caſes where appearances are otherwiſe, the general regard to truth, which is of ſo much conſequence to the world, ought to make us adhere inviolably to it; and that it is a moſt dangerous practice to falſify, pretended or real, as is often done, from falſe delicacy, falſe ſhame, and other ſuch diſingenuous motives, or even from thoſe which border upon virtue. The harm which theſe things do, by creating a mutual diffidence, and diſpoſition to deceive, is exceedingly great; and in ſcarcely any inſtances to be counterbalanced by the preſent good effects aſſigned as the reaſon for this practice. On the ſuppoſed reſtrictions of this duty, ſee hereafter, IV. § 3.

(10) Obedience to the civil magiſtrate, and to the laws of the community, is a ſubordinate general rule of the greateſt importance. It is evidently for the public good, that every member of a ſtate ſhould ſubmit to the governing power, whatever that be. Peace, order, and harmony, reſult from this, taken on the whole: confuſion and miſchief of all kinds from the contrary. So that, though it may, and muſt be ſuppoſed, that diſobedience in certain particular caſes will, as far as the ſingle act and its immediate conſequences are conſidered, contribute more to the public good than obedience, yet as it is a dangerous example to others, and will probably lead the perſon himſelf into other inſtances of diſobedience afterwards; diſobedience becomes, in every caſe, upon the whole, of a tendency deſtructive of the public welfare. We ought, therefore, in conſequence of this rule, to reſpect all perſons in authority; not to paſs haſty cenſures upon their actions; to make candid allowances on account of the difficulties of government, the bad education of princes, and of perſons of high birth; and of the flattery and extraordinary temptations with which they are ſurrounded; to obſerve the laws ourſelves, and to promote the obſervance of them where the penalties may be evaded, or are found inſufficient; to look upon property as a thing abſolutely determined by the laws, ſo that, though a man may, and ought to recede from what the law would give him out of compaſſion, generoſity, love of peace, view of greater good upon the whole, &c.; yet he muſt never in any way evade, ſtrain, or do violence to the laws, in order to obtain what he may think his own according to equity; and whenever he has offended, or is judged by lawful authority to have offended, he muſt ſubmit to the puniſhment whatever it be.

This rule obviouſly does not extend to thoſe extreme caſes, where the people at large, (for whoſe benefit all power ſhould be exerciſed, and on whoſe will it muſt eventually depend,) ſee reaſon to reſiſt the exerciſe of uſurped or arbitrary power, to change one line of ſovereigns for another, or to place the exiſting monarch under thoſe reſtrictions, which may prevent the abuſe of his authority. In making ſuch reſiſtance, however, it ſhould be clear, that the propoſed change will meet with at leaſt the concurrence of the great bulk of the people, that the probabilities of ſucceſs are adequate to juſtify the riſks which muſt be run, and that the advantages to be gained will be ſuch as to counterbalance the immediate evils; evils which muſt often check the ardour of enlightened and diſintereſted patriotiſm, and ſhould be ſeriouſly weighed, not only in the more extenſive caſes, but even in thoſe which merely reſpect the reformation of real or ſuppoſed abuſes. The maſs of ſuffering, and of moral evil produced when force muſt be employed to throw off an oppreſſive yoke, is utterly incalculable; and, on the whole, more is generally to be effected by the gradual diffuſion of knowledge and of ſound views of the nature and ends of political eſtabliſhments, which muſt eventually, (and often much more rapidly than could be expected before hand,) ſet a complete bar to all injurious encroachments on civil liberty.

Nor does this rule extend to thoſe important caſes where the rights of conſcience are concerned. If the laws of the civil magiſtrate require any thing which the law of God forbids, they muſt be neglected, or diſobeyed, without heſitation.

Intimately connected with this ſubject is one point, to which we muſt briefly advert, *viz.* honeſty with reſpect to the public revenue. Many who have a real principle of genuine uprightneſs in other reſpects, are looſe in their practice in this; and it is, we fear, a mournful truth, that by the frauds and falſehoods which they have employed in connection with the revenue, great numbers have had their moral principles weakened, if not altogether perverted. How much ſuch practices have a tendency to diminiſh mutual confidence, it is unneceſſary to ſay. If we know that a man defrauds the revenue, contrary, it may be, to his own ſolemn declaration, we may hope, and perhaps ſee reaſon to believe, that he will not defraud or deceive in the common tranſactions of life; but our ſtrong confidence that he will not muſt be greatly ſhaken. The preſſure of national burdens cannot indeed but be deeply felt by individuals; but we ought ever to bear in mind, when we are diſpoſed to aim to leſſen its effects on ourſelves, by unlawful concealment, or falſe declarations, &c. that we are thereby throwing an undue weight upon the more conſcientious, and that we cannot do it without (as far as it is known or ſuſpected) leſſening the confidence of others in us, and looſening the bonds of ſociety, nor without weakening our own moral principles; and even if we ſhould ſatisfy ourſelves, that, in the particular inſtance, we have equity, if not law on our ſides, yet that we cannot employ our ſuppoſed right without fraud, if not deliberate falſehood, and perhaps even perjury. As long as we have the power of curtailing thoſe expences which reſpect ſhow and luxury, or, at moſt, mere convenience, we have no plea of real neceſſity: and, after all, our pleaſures and our pride are commonly our heavieſt taxes.

Reſpecting thoſe frauds on the public revenue, which come under the general head of ſmuggling, they cannot be too much deprecated. They almoſt ſolely reſpect articles of luxury, on which the ſame remark may be made as above; and, at any rate, ſmuggled goods cannot be purchaſed, without directly encouraging frauds and falſehood in others, and aſſiſting to train up a ſet of deſperate perſons, who are thus prepared to make ſociety in any manner the ſubject of their lawleſs prey: they cannot be purchaſed without increaſing the burdens of the conſcientious, nor without injury to the fair dealer. The direct tendency of ſome of our revenue laws is, in various ways, to weaken the reſtraints of duty; and the evil, for which individuals cannot be altogether anſwerable, ſhould not be increaſed by their own violations. If theſe remarks ſhould meet the eye of any one of thoſe reſpectable ſenators, who are concerned for the morality as well as preſent intereſts of the people, we earneſtly ſolicit him to take into conſideration the ſtate of thoſe laws in this particular point of view. We doubt not he will find that, in ſome caſes, even the truly upright man, who is anxious to make no declaration but what is ſtrictly true, can ſcarcely avoid departures from the exact truth, which are extremely painful to his own mind; and that thoſe who are but little under ſuch reſtraint, are continually led, by the forms and oaths of the cuſtom-houſe, to breaches of truth, ſanctioned by an appeal to God, which cannot fail to looſen the influence of an oath in all caſes, and prepare the way for perjury in its worſt forms. The effect of the whole, in its various ramifications, is a degree of moral injury which can ſcarcely be calculated: and while we experience heart-felt delight (not, however, unmixed with pain from preſent diſappointment) at contemplating thoſe exertions, which are deſigned to bring our penal law to a correſpondence with the only juſtifiable ends of puniſhment, we ſhould be diſpoſed to place upon a level with them, efforts of the ſame enlightened, comprehenſive, dignified, perſevering nature, directed to the reformation of our revenue laws, where they unneceſſarily affect the morals of the people.

Other rules, ſays Hartley, beſides the ten foregoing, might be aſſigned, or theſe expreſſed in a different way. I have put down thoſe which appear to be, in fact, the chief principles of ſocial conduct to wiſe and good men. They muſt all be ſuppoſed to influence and interpret each other. Let a man only diveſt himſelf as much as poſſible of all ſelfiſh regards, and love his neighbour as himſelf, and God above all, and he will generally find ſome point, and that without much difficulty or perplexity, in which all theſe rules unite to produce the greateſt good, upon the whole, to all perſons concerned.

Though our plan and limits will not allow of our entering at length into the duties ariſing from the particular relations of ſocial life, yet we deem the obſervations of Hartley, on the ſubject of the parental relation, ſo important, that we ſhall make an abſtract of his leading ſtatement. The principal duty of the parental relation is the giving of a right education, or the imprinting ſuch aſſociations on the minds of children, as may conduct them ſafe through this world to a happy futurity. In the latter reſpect there can be no doubt, becauſe religion muſt on all hands be allowed to be the one neceſſary thing; and, in the courſe of theſe inveſtigations reſpecting the primary purſuit of life, it appears that it contributes as certainly to give us the maximum of happineſs in this world, at leaſt the faireſt proſpect of it, as to ſecure it in the next: ſo that a parent ought to inculcate it in every point of view. The chief errors of education are owing to the want of a practical perſuaſion of this point, or to a falſe tenderneſs or opinion on the part of a parent, by which he is led to believe that the object does not require, in the caſe of his child, frequent corrections and reſtraints, with perpetual encouragements and incentives to virtue, by reward, example, advice, books, converſation, &c. If due care were taken from the firſt, little ſeverity would ordinarily be neceſſary; but in proportion as this is neglected in the firſt years, a much greater degree of care, with high degrees of ſeverity, both bodily and mental, become abſolutely neceſſary to preſerve from miſery both here and hereafter. Affectionate parents ſhould, therefore, labour from the earlieſt dawnings of underſtanding and deſire, to check the growing obſtinacy of the will; to curb all ſallies of paſſion; to impreſs the deepeſt, moſt amiable, reverential, and awful impreſſions of God, a future ſtate, and all ſacred things; to reſtrain anger, jealouſy, and ſelfiſhneſs; to encourage love, compaſſion, generoſity, forgiveneſs, gratitude; to excite and even oblige to ſuch induſtry, as the tender age will properly admit. For one principal end and difficulty of life is, to generate ſuch moderate, varying, and perpetually actuating motives, by means of the natural ſenſible deſires being aſſociated with, and apportioned to, foreign objects, as may keep up a ſtate of moderate cheerfulneſs, and uſeful employment, during the whole courſe of our lives; whereas ſenſual, blind, and uninformed deſire preſſes violently for immediate gratification, is injurious to others, and deſtroys its own aims, or, at the beſt, gives way only to ſpleen and diſſatisfaction.

14. *Eſtimate of the Pleaſures of Theopathy.* — We now proceed to the important inquiry reſpecting the theopathetic affections, what regard they claim from us in the formation of the rule of life. And here it appears that the love of God ſhould be our primary purſuit, and ultimate end, becauſe it regulates, improves, and perfects all the other parts of our nature, and affords a pleaſure ſuperior in kind and in degree to all the reſt.

We have already ſeen the influence of the precepts of piety on the four inferior claſſes of human pleaſures, thoſe of ſenſation, imagination, ambition, and ſelf-intereſt; but the precepts of piety are thoſe which teach us what homage of our affections and external actions ought to be addreſſed to the Deity, in a direct and immediate manner. Now all the affections, enjoined by theſe precepts, terminate ultimately in the love of God, which, therefore, may be uſed in the ſame ſituations in which the term precepts of piety has been employed.

But in addition to this, it is obvious in a ſhorter way. The perpetual exertion of a pleaſing affection towards a Being who is infinite in power, knowledge, and goodneſs, and who is alſo our friend and father, cannot but enhance all our joys, and alleviate all our ſorrows. A ſenſe of his preſence and protection will reſtrain all actions which are exceſſive, irregular, or hurtful; will ſupport and encourage us in all ſuch as are of a contrary nature; and will infuſe ſuch peace and tranquillity of mind, as will enable us to ſee clearly and act uniformly. The perfection, therefore, of every part of our natures muſt depend upon the degree in which the love of God, and a conſtant ſenſe of his preſence, have obtained poſſeſſion of the mind.

With reſpect to the ſupport and regulation afforded by piety to benevolence, it may be obſerved that the love of our fellow men can never be free from partiality and ſelfiſhneſs, until we are able to view all things in the relation which they bear to God. If the relation to ourſelves be made the point of view, our proſpects muſt be narrow, and the appearance of what we do ſee, diſtorted. When we conſider the ſcenes of vanity, folly, and miſery, which preſent themſelves to our view from this point; when we are diſappointed in the happineſs of our friends, or feel the reſentment of our enemies, our benevolence will begin to languiſh, and our hearts fail us: we ſhall complain of the corruption and wickedneſs of that world which we have hitherto loved, with a benevolence merely human; and ſhew, by our complaints, that we are ſtrongly tinctured with the ſame corruption and wickedneſs. This is generally the caſe with young and unexperienced perſons in the beginning of a virtuous courſe, and before they have made advances in piety. The diſappointments which human benevolence meets with, are ſometimes apt to incline us to call the divine goodneſs in queſtion. But he who is poſſeſſed of a full aſſurance of this, who loves God with his whole powers, as an inexhauſtible fountain of love and benevolence to his creatures, at all times and under all circumſtances, as much when he chaſtiſes as when he rewards, will learn thereby to love enemies as well as friends, the ſinful and miſerable as well as the holy and happy; to rejoice and give thanks for every thing he ſees and feels, however irreconcileable to his preſent ſuggeſtions; and to labour as an inſtrument under God, with real courage and conſtancy, for the promotion of virtue and happineſs.

In like manner the conſcience or moral ſenſe requires a perpetual direction and ſupport from the love of God to keep it ſteady and pure. When men ceaſe to have a due regard for God, having ſome other end beyond which they do not look, they are very apt to relapſe into negligence and calloſity, and to act without any virtuous principle. And, on the other hand, if they regard him with ſlaviſh fear, they fill their minds with endleſs ſcruples and anxieties about the lawfulneſs of trivial actions.

Thus the love of God regulates, improves, and perfects all the other parts of our nature: but further it affords a pleaſure ſuperior in kind, and in degree, to all the reſt of which our natures are capable.

(1) The love and contemplation of God in ſome meaſure render us partakers of the divine nature, and, conſequently, of the perfection and happineſs of it. Our wills may thus be united to his will, and therefore rendered free from diſappointment: we ſhall, by degrees, ſee every thing as God ſees it, that is, ſee every thing which he has made to be good. Though this can only be the caſe in part in the preſent world, yet it is well known that there have been thoſe who have ſo far reached this perfection of our nature, as to acquieſce, and even to rejoice in the events of life, however apparently afflicting; to be freed from fear and ſolicitude; and to receive their daily bread with conſtant thankfulneſs. And though the number of theſe happy perſons may have been comparatively ſmall, and the path be not frequented and beaten, yet if the deſire be ſufficiently earneſt, it is in the power of all to arrive at the ſame ſtate, by ſufficient earneſtneſs and conſtancy in the uſe of the appointed means.

(2) The love of God may be conſidered as the central affection to which all the others point. When men have entered ſufficiently into the ways of piety, the ideas of the Supreme Being recur more and more in the whole courſe and tenor of their lives, and, by uniting with all their thoughts and feelings, overpower all the pains, and augment and connect with themſelves all the pleaſures of the mind. Every thing beautiful and glorious brings in the ideas of God, mixes with them, and coaleſces with them; for all things are from God, he is the only cauſe and reality, and the exiſtence of every thing elſe is only the effect and proof of his exiſtence and excellence. Let the mind be once duly imbued with this truth, and its practical applications, and every thing will afford exerciſe for the devout affections. Add to this their unlimited extent, their purity, and perfection, and it cannot but be acknowledged that they muſt be far ſuperior to all the reſt both in kind and in degree.

(3) The objects of other pleaſures are frequently removed. No time, no place, no circumſtance of life can deprive us of this. Our hearts may be directed towards God in the greateſt external confuſion, as well as in the deepeſt ſilence and retirement. All the duties of life, when directed to God, become pleaſures; and by the ſame means every the ſmalleſt action becomes the diſcharge of the proper duty of the time and place. Thus time is turned

to its beſt advantage: thus every ſituation and event of life may be converted into a ſource of preſent comfort and future felicity.

(4) When the love of God is thus made to ariſe from every object, and to exert itſelf in every action, it becomes of a permanent nature, ſuited to our preſent frame, and will not paſs into deadneſs or diſguſt, as our other pleaſures do from repeated gratification.

We ſhould be glad if our limits would allow of our laying before our readers a view of thoſe means which are pointed out by Hartley, for the culture of the theopathetic affections, of *faith*, *fear*, *gratitude*, *hope*, *truſt*, *reſignation*, and *love:* we muſt, however, content ourſelves with referring to his 72d propoſition on this ſubject; and to his important rules in the 73d propoſition, concerning the manner of expreſſing them in prayer, and other religious exerciſes; and ſhall only add the following obſervations, derived from the 73d.

There cannot be a more fatal deluſion, than to ſuppoſe, that religion is nothing but a divine philoſophy in the ſoul; and that the foregoing theopathetic affections may exiſt and flouriſh there, though they be not cultivated by devout exerciſes and expreſſions. Experience, and many plain obvious reaſons, ſhew the falſehood and miſchievous tendency of this notion; and it follows from the theory of aſſociation, that no internal diſpoſitions can remain long in the mind, unleſs they be properly nouriſhed by proper aſſociations, that is, by ſome external acts. This, therefore, among others, may be conſidered as a ſtrong argument for frequent prayer.

In ſection 10, (entitled Eſtimate of the Pleaſures of Self-intereſt,) we referred to Dr. Prieſtley's ſermon on the duty of not living to ourſelves; we ſhall here copy a few paragraphs from it, which the reader will perceive to bear cloſely upon this, and upon the 10th ſection, and for which, if not before familiar to him, we perſuade ourſelves we ſhall have his thanks.

" Every day paſſed in the ſteady and earneſt diſcharge of a man's known duty, will paſs with uniform cheerfulneſs and alacrity. And in the glorious animating proſpect of a future happy ſtate of mankind, on which, in a humble truſt and confidence in the aſſiſtance and grace of God, he has ſpent all his cares, and exerted all his powers, that joy will ſpring up in his heart here, which will hereafter be unſpeakable and full of glory.

" If troubles and perſecutions ariſe on account of our adhering to duty; if we be oppoſed in the proſecution of laudable undertakings, or ſuffer in conſequence of undertaking them; the true piety of a perſon who habitually lives to God, and not to himſelf, is capable of converting them all into pure unmixed joy and tranſport. Then the human mind rouſed to the moſt intent exertion of all its faculties, burdened with no conſciouſneſs of guilt, referring itſelf abſolutely to the diſpoſal of its God and father, diſtruſting its own powers, and confiding in the infinite power, wiſdom, and goodneſs of God, acquires a fervour of ſpirit, a courage, fortitude, and magnanimity, tempered with the moſt perfect ſerenity, and the greateſt preſence of mind, that is ſufficient, and more than ſufficient, to bear a man through every difficulty, and even to convert all pain into pleaſure. His highly agitated ſtate of mind, in thoſe trying circumſtances, is almoſt pure rapture and extacy.

" What the extraordinary exerciſes of devotion are able to do upon extraordinary occaſions, the habitual moderate exerciſe of piety will be able to do in the ordinary courſe, and the common troubles of our lives; ſo that it may not only be compared to a ſtrong cordial, to be applied when the mind is ready to faint under adverſity, but to that food which is the daily ſupport of our lives.

" To have God always in our thoughts, is not poſſible in this world. Preſent objects, to the influence of which we are continually expoſed, muſt neceſſarily engage a great part of our attention; and worldly objects, by continually engroſſing our thoughts, are apt to become of too great importance to us. We grow anxious about them, and our minds are haraſſed and fatigued with a conſtant and cloſe attention to them. Now, it is when the mind is in this ſtate, or rather tending towards it, that the benign influences of devotion are, in the ordinary courſe of our lives, the moſt ſenſibly felt; when the mind, looking off, and above, all worldly objects, and deeply impreſſed with a ſenſe of the infinite power, wiſdom, and goodneſs of God, unburdens itſelf of every anxiety, and caſts all its cares upon its heavenly father; and when the preceding tumult and diſorder of the paſſions only ſerve to augment that unſpeakable joy, ſatisfaction, and confidenee, with which a deep ſenſe of the preſence and providence of God inſpires the ſoul.

" The relief a benevolent mind feels from communicating its troubles and cares to an intimate friend, in whoſe wiſdom and integrity he can confide, though of the ſame nature, is but a faint image of what the truly pious ſoul feels in the delightful ſeaſons of the devout intercourſe which he maintains with his God.

" This is a perpetual ſource of joy and ſatisfaction to a truly devout mind, which the wicked, thoſe perſons who live to themſelves, and not to mankind, or to God, intermeddle not with. Not even an idea of that ſweet tranquillity, exalted joy, and calm fortitude, whieh true devotion inſpires, can be communicated to another who hath had no experience of it himſelf. This is true of thoſe things of whieh St. Paul ſays that the natural man cannot comprehend them, and that they are fooliſhneſs to him, becauſe they are ſpiritually diſcerned.

" I would be no advocate for enthuſiaſm. The fervour of devotion cannot always be kept up. That is ineonſiſtent with the condition of our nature, and far from being neceſſary in our preſent ſtate; but that cheerful ſerenity and compoſure in which moderate acts of devotion leave the mind, is an excellent temper for entering upon, and perſevering with ſpirit and alacrity in any uſeful and honourable undertaking."

This religious philoſopher then proceeds, in reference to the general object of his diſcourſe, in the following words.

" The ſum of this practical doctrine, ſuggeſted by revelation, and confirmed by reaſon and obſervation, is, that *no man can be happy who lives to himſelf;* but that true happineſs conſiſts in having our faculties wholly engroſſed by ſome worthy object, in the purſuit of which the ſtrongeſt and beſt of our affections have their full play, and in which we enjoy all the conſiſtent pleaſures of our whole nature; that though a regard to our greateſt happineſs be of excellent uſe, particularly about the beginning of our progreſs towards perfection and happineſs, in bringing our inferior appetites and paſſions into due ſubjection to the ſuperior powers of our nature, yet that ſelf-love, and a regard to ourſelves, is very apt to grow too intenſe, and is, in fact, the cauſe of a great deal of the uſeleſs anxiety, perplexity, and miſery which is in the world; and that therefore it ought to be our care, that our minds be engroſſed as much as poſſible by other objects; and that even motives to virtue which turn our attention frequently upon ourſelves ſhould be uſed with caution, for fear of feeding that vanity and ſelf-conceit which we ought to ſtudy every method of repreſſing, as the greateſt bane of true religion, being moſt oppoſite to the genuine temper of Chriſtianity, and moſt deſtructive of human happineſs."

15. *Eſtimate of the Moral Senſe.*—It has been already ſtated, that the moral ſenſe ought to have great influence even in the moſt explicit and deliberate actions; hence the culture of its feelings, and the correcting of its dictates, ſhould be made a primary object.

Further, the moral ſenſe ought, on urgent occaſions, to have the ſole influence; and this for ſeveral reaſons. 1. Becauſe it offers itſelf on the various occaſions of life, with the tone of authority. It warns us before hand, and calls us to account afterwards; it condemns or approves; it rewards by the pleaſures of ſelf-approbation, or puniſhes by the pains of ſelf-condemnation. 2. The moral ſenſe is principally generated by piety, benevolence, and rational ſelf-intereſt. All theſe are explicit guides in deliberate actions; and ſince they are excluded, on ſudden occaſions, through the want of time to weigh and determine, it is highly reaſonable to admit the moral ſenſe formed from them, and whoſe dictates are immediate, as their ſubſtitute. 3. The greatneſs, the permanency, and the calm nature, of the pleaſures of the moral ſenſe, with the horrors and the conſtant recurrence of the ſenſe of guilt, are additional arguments to ſhew that theſe pleaſures and pains were intended as the guides of life.

The perfection of the moral ſenſe conſiſts in the four following particulars: 1. That it extend to all the actions of moment which occur in the intercourſes of real life; and be a ready monitor on all ſuch occaſions: 2. That its pleaſures and pains ſhould be ſo vivid as to furniſh a very ſtrong excitement to ſhun vice, and to walk ſteadily in the path of religious duty: 3. That it ſhould not deſcend to trifling or minute particulars; for, though ſcrupuloſity is probably a neceſſary ſtep in the progreſs of the mind to moral excellency, yet, if it continue, and become the prevailing habit of the mind, it will check benevolence, and turn the love of God into a ſuperſtitious fear: 4. It is neceſſary that the dictates of the moral ſenſe ſhould be perfectly conformable to piety and benevolence, of which it may be conſidered as a ſubſtitute.

In order to obtain the moſt perfect ſtate of the conſcience, it is neceſſary for us to be much employed in the practical ſtudy of the ſacred ſcriptures, and of the writings of good men of all denominations; in obſerving the living examples of moral worth, and in the peruſal of moral and religious biography; in ſelf-examination; in prayer, and other exerciſes of devotion; in endeavouring to convert all the ſocial and religious affections into the love of God; in aiming to acquire a truly charitable and benevolent ſpirit; and in walking faithfully, according to the dictates of benevolence, piety, and the moral ſenſe, ſuch as they are at preſent. Some of theſe directions are more particularly ſuited to correct one defect in the moral ſenſe; ſome, another; but they will all conſpire in purifying and perfecting it. On the origin, growth, and culture of the moral ſenſe, we beg leave to refer the reader to MORAL *Education*, IV.; and we ſtrongly recommend the peruſal of Hartley's General Corollaries, at the end of his inveſtigations reſpecting the Rule of Life.

16. *A ſtrict regard to the precepts of Benevolence, Piety, and the Moral Senſe, favours even groſs Self-intereſt, and is the only method by which the refined, and the rational, can be ſecured.*—Here we may obſerve, 1. That ſince the regard to benevolence, piety, and the moral ſenſe, procures the pleaſures of ſenſation, imagination, and ambition, in their greateſt perfection on the whole, it muſt favour groſs ſelf-intereſt, or the purſuit of the means of obtaining them. 2. This regard has, in many caſes, an immediate tendency to procure theſe means, that is, to procure riches, power, learning, &c. and though it ſometimes happens that a man muſt forego both the means of obtaining pleaſure, and pleaſure itſelf, from a regard to duty, and often happens that the beſt men have not the greateſt ſhare of the means; yet it ſeems that the beſt men have, in general, the faireſt proſpect for that competency, which is moſt ſuitable to real enjoyment. Thus, in trades and profeſſions, though it is ſeldom obſerved that men eminent for piety and charity amaſs great wealth, yet they are generally in affluent or eaſy circumſtances, from the faithful diſcharge of duty, their prudence, moderation in expences, &c. and ſcarce ever in indigent ones. A ſenſe of duty produces a deſire to diſcharge it: this recommends to the world, to the bad as well as to the good; and where there are inſtances apparently to the contrary, farther information will generally diſcover ſome ſecret pride, negligence, or imprudence, that is, ſomething contrary to duty, to which the perſon's ill ſucceſs in reſpect of this world, may be juſtly aſcribed. 3. A regard to duty plainly gives the greateſt capacity for enjoyment; as it ſecures us againſt thoſe diſorders of body and mind, which render the natural objects of pleaſure inſipid or ungrateful. 4. As to refined ſelf-intereſt, or the purſuit of the means for obtaining the pleaſures of ſympathy, theopathy, and the moral ſenſe, it appears at firſt ſight, that a due regard to theſe muſt procure for us both the end and the means. 5. However groſs or refined ſelf-intereſt may, upon certain occaſions, be diſappointed, the rational one never can whilſt we act upon a principle of duty. Our future happineſs muſt be ſecured thereby. This the profane and profligate, as far as they have any belief of God, providence, or a future ſtate, (and it is ſcarcely poſſible for a rational being to arrive at more than ſcepticiſm and uncertainty in theſe things,) muſt allow, as well as the pious Chriſtian. And, when the rational ſelf-intereſt is thus ſecured, the diſappointments of the other two become far leſs grievous, and make far leſs impreſſion on the mind. He that has a certain reverſion of an infinite and eternal inheritance, may be very indifferent about preſent poſſeſſions.

17. *Practical Obſervations on Self-intereſt and Self-annihilation.*—Self-intereſt being reckoned by ſome writers the only ſtable point upon which a ſyſtem of morality can be erected, and ſelf-annihilation by others the only one in which man can reſt, I will here (ſays Hartley, prop. 67.) endeavour to reconcile theſe two opinions, giving at the ſame time both a general deſcription of what paſſes in our progreſs from ſelf-intereſt to ſelf-annihilation, and ſome ſhort hints of what is to be approved or condemned in this practice.

(1) The vicious pleaſures of ſenſation, imagination, and ambition, being often very expenſive, are checked by the groſſeſt of all the kinds of ſelf-intereſt, the mere love of money; and the principle upon which men act in this caſe is eſteemed one ſpecies of prudence. This may be tolerated in others, where it is not in our power to infuſe a better motive; but, in a man's own mind, it is very abſurd to have recourſe to one, which muſt leave ſo great a degree of impurity, when others which are purer and ſtronger, rational ſelf-intereſt particularly, are at hand.

(2) The deſire of bodily and mental accompliſhments, and in particular of ſcience and learning, conſidered as means of happineſs, often checks both the forementioned vicious pleaſures, and the love of money. Now this kind of ſelf-intereſt is preferable to the laſt indeed; but it cannot be approved by any that are truly ſolicitous about their own reformation and the purification of their motives.

(3) Groſs ſelf-intereſt ſometimes excites perſons to external acts of benevolence, and even of piety ; and though there is much hypocriſy always in theſe caſes, yet an imperfect benevolence or piety is ſometimes generated in this way. However, one cannot but condemn this procedure in the higheſt degree.

(4) As refined ſelf-intereſt ariſes from benevolence, piety, and the moral ſenſe ; ſo converſely it promotes them in various ways. But then, as it always checks their growth in various other ways, it cannot, in many caſes, be allowed ; and is, upon the whole, rather to be condemned than approved. More favour may be ſhewn it, where it reſtrains the vicious pleaſures of ſenſation, imagination, and ambition.

(5) Rational ſelf-intereſt excites us to all the proper methods of checking the laſt-named vicious pleaſures, as well as groſs and refined ſelf-intereſt, and producing in ourſelves the virtuous diſpoſitions of benevolence, piety, and the moral ſenſe. This part of our progreſs is extremely to be approved, and eſpecially the laſt branch of it.

(6) The virtuous diſpoſitions of benevolence, piety, and the moral ſenſe, and particularly that of the love of God, check all the foregoing ones, and ſeem ſufficient utterly to extinguiſh them at laſt. This would be perfect ſelf-annihilation, and reſting in God as our centre. And upon the whole we may conclude, that though it be impoſſible to begin without the pleaſures of ſenſation and the ſelfiſhneſs founded upon them, or to proceed without the other intermediate principles, and particularly that of rational ſelf-intereſt ; yet we ought never to be ſatisfied with ourſelves, till we arrive at perfect ſelf-annihilation, and the pure love of God.

III. We now proceed to the third object propoſed, *viz.* to ſtate what *criterion of virtue and fundamental principle of duty*, we deem, from the foregoing views, moſt ſuitable to the moral condition of human nature, and moſt likely to lead to its higheſt excellence.

We have already ſtated, (near the cloſe of our *firſt* diviſion,) that the *ultimate obligation*, the *beſt rule*, and the *immediate motive* of virtue, are three diſtinct conſiderations ; and we apprehend, that owing to this diſtinction not being kept ſufficiently in ſight, much confuſion has ariſen in moral inveſtigation.

On the worth and purity of our motives, depends entirely the value of any action as far as the individual himſelf is concerned : and that rule of duty muſt be the beſt, which is itſelf the beſt *guide* of duty, and at the ſame time is the moſt likely to lead to thoſe motives, which, in proportion as they have the chief actuating influence in the mind, exalt it towards the higheſt point of human excellence. The beſt rule of duty will of courſe ſupply the beſt *criterion* of virtue, in other words, the beſt teſt by which to determine whether an action or diſpoſition is entitled to the denomination of virtuous.

Though we ſet out with the poſition, that the agent's greateſt happineſs on the whole is the remoteſt obligation of virtue, yet it is clear, from the foregoing conſiderations, that this is not a motive on which the mind can reſt without checking its moral progreſs. It cannot be made a primary motive, without defeating its own end (ſee II. 10.) It is equally clear, that an habitual regard to one's own greateſt happineſs on the whole, as the ſole end of actions and diſpoſitions, would be continually miſleading us from that path, by which alone we can reaſonably expect to reach the object. It cannot, therefore, be made the criterion of virtue.—When it is once aſcertained, that a ſtrict regard to the dictates of piety, benevolence, and the moral ſenſe, are the beſt means of promoting our greateſt welfare, we have nothing to do but to obey them, with the ſecurity, (if we think at all about it) that thus all will be well for us. To ſhew that a certain courſe of conduct is our duty, is a good way of proving that it will promote our greateſt happineſs on the whole : and, in fact, taking a future life into account, we have no other means of proving it ; for nothing can be more certain, than that it is only by a faithful endeavour to diſcharge our duty, that we can obtain happineſs in a ſtate of retribution. That, therefore, cannot be made a criterion of duty, for which duty does itſelf afford the beſt criterion.

From the conſiderations in the foregoing paragraph it neceſſarily follows, that the tendency to promote the agent's greateſt happineſs on the whole, though it has been ſhewn to be the remoteſt ſource of obligation, cannot be the beſt criterion of virtue, any more than the beſt motive to the practice of it. Indeed it would be abſurd to employ that as the mode of judging reſpecting our duty, which duty, as well as a regard to our own greateſt happineſs, requires to be made only a ſubordinate motive to the diſcharge of it, and which in the higheſt ſtages of moral excellence will be entirely left out of ſight as a motive.

On this ground, we cannot accord with Mr. Belſham's ſtatement in p. 432 of his Elements. “ Hence it follows, that *there can be but one rule of right*, namely, the tendency of an action or affection to the ultimate happineſs of the agent, or what completely coincides with this, under the government of perfect wiſdom and benevolence, to the greateſt general good ; and all diſtinctions between what is commercially, legally, politically, &c. right, and what is morally or theologically right, are groundleſs, abſurd, and in practice highly pernicious.” The laſt part of the paragraph is unexceptionable and important ; the poſition, which we have put in italics, in the unlimited and unqualified way in which it is expreſſed, is erroneous, and liable to great and injurious perverſion. The effect of an action or affection on the ultimate happineſs of the agent, muſt itſelf be dependent on the will of God : that will muſt undoubtedly ſpring from infinite benevolence and perfect rectitude ; but a rule, which is itſelf dependent upon another, cannot be the *only* rule of right, and from what we have already ſtated, it cannot be the beſt.

It may often be convenient to employ ſome one of the extenſive criteria of virtue as, in fact, a means of applying the moſt general and beſt criterion : juſt the ſame as in order to apply the moſt general rule of benevolence, we find it convenient to employ ſome rules of leſs extent as means of judging what benevolence really requires (ſee II. 13.) ; but no quality or effect of virtue can be admitted as the ultimate or even the beſt criterion, which is in any way arbitrary or dependent upon peculiarities in the mental or moral character of the individual applying it, which will not include all ſpecies of virtue, or which cannot itſelf be made a primary motive to the performance of it. If any criterion of virtue can be laid down which is ſelf-conſiſtent, univerſal, invariable, authoritative, eaſily applicable, itſelf excellent as a motive, and perfectly and obviouſly conſiſtent with the remoteſt obligation, that muſt be the *beſt* criterion or rule of duty.

Theſe principles completely exclude all conſiderations founded ſolely on a regard to our own preſent welfare ; all views of individual intereſt, utility, expediency, &c. If the tendency of virtue to our own greateſt happineſs on the whole, is not the beſt criterion of virtue, its tendency to more limited degrees of happineſs cannot. The tendency of virtue to promote our preſent welfare is often a good guide ; and as a ſubordinate rule may be admitted with advantage. In one point of view it is even ſuperior to the tendency of virtue to promote our greateſt happineſs on the whole; becauſe of this we can decide but imperfectly, and only by taking the will of God into account: the preſent effects of virtue are often obvious to all poſſeſſed of any tolerable degree of experience and good ſenſe. But as the preſent effects of virtue are often in oppoſition to immediate intereſt and pleaſures, and its moſt valuable influence on human happineſs cannot be thoroughly diſcerned except by the virtuous themſelves, they cannot furniſh more than a ſubordinate teſt of duty, and are at the ſame time in oppoſition to the higheſt, ſo far as they tend to fix the mind upon themſelves as motives.

The tendency of virtue to promote the good of others, though, perhaps, in a greater or leſs degree, directly or indirectly, an invariable quality of virtue, yet is far from being eaſily applicable, except to thoſe branches of virtue which do not immediately reſpect our fellow creatures: it is often remote, indirect, and ſubordinate. Beſides, if this tendency were aſſumed as the teſt of virtue, it would have little authority; it would carry with it little obligation, in thoſe branches of ſelf-regulation and piety which do not obviouſly affect the intereſts of others. The conformity of actions and diſpoſitions to *benevolence*, is an excellent and extenſive criterion of duty; but we are ſeeking for that which may be truly called THE *criterion* or rule of duty. Benevolence has a great advantage over the preceding rule, becauſe it cannot too much operate as a motive; it often has a powerful influence in the exerciſe of the perſonal virtues, and when ſupported by the views of religion, muſt always appear to be conſiſtent with the individual's own higheſt welfare: but it will not appear to include every ſpecies of duty without a greater degree of moral comprehenſion, than can be expected before a high degree of moral worth has been acquired.

Nor can a conformity to *juſtice* be juſtly deemed the criterion of virtue; not even in the ſenſe in which it is taken by the author of Political Juſtice, (b. ii. ch. 2.) who, as Mr. Belſham obſerves, (Elements, p. 442.) makes it expreſs "benevolence under the direction of wiſdom." A diſpoſition to render unto *all* their due, will, in a variety of caſes, perfectly coincide with benevolence, and contribute to prevent the erroneous directions of this affection; and the conformity to juſtice may with great advantage be made a criterion of ſocial virtue, but no farther. Juſtice as a criterion of duty in general is more defective than benevolence; becauſe benevolence has more influence over the diſpoſitions, and will operate more extenſively as a motive, in thoſe caſes of duty which are not directly ſocial, and where juſtice does not appear to afford any direction, except through the medium of benevolence. Godwin does, indeed, "aſſume the term *juſtice* as a general appellation for all moral duty," (clearly by this and his ſubſequent ſtatements excluding from the claſs of moral duty, the divine and perſonal virtues); and he defines juſtice (p. 127.) to be "that impartial treatment of every man in matters that relate to his happineſs, which is meaſured ſolely by a conſideration of the properties of the receiver, and the capacity of him that beſtows:" but he afterwards (p. 150.) gives a much more comprehenſive account of *virtue*, which he defines "to be any action or actions of an intelligent being, proceeding from kind and benevolent intention, and having a tendency to contribute to general happineſs." According to this, together with his previous theory, virtue is juſtice in action, ſpringing from benevolence in principle: but it is clear that even this cannot reach the virtues which reſpect God and ourſelves; becauſe though benevolence may prompt to them, it cannot be ſaid, with any propriety, (nor, we imagine, would Godwin have intended to ſay,) that they are a branch of juſtice, eſpecially as he has himſelf defined it.

If the conformity of actions, &c. to the dictates of the *moral ſenſe*, to the perceptions of the *underſtanding*, and ſo on, be made the criterion of duty, it muſt, from the very nature of thoſe mental principles or powers, as we find them actually exiſting in the human mind, be an unſteady, ever varying guide. The directions of the well cultivated underſtanding, or of the well regulated conſcience, eſpecially of the latter, are often a good means of judgment; but it is only when they accord with the directions of a ſtill higher and more authoritative principle; and they do not, therefore, poſſeſs thoſe qualifications which would entitle them to be made the ultimate criterion of duty.

Still leſs can the congruity, fitneſs, propriety, beauty, &c. of actions or diſpoſitions, be made more than one criterion of moral worth. The perception of theſe qualities depends upon the correctneſs and extent of the underſtanding and the moral powers; and they are, therefore, more exceptionable than the foregoing as criteria of duty.

The fact is, the idea aſſociated with the term *virtue*, or *rectitude*, or *moral worth*, is ſo exceedingly complex, formed of ſo many notions and feelings, that no definition can directly include them all. All that can be expected from a definition is, that it ſhall include every object to which the term can juſtly be applied, and exclude every other: but in ſuch a caſe as this, at leaſt, it is in vain to look for one which ſhall bring into view all the aſſociated circumſtances. Theſe will depend upon the mental and moral character of the individual, upon his experience and obſervation, &c. And it is owing to inattention to this circumſtance, that ſo many definitions have been given, in reality, eſſentially defective, though, through the unobſerved influence of other views, not excluding in the minds of thoſe who have laid them down, claſſes of human conduct and diſpoſitions which are certainly a part of moral excellence, but to which thoſe definitions do by no means extend.

Paley's definition (vol. i. p. 41.), which is copied from Gay's Preliminary Diſſertations, is peculiarly defective, yet at the ſame time redundant. "Virtue," he ſays, "is the doing good to mankind, in obedience to the will of God, and for the ſake of everlaſting happineſs. According to which definition," he continues, "the good of mankind is the ſubject; the will of God, the rule; and everlaſting happineſs, the motive of human virtue." Paley had good reaſon to be pleaſed with Mr. Gay's Diſſertations; for they contain many judicious and valuable obſervations on the foundation of morals; but thoſe who read them ſubſequently to their ſtudy of the Hartleyan philoſophy, can ſcarcely fail to be ſtruck with the progreſs which has been made in moral and mental inveſtigation ſince the author wrote; and if Paley's acquaintance with the principles of mental ſcience had been more preciſe and extenſive, it may reaſonably be ſuppoſed that his clear judgment would have framed a definition much more ſatisfactory than the one he has adopted. In the firſt place, what he terms the *ſubject* of virtue is radically defective; it excludes, becauſe it does not include, the perſonal and divine virtues; and yet, in the very next page, he ſpeaks of the diviſion of *virtue* into the duties towards *God*, towards other men, and towards *ourſelves*. It is clear, nevertheleſs, that Paley's definition does not include reverence, gratitude, chaſtity, temperance, &c. Next, his mode of ſtating his *rule* is inaccurate. If it is ſaid that we do a thing *in obedience* to the will of another, it is obviouſly implied that we not only do it conformably to his will as a rule, but having the intention to obey it as our *motive*. As the expreſſion ſtands, it excludes from the character of virtuous, every action which is not influenced, directly caſes in which the laws of God fail of application, yet from theſe ſources the mind ſincerely deſirous of knowing and doing the will of God can ſeldom be at a loſs to diſcover what it really is.

(3) The will of God conſidered as a rule of duty is an *invariable* principle. As far as we are left to aſcertain the will of God from inferior and ſubordinate rules, this rule muſt, in ſome meaſure, partake of their uncertainty: but with the laws of God to aid and guide us, to prevent confined experience and an erroneous conſcience from miſleading us, it is extremely ſeldom that there can be any difference of opinion as to duty, where the will of God is honeſtly employed as the ſtandard. If utility be made the criterion of virtue, or rule of duty, greater or leſs degrees of experience, greater or leſs freedom from the perverting influence of ſelfiſh feelings, will lead to widely different concluſions, if not with reſpect to the juſtneſs of the grand principles of duty, at leaſt with reſpect to the extent and application of them. If the dictates of conſcience (unleſs it be trained by the very rule of which we are ſpeaking) be fixed upon as the guide of duty, we ſhall find them varying in extent, in correctneſs, and in power, through the influence of faſhion, of prejudice, of ignorance, of prevalent opinions, and examples. But he who ſets out with the will of God as his rule of duty, has a fixed principle which will not bend to the reaſonings of the philoſopher, to the opinions of the multitude, or to the promptings of paſſion. If, indeed, we do not ſeek for that as a *primary* principle of duty, we may ſometimes be led to ſuppoſe that conduct to be directed by the will of God which is really inconſiſtent with it: but the more we ſeek for the guidance of that principle, humbly, ſincerely, and earneſtly, the more we ſhall find it; and the more we find it, the more firm, ſteady, and invariable, muſt our views of duty become, for the will of God itſelf muſt be invariable. And here we would obſerve

(4) That by taking the will of God as our rule of duty, our ideas of duty gradually become clear and comprehenſive, and this to a degree which cannot be generally, at leaſt, expected, where we reſt in any ſubordinate rules. Voluntary obedience to the will of God has an exalting and expanding influence on the mind. If our individual welfare be regarded as the foundation of duty, in ſo far as we make it our rule, our views would be confined to our own little ſphere, we ſhould judge of actions and diſpoſitions only, or principally, in the relation they bear to perſonal happineſs; and, leaving out of view the intricacies and perplexities in which we ſhould be continually involved, our notions of duty (unleſs ſtill guided by the rules of revelation) would be as narrow and contracted as the principle on which they are founded. The ſame thing may be obſerved, though to a leſs extent, as to rules of duty founded upon utility and conſcience, unleſs ſtill further guided by the rules of revelation: ſo far from expanding as we proceed, our views would uſually become limited by difficulties and objections, which, in the commencement of our moral inveſtigations, we had overlooked. But fix upon the will of God as the rule of duty, with an impreſſive conviction upon the mind that his will muſt be right and good, we ſee more and more clearly the tendency of obedience to promote the welfare of his rational creatures: one moral truth ſerves as the baſis for another: as we advance difficulties leſſen: we ſee things more as they would be viewed by us if we could take the whole into account and forget their relation to ourſelves: and we learn to view duty in its whole extent, where other rules would leave deficiencies; we learn to view actions and diſpoſitions without that undue reference to their *immediate* conſequences, to which the ſubordinate rules of duty muſt too generally confine us. From this we are led to obſerve

(5) That the will of God, conſidered as a rule of duty, is in an eminent degree *a ſafe* guide. Several eminent moraliſts have made general expediency the criterion of virtue; and the author of Political Juſtice, (whoſe moral ſpeculations, though in ſome caſes intereſting and valuable, often ſhew the folly of leaving the will of God as our chief guide,) maintains, that morality "is nothing but a calculation of conſequences, and an adoption of that mode of conduct, which, upon the moſt comprehenſive view, appears to be attended with a balance of general pleaſure and happineſs." But it is plain that beings who cannot ſee the conſequences of any action in their whole extent and connections cannot be adequate judges of general expediency: and that if they take this as more than a ſubordinate rule of duty they muſt be continually miſled by their ignorance and ſelfiſh prejudices. The true plan undoubtedly is, to aſcertain, as far as we can, what is our duty, taking the will of God as our rule and guide; and then to purſue it without thinking too much on the particular conſequences of our obſervance of it. "The happineſs of the world," as biſhop Butler admirably remarks, "is the concern of Him who is the lord and proprietor of it; nor do we know what we are about when we endeavour to promote the good of mankind in any way but thoſe which he has directed." Even benevolence will ſometimes do harm, unleſs it is under the guidance of religious principle.

(6) The will of God is a rule which carries with it its own obligation. We may indeed be told, that we have ourſelves admitted that there is one ground of obligation beyond it, which is brought into view by that definition of virtue, which makes it conſiſt in its tendency to promote the ultimate happineſs of the agent; and it is to be allowed, that we may aſk with reverence, Why ſhould we obey the will of God? But the anſwer is plain and obvious:—Becauſe, under the government of an infinitely wiſe, good, and powerful being, obedience to his will muſt ſecure our greateſt welfare. When once aſked, it is a queſtion which never need be aſked again. Its anſwer is a ſelf-evident and neceſſary truth. We may ſay, therefore, that this rule carries its own authority along with it. We cannot think of any *higher* obligation than the command of that gracious Being, under whoſe government we live, and upon whom we depend now and for ever. We have nothing to do but to know what his will is, and then obey, with full ſecurity that we are doing what is wiſe and right; what, in fact, is beſt for others and for ourſelves. And we muſt again obſerve, that if we make the tendency of our actions, &c. to our own ultimate happineſs the criterion of virtue, we have no more ſure and general guide as to that tendency than the will of him, upon whom our ultimate happineſs depends; ſo that take whatever view of it we will, we come to the ſame concluſion.

(7) It is impoſſible for any one, who regards the ſcriptures as the authentic records of divine revelation, to heſitate in admitting that the principle of religious obedience is the foundation of duty; and that we cannot fulfil our duty, without making the will of God our rule of life. The expreſs declarations of the ſcriptures, the examples they preſent to our imitation, and the views they unfold as to the relations in which we ſtand to God, all point to this truth. This to the Chriſtian muſt be deciſive; and to him, and to every one who agrees in the foregoing views of human nature, it muſt appear an important conſideration in favour of the ſame poſition.

(8) That the employment of the will of God as our *rule* of duty, muſt almoſt neceſſarily lead us to make the will of God our *motive*, as well as our guide. It is indeed a ſuppoſable caſe, that a perſon ſhould habitually employ this exalted rule, only from its being the beſt for him, as the beſt guide to his higheſt intereſts; but ſuch is the conſtitution of the human mind, that it is ſcarcely a poſſible caſe. We are ſo formed, that what we purſue as a means will gradually become our end. In whatever way we learn the will of God, whether by the courſe of his providence, by our conſciences, by the frame of man, or, above all, by revelation, if we ſteadily employ it as our rule and guide, (although in the firſt inſtance, becauſe it is our wiſdom to do ſo, becauſe thus we ſhall beſt promote our own welfare,) it muſt, as we proceed, be continually obeyed, without any explicit reference to its conſequences to ourſelves; and in proportion to the frequency and conſiſtency of voluntary obedience to the will of God, it will of itſelf become our ultimate object. Beſides, if we take the will of God as the guide of duty, it cannot fail to teach us, (what other rules too often leave out of ſight,) that it is our duty to cultivate the diſpoſition to obey him, to ſeek for his approbation, to ſhun his diſpleaſure, to fear him, to love him, to truſt in him, and to ſerve him; and we cannot therefore doubt, both from the natural tendencies of the mind, and from thoſe views of duty which the will of God communicates, that if we do make it our guide, we ſhall neceſſarily be led to make it our motive. Habitual, univerſal, voluntary, intentional obedience to the will of God, muſt be the higheſt point of excellence among all his rational creatures. This motive muſt carry along with it worth and happineſs, ſecurity and peace, in proportion to the ſteadineſs and extent of its influence. This the frame of man, and the courſe of providence, and the light of revelation, moſt expreſsly and forcibly teach us. In proportion as the will of God becomes our motive, ſhall we ſee clearly, and diſcharge ſteadily, the whole of our duty: in that proportion ſhall we become like him, whoſe grand end and aim was to promote the glory of the great Being who ſent him, and to finiſh his work: in that proportion ſhall we become partakers of the divine nature, and the will of God become our will.

We ſhould here be diſpoſed to enter expreſsly into the conſideration of the means we have of knowing the will of God; but ſome remarks, cloſely bearing on this point, will find a place in the next diviſion of this article; and others, reſpecting ſocial duty, have already been ſtated in the 13th ſection of the preceding diviſion.

IV. We now proceed to our laſt diviſion, in which we propoſed to offer ſome concluſions from the preceding diviſions, which may give ſome aſſiſtance in forming a baſis of practical morality.

If our limits of time and ſpace permitted, we had propoſed to make this diviſion more extenſive than we now find practicable, and to introduce ſome conſiderations reſpecting the ſeveral branches of virtue, which come under the denomination of juſtice. We muſt now confine ourſelves to the following objects: 1. The duty of candour. 2. Remarks on a theory reſpecting the confined charities, in Godwin's Political Juſtice. 3. On the extent of the obligation of truth, including ſome principles applicable to other caſes, in which the dictates of duty are not clear.

1. *On the Duty of Candour.*—"The word *juſtice*," ſays Mr. Stewart in his Outlines, p. 234, "in its moſt extenſive ſignification, denotes that diſpoſition which leads us, in caſes where our own temper, or paſſions, or intereſt, are concerned, to determine and to act, without being biaſſed by partial conſiderations. In order to free our minds from the influence of theſe, experience teaches us either to recollect the judgments we have formerly paſſed, in ſimilar circumſtances, on the conduct of others; or to ſtate caſes to ourſelves in which we, and all our perſonal concerns, are entirely left out of the queſtion."—"Juſtice operates, firſt, in reſtraining the partialities of the temper and of the paſſions; and, ſecondly, in reſtraining the partialities of ſelfiſhneſs, where a competition takes place between our intereſts and thoſe of other men. Theſe two modifications of juſtice may be diſtinguiſhed from each other, by calling the firſt *candour*, the ſecond *integrity* or *honeſty*." Mr. Stewart's remarks on the ſubject of candour are peculiarly judicious and important; and we deem no apology neceſſary for laying them before our readers. "This diſpoſition," he obſerves, "may be conſidered in three points of view: as it is diſplayed, 1, in judging of the talents of others; 2, in judging of their intentions; 3, in controverſy.

"The difficulty of eſtimating candidly the talents of other men, ariſes, in a great meaſure, from the tendency of emulation to degenerate into envy. Notwithſtanding the reality of the theoretical diſtinction between theſe diſpoſitions of mind, it is certain that in practice nothing is more arduous than to realize it completely; and to check that ſelf-partiality, which, while it leads us to dwell on our own perſonal advantages, and to magnify them in our own eſtimation, prevents us either from attending ſufficiently to the merits of others, or from viewing them in the moſt favourable light. Of all this a good man will ſoon be ſatisfied from his own experience; and he will endeavour to guard againſt it as far as he is able, by judging of the pretenſions of a rival, or even of an enemy, as he would have done if there had been no interference between his claims and theirs. In other words, he will endeavour to do juſtice to their merits, and to bring himſelf, if poſſible, to love and to honour that genius and ability which have eclipſed his own. Nor will he retire in diſguſt from the race, becauſe he has been outſtripped by others, but will redouble all his exertions in the ſervice of mankind; recollecting that if nature has been more partial to others than to him in her intellectual gifts, ſhe has left open to all the theatre of virtue; where the merits of individuals are determined, not by their actual attainments, but by the uſe and improvement they make of thoſe advantages which their ſituation has afforded them.

(2) "Candour in judging of the intentions of others is a diſpoſition of ſtill greater importance." It is "highly probable that there is much leſs vice or criminal intention in the world, than is commonly imagined; and that the greater part of the diſputes among mankind ariſe from mutual miſtake, or miſapprehenſion. Every man muſt recollect many inſtances in which his motives have been groſsly miſapprehended by the world; and it is reaſonable for him to allow, that the caſe may have been the ſame with other men. It is but an inſtance, then, of that juſtice we owe to others, to make the moſt candid allowances for their apparent deviations; and to give every action the moſt favourable conſtruction it can poſſibly admit of. Such a temper, while it renders a man reſpectable and amiable in ſociety, contributes, perhaps more than any other circumſtance, to his private happineſs.

(3) "Candour in controverſy, implies a ſtrong ſenſe of juſtice united to a ſincere and diſintereſted love of truth. It is a diſpoſition of mind ſo difficult to preſerve, and ſo rarely to be met with, that the moſt uſeful rule, perhaps, to be given with reſpect to it, is to avoid the occaſion of diſpute and oppoſition. A love of controverſy indicates not only an overweening vanity, and a diſregard for truth, but, in general, perhaps always, it indicates mediocrity of genius;

for it ariſes from thoſe feelings of envy and jealouſy which provoke little minds to depreciate the merit of uſeful diſcoveries. He who is conſcious of his own inventive powers, and whoſe great object is to add to the ſtock of human knowledge, will reject unwillingly any plauſible doctrines, till after the moſt ſevere examination; and will ſeparate, with patience and temper, the truth they contain from the errors that are blended with them. No opinion can be more groundleſs, than that a captious and diſputatious temper is a mark of acuteneſs. On the contrary, a ſound and manly underſtanding is in no inſtance more ſtrongly diſplayed, than in a quick perception of important truth, when imperfectly ſtated and blended with error;—a perception which may not be ſufficient to ſatisfy the judgment completely at the time, or at leaſt to enable it to obviate the difficulties of others; but which is ſufficient to prevent it from a haſty rejection of the whole from the obvious defects of ſome of the parts." "The effects of controverſy on the temper, although abundantly ſenſible even in the ſolitude of the cloſet, are more peculiarly adverſe to the diſcovery of truth in thoſe diſputes which occur in converſation; and which ſeldom anſwer any purpoſe, but to rivet the diſputants more firmly in their errors. In conſequence, indeed, of ſuch diſputes, the intellectual powers may be ſharpened, and original hints may be ſuggeſted; but few inſtances are to be found, in which they do not miſlead the diſputants to a ſtill greater diſtance from truth than before, and render their minds ſtill more inacceſſible to conviction."

2. *Remarks on a Moral Principle in Godwin's Political Juſtice.*—Following Hartley, we formerly ſtated, as a good general rule of benevolence, that perſons in the near relations of life, benefactors, &c. appear to have, in moſt caſes, a prior claim to ſtrangers. This rule will lead us to avoid all thoſe opinions which attempt to found univerſal benevolence upon the ruin of the more confined charities. However ſpecious they may appear, they muſt be falſe, becauſe they counteract the moral improvement of man, by checking it at its origin. We particularly refer to thoſe which Godwin has advanced in his work on Political Juſtice. His moſt general principle is, that every individual exertion ſhould be ſo directed, as to produce the greateſt poſſible ſum of good to the ſpecies; and hence he infers that if we have the power to ſave the life, or increaſe the happineſs of one or two human beings, we owe our exertions to him who is uſeful, and perhaps extenſively uſeful to ſociety, in preference to him who is an uſeleſs and perhaps injurious member of ſociety. The claims of ſelf are excluded by the general principle. "What magic," ſays Godwin, "can there be in the word *my* which ſhould change its operation?" Hence the claims of the confined charities ought not to oppoſe the deductions from the general principle. Hence it is not our buſineſs, in the direction of our benevolent exertions, to conſider the relation in which the individual ſtands to us; but that in which he ſtands to ſociety. Not is he my parent, relative, friend, or benefactor; but is he a worthy or a worthleſs member of ſociety?

Godwin's errors are the more injurious, becauſe they are apparently on the ſide of benevolence; they reſult from the inaccurate extenſion and application of principles which in themſelves are indiſputable. Whenever private intereſt interferes with the public good, private intereſt is to be ſacrificed; and this, whether our own immediate good is the object, or the good of thoſe who are intimately connected with us, by ſome of the natural bonds; that is, thoſe which ariſe in the mind by the laws of our conſtitution. That the conduct dictated by the confined charities is to yield to what is really for the general good, cannot be diſputed; but that we are in all caſes to act totally independently of a regard to thoſe confined charities, is a poſition which will not bear the teſt of experience, nor of the mental conſtitution of man.

In the firſt place, general benevolence never could ariſe in the human ſoul but through the medium of the more limited affections. Love to others is founded on feelings originally perſonal, then it embraces the narrow circle of our immediate friends and acquaintance, and then, perhaps, there is little difficulty in extending it to thoſe who bear with us the relation of children to the great parent of mankind. But before we can form the deſire to do good to *all* men, we muſt have formed the deſire to do good to *ſome* men; and though the deſire of doing good to ſome, may be of that confined nature which would ſometimes lead to the promotion of their aggrandizement and happineſs, at the expence of thoſe of others, yet the confined charities form too important a part in the great ſyſtem, to be on this account rejected, as not being on the whole ſafe guides. We may lop off the excreſcences, but it would be folly to deſtroy the root.

But, ſecondly, admit the formation of the affection of general benevolence independently of the private charities, it is obvious that without long culture and enlarged views, the general affection could acquire the vividneſs, which, by their frequent recurrence and particularity, the more confined affections can. Hence the removal of miſery would be left to thoſe who had thus cultivated the extenſive affections, and conſequently the means of removing it muſt be moſt materially diminiſhed.

Thirdly: this principle would leave no rule for conduct upon which any one could act. If we are to be determined in our acts of benevolence, particularly in caſes of immediate urgency, merely by the conſideration of the utility of the individual to ſociety, our lives would be a continual ſeries of calculation, and, in general, of erroneous calculation. Who is there capable of accurately appreciating the worth of the individual? Our ideas are, in general, formed merely upon appearances which ſtrike our attention, and force us to obſerve them. The ſilent efficacy of example, and private exertions to remove miſery, and ſtill more to remove or prevent vice, the parent of miſery, are in general known only to him who ſeeth in ſecret. Even in caſes where much is obvious, what diverſity ſhall we find in opinion; and where the co-operation of individuals for the benefits of others is neceſſary, how improbable that they ſhould have formed the ſame ſtandard.

But admit that the caſes are clear, that the perſon whom we are about to leave to death, (which is a ſuppoſition of Godwin's,) is obviouſly and deciſively a leſs important member of ſociety than he whom we attempt to ſave;—if we violate none of thoſe feelings which riſe up in the human frame altogether independently of the will of the individual, there can be no heſitation: but ſuppoſe that our intended conduct will violate them. Let it firſt be conſidered, that thoſe feelings are not only neceſſary to the culture, nay, even to the formation of individual benevolence, but to the good order, perhaps to the very exiſtence, of ſociety. Take the ſtrongeſt caſe; ſuppoſe the filial and parental affections to be annihilated, and it is abſurd to juſtify and lay down as juſt, that conduct which, if not counteracted by the eternal laws of our frame, would lead to ſuch annihilation, if that annihilation itſelf be not an object of deſire; ſuppoſe theſe affections annihilated, and the heart ſhrinks from the picture. The claims of the helpleſs infant upon the parent would be rejected; and if enlarged views of duty to ſociety did not induce the parent to think that he had better remove from exiſtence a being who would be a burden to others and himſelf, and who probably would not be educated ſo as to be wiſe and happy, there would ariſe conſtant diſcouragements which would effectually prevent thoſe ſteady, uniform, endeavours to cultivate the mental and moral powers, which are neceſſary to attain the object; and if the evil did not ſoon eradicate itſelf, man, if he exiſted, would gradually ſink to the level of the brute. But if the parental affections did not exiſt, neither would thoſe of the filial relation. Yet by theſe it is that the rudiments of general good-will are formed in the infant breaſt: with theſe it is that the being who is to love all mankind begins his career of love: theſe are the ſource of that ardent diſintereſted benevolence which carries the individual out of himſelf, which leads him to forget himſelf and all his immediate intereſts, and view only the good of others. Can it be ſuppoſed that this highly cultivated benevolence is in oppoſition to that more confined affection from which it ſprung? We ſee it modifying its direction, but never annihilating it. On the contrary it may juſtly be affirmed, that the confined affections become more inwrought in the frame, as univerſal benevolence becomes more and more a feature of the mind: and it muſt, for univerſal benevolence is but only the ſum total of all the confined affections, extended by the hand of piety. It is perhaps an invariable truth that we love *ſome* more in proportion as we love *all* more.

Wherever the claims of the confined affections are in direct oppoſition to the dictates of the enlightened conſcience, there can be no room for doubt, though we ought to be careful that our departure from their claims not only is, but if poſſible, ſhall appear to be, demanded by theſe dictates; but even in caſes which, independently conſidered, are obvious, we are to take into conſideration the evil that will reſult from a breach of theſe affections. For this purpoſe we ſhould conſider what would be the conſequence if our conduct became general: and next the tendency of human conduct to ſuch extenſion. There are ſome affections which not all the efforts of philoſophy could ſucceed in eradicating: vice may do it, and heedleſs levity; but the calm exertion ariſing from a view to utility never could. We refer to the parental affections. Hence though we might condemn the parent who left his ſon to periſh in the flames, while he endeavoured to ſave the life of Fenelon, and ſhould require ſtrong proof that the parental affections exiſted in him, in their due force; yet we ſhould doubly condemn the ſon who in ſuch a caſe left his father to periſh.

Godwin's principles, if carried to their full extent, would deſtroy ſociety. We preſume that the ardour of general benevolence miſled him, and that in his wiſh to make its dictates paramount in the human breaſt, he forgot, or rather did not obſerve, that he was endeavouring to counteract the moſt eſſential laws of the human frame. It is one of thoſe numerous inſtances in which an acquaintance with the human mind is neceſſary: had Godwin attended to its laws, it is reaſonable to hope that he never would have given a theory to the world, which even a ſlight acquaintance with its practicability and effects ſhould have conſigned to oblivion.

On the Obligation of Truth.—We ſhall in this ſection offer ſome conſiderations on a ſubject of no ſmall importance, and which has been the ſource of ſome very erroneous and injurious principles; we mean the reſtrictions which eminent moraliſts have admitted to the duty of truth.

A *lie* is *a falſehood told with a deſign to deceive.* Whatever be the motive leading to the employment of it, it is equally a lie. The moral culpability of the individual may be leſſened or increaſed by the motive; but nothing more. We may call it by the mild appellations, *untruth*, *falſehood*, *departure from truth*, &c.; but the nature of the thing is not altered. A falſehood told with the deſign to deceive is a lie. The expreſſion a *departure from truth* does not appear invariably to imply any *intention* to deceive; a *breach of truth*, according to common uſage, always does. *Veracity* expreſſes the diſpoſition to adhere ſtrictly to truth: it is uprightneſs in our words. A *departure from veracity* always implies an intention to deceive; and ſtill more forcibly does a *breach* of veracity.

It is an important maxim in morals as well as in education, to call things by their right names. The odium of vice is often leſſened by mild expreſſions reſpecting it. And, on the other hand, moral diſtinctions are often confounded, by giving to things, in themſelves harmleſs, appellations which properly belong only to what is morally culpable. Fictitious narratives, *e. g.* are not lies: if the author pretend that they are founded on fact, or that they are true, when ſuch is not the real ſtate of the caſe, that aſſertion is a lie; but the narratives themſelves are not lies. In like manner the exaggerations too common in converſation, and thoſe falſehoods which ſolely ariſe from unfortunate mental habits, without any intention to deceive, and thoſe expreſſions of complaiſance which, though not true in their ſtrictly literal ſenſe, are ſo in the way in which they are almoſt univerſally interpreted, theſe ought not to be called lies. We do not ſay that they are altogether free from moral culpability; but it is not that of intentional deception. The exaggeration, or the expreſſion of complaiſance, may be intended to deceive; and then it becomes a lie; and in proportion as it verges to this point is its culpability. The culpability of the other departures from truth, (ſee INTELLECTUAL *Education*, col. 31.) depends upon the degree in which the individual has been negligent in his endeavours to check, or to correct, ſo injurious a habit: in itſelf conſidered it has no moral quality.

We have given the only definition of a lie which appears preciſe and intelligible; and it is accordant with the ſerious uſe of the term in common language. We fear that Paley has contributed to cauſe great incorrectneſs of expreſſion, and even great laxity of principle, on this ſubject; and we are led to enter ſomewhat more fully into it from this circumſtance. When we ſee that eminent writer expreſſing himſelf ſo looſely as to ſpeak of thoſe falſehoods which are not criminal as not being lies, and laying down as a maxim that falſehoods are not criminal, "where the perſon to whom we ſpeak has no right to know the truth," we feel apprehenſive of the conſequences, and ſhould rejoice to be able to correct his views by thoſe principles of morality which our rule of duty appears to us decidedly to preſcribe on the ſubject.

Paley does, indeed, qualify a little the random poſition we have quoted from him, by adding, "or, more properly, where little, or where no inconvenience reſults from the want of confidence in ſuch caſes," and his illuſtrations are caſes of an extreme nature; but he ſtill founds the obligation of truth upon a balance of known or ſuppoſed advantages, or even of conveniencies; and his authoritative deciſions on this point have, we doubt not, often led to departures from truth, where an unbiaſſed judgment muſt have ſhewn at once what was the way of duty.

This is a period of inquiry and ſpeculation; and there are few who have opportunities of mental culture, who do not meet with diſcuſſions and difficulties, which the religious man of plain underſtanding might decide at once by an appeal to the ſcriptural rule of life, but which puzzle the reaſoner who prefers ſome other baſis of duty than the will of God, and ſtill more miſlead the conſciences of thoſe who want juſtification or excuſe for their own half-acknowledged violations of duty. And there are caſes in common life, where thoſe who are accuſtomed to think of the conſequences of their actions, and rightly judge that they may thus often obtain important aſſiſtance in knowing the will of God, are apt to lay too much ſtreſs upon the *immediate* conſequences, where their way would otherwiſe be clear. And the worſt of all is, that theſe ſpeculative difficulties, and theſe ſuppoſed excuſable departures from a clear and acknowledged rule of duty, are continually leading to other departures which are obviouſly wrong; and this particularly among the young, and thoſe whoſe views of duty are not yet ſettled, and their habits confirmed. The influence, too, of authority is great, eſpecially where it accords with the previous diſpoſitions, and with the preſent intereſts. And it is peculiarly injurious, where we look up with juſt reſpect to the moraliſt who ſanctions ſuch departures,—reſpect founded upon his eminent uſefulneſs, and upon the general correctneſs of his principles, united with an intereſting and convincing method of proof and illuſtration. And with reſpect to example, a lie is a definite thing: and the young and uninformed can uſually judge as correctly as to the fact, as perſons of the moſt cultivated underſtanding; while at the ſame time they cannot enter into the force of thoſe nice diſcriminations and plauſible reaſonings, by which ſuch perſons bewilder themſelves, and perſuade themſelves that they are excuſable in violating an expreſs rule of duty. It has often in ſuch caſes been, we doubt not, the inference,—"If another is excuſable in lying, in order to prevent ſome miſchief, or to produce ſome good, why may not I? and if this expreſs law of God may be broken, when ſome good is to be obtained, or ſome evil to be ſhunned, why may not another?" The ſtate of the matter is, that the *extreme* caſes in which the obligation of truth has been ſuppoſed to ceaſe, are of very rare occurrence; and if the exception were confined to them, it would be attended with no advantage to bring them forwards for public diſcuſſion: but when an exception is admitted to a rule of duty, unleſs it can ſo be well defined, as to form itſelf a rule, there is no knowing where to ſtop. The ſhades of diſtinction in caſes of moral conduct are often ſo much blended, that it requires a very diſcerning eye to perceive their limits; and all know that when ſelfiſh feelings of eaſe, of pleaſure, or of profit, are concerned, they never fail to throw a film over the eye of the underſtanding, and greatly obſcure its power of diſcrimination. Thoſe ſuppoſed exceptions to truth which are of an extreme nature, ſeldom fail to lead the ſpeculative philoſopher to others in which the way of duty ſeems to the Chriſtian moraliſt perfectly clear: and theſe again at leaſt furniſh excuſes, and ſometimes imaginary juſtification, for departures from truth in which thoſe who judge by the ſtandard of revelation can ſee nothing but guilt.

It may perhaps make our way clearer, if we come to the more direct conſideration of the caſes of real or ſuppoſed difficulty, and attend a little to ſome fundamental poſitions which ſhould have great influence in all our inquiries reſpecting duty.

(1) General rules of duty are abſolutely neceſſary for the moral welfare of man; and, therefore, whatever tends to weaken the influence of any ſuch rule, is in itſelf conſidered an evil. To perceive the neceſſity of general rules of duty in the preſent condition of human nature, it is ſimply requiſite to conſider what would be the ſtate of things without them. We ſhould then be under the neceſſity of calculating in every caſe that comes before us, on which ſide the good or evil attending the propoſed action preponderates. In fact, our lives muſt then be a ſeries of mere calculation, and the active employments of life muſt be interrupted or altogether neglected. We ſhould be obliged to decide, in numerous caſes of continual occurrence, without poſſeſſing the means of judging as to the conſequences of our actions. The great maſs of mankind would be left without any guide. All would be left under the influence of emotion, prejudice, and ſelf-love; and no conſiſtency or regularity could be expected in the moral conduct of men. We are not unfrequently unable to trace completely even thoſe conſequences of actions which are immediate and apparent; ſtill leſs thoſe which gradually ariſe in the ſilent lapſe of time. The conſequences of actions may laſt, when the agents have long finiſhed the journey of life. Our actions may influence others: our deviations may directly or indirectly produce more extenſive deviations, of which we ſhall have, and can have, no knowledge. Perhaps there is ſcarcely an important action of our lives, the conſequences of which are confined to ourſelves, or even to our own ſphere of obſervation. Beſides, if we were unable to lay down general rules for moral conduct, and were obliged to decide upon each action as it occurred, it is ſcarcely poſſible that we ſhould avoid the influence of heated feeling; and we ſhould ſeldom poſſeſs that abſtraction of mind, which would enable us to leave the preſent out of conſideration, and view with calmneſs and impartiality the real tendencies of our actions. The caſes are innumerable in which intereſt or paſſion paints in vivid colours the courſe to which they prompt; and throw into the back ground, and render almoſt imperceptible the dangers which ſhould induce us with ſteady firmneſs and perſeverance to avoid it. From theſe conſiderations taken together, it may be regarded as indiſpenſably neceſſary, that there ſhould be general rules for directing the moral conduct; and from this it immediately follows, that every deviation from a general rule of duty muſt, in itſelf conſidered, be an evil.

(2) In conſidering the conſequences of departing from a rule of duty, we muſt not confine ourſelves to the *immediate* conſequences; but muſt alſo take into account the ill effects ariſing from the limitation of the rule itſelf, the tendency of one limitation to furniſh ground for another, the tendency of one departure from the rule to lead on to another, to weaken its authority in our own minds, to weaken its authority in the minds of others, and ſo on.

(3) *Expediency* muſt always give way to *right*. *Expediency* particularly refers to the temporal conſequences of actions, eſpecially to thoſe which actually come within the ſphere of our own obſervation; and, of courſe, our views of it muſt depend upon the comprehenſion of our minds, and upon the extent of our experience and obſervation. *Right* takes the whole into conſideration, and reſts moſt on eſtabliſhed principles of duty, particularly thoſe derived from the divine law. As ſoon as a perſon has by any means ſatisfied his mind reſpecting the will of God, in any particular caſe, he then knows what is right for him. Expediency is peculiarly the ſubject of prudence; right, of duty. Though it is often the part of duty as well as of prudence to do that which is moſt expedient; yet where expediency appears to oppoſe a clear rule of duty, we ought not to heſitate in our choice. The right, purſued aright, muſt always prove, under the government of wiſdom and benevolence, the moſt expedient.

(4) Where the rules of duty are not only agreeable to the dictates of conſcience, and to thoſe concluſions which are drawn from an extenſive conſideration of the external and internal conſequences of actions, of the frame of man and the courſe of Providence; but are alſo ſanctioned by

the expreſs authority of revelation, they ought not to be violated, except in caſes of abſolute neceſſity; that is, where, after a ſerious deliberate examination, they appear to us to interfere in their direction. In ſuch caſes, (which, however, are very rare, even in our preſent ſtate of knowledge as to duty, and which in all probability will hereafter altogether diſappear,) we muſt, to the beſt of our abilities, balance the importance of their directions, and decide by the reſult. According to the old maxim, we muſt, of two evils, chooſe the leaſt.

(5) If ever the rules of duty appear to interfere in their directions, we muſt be conſiderably guided by the comparative importance of the rules themſelves. In forming the compariſon, we muſt take into account, not merely the conſequences of the particular caſe, but alſo the ſtrength and univerſality of their obligation; the conſequences which would follow from their being generally neglected, and the common tendency to ſuch neglect; and alſo the nature of the conſequences, whether they affect the religious and moral welfare of ourſelves and others, or reſpect temporal intereſts merely; and again, we muſt conſider whether the rules are clear and definite, or whether they are by their nature indeterminate; becauſe, where they are clear and definite, the violation of them is obvious and certain; where they are indeterminate, the violation of them may be in appearance only; and the conſequent ill effects on the minds of others, will uſually be leſs in the latter caſe than in the former. Some may perhaps think, that if all theſe calculations are to be made in caſes of duty, the way of duty muſt be indeed difficult and perplexed. The fact is, we are ſpeaking of caſes which, if the mind be under the guidance of religion, are of rare occurrence. An humble devout heart is the beſt preparation for knowing our duty. The wiſeſt among the ſages of antiquity has well ſaid, "truſt in the Lord with all thy heart, and lean not to thine own underſtanding; in all thy ways acknowledge him, and he ſhall direct thy paths."

(6) It appears to us a clear and important moral principle, (founded, in a great meaſure, on the foregoing conſiderations,) that the violation of any rule of duty is wrong unleſs it is right; that is, unleſs it be required by ſome other rule, which, in the particular caſe at leaſt, requires the preference as more urgent and important. For inſtance, obedience to parents is a clear and poſitive duty; and where no higher duty interferes, diſobedience cannot but be wrong; but it may happen that a parent commands what is forbidden by the laws of God; and it then is not only right to diſobey, but it would be wrong to obey. With reſpect to the rules of duty, there is, we apprehend, no middle courſe. If no higher rule interferes with the operation of that which reſpects our own caſe, it is our duty to obey it; if a higher rule does interfere with it, it is our duty to neglect it. In every caſe of moral conduct, there is but one right courſe; every other muſt be wrong. Not that all the rules of duty are of equal importance; ſtill leſs that there are no degrees of right and wrong, as far as reſpects the motives; but that our actions, to have any moral character at all, muſt either be right or wrong. There is no neutrality in duty.

We have not referred to the motives leading to any departure from a rule of duty, becauſe our concern is not here with the criminality of the agent, but merely with the character of the action; and, indeed, it belongs not to any human being to apportion to each his place in the ſcale of moral worth. He only who knows the ſecrets of the heart, can know, with certainty, in any caſe of departure from duty, whether it aroſe from blameleſs ignorance, from a miſtaken deſire to do right, from benevolent feelings, or from weakneſs and timidity, from the promptings of intereſt, from directly criminal diſpoſitions. Where actions are right, we ſhould not readily admit ſuppoſitions tending to lower the worth of them; where they are in themſelves indifferent, we ſhould be cautious in aſſigning wrong motives to them; and even when wrong, we ought readily to admit and ſuggeſt what will palliate the culpability of the offender; but we ſhould never allow ourſelves, through the feelings of candour, to confound the diſtinctions between right and wrong; and, without pretending to aſcertain the merit or demerit of the agent, it is often neceſſary to decide reſpecting the rectitude or immorality of his conduct, both with a view to our own guidance, and as a direction and warning to thoſe around us. Ignorance is an excuſe for departures from duty, only where it is unavoidable. If it ariſe from the want of a ſincere deſire to ſeek and find the true path, or from an indiſpoſition to ſee the truth, becauſe the truth will probably condemn; ignorance partakes of the criminality of thoſe ſources of it, and is reſponſible for its conſequences. And the true way to acquire ſtability and conſiſtency of conduct, is to enlighten the conſcience beforehand, to form judicious ſteady principles of action, and to ſubmit to their guidance without allowing the immediate conſequences to enter much into our calculations. Such a principle, we are ſatisfied, is what we have already ſtated; that the violation of any rule of duty is wrong, unleſs in the circumſtances of the caſe it is required, by ſome more immediately urgent and higher rule; that is, unleſs in thoſe circumſtances it is right.

The application of the foregoing moral principles to the difficulties of veracity, is ſufficiently obvious; but a general view of it may abridge the particular conſideration of them. There may be caſes in which benevolence ſeems to lead to a violation of truth. It is our duty to do good as we have opportunity, and therefore, the caſuiſt may ſay, ſince in this particular caſe, the good to which benevolence points is great and important, the neceſſity urgent, and the ill conſequences of a breach of truth are ſlight, here benevolence ought to ſuſpend the obligation of truth, and here *falſehood* is a *duty*. The genuine feelings of uprightneſs and ſincerity can ſcarcely bear ſuch a combination of terms; and yet falſehood cannot be otherwiſe than wrong, unleſs it be abſolutely right. But let us not decide by mere feeling, leſt when the deſire of ſelf-juſtification turns the ſcale, principle ſhould be forgotten. The falſehood muſt be an evil, as a violation of a poſitive rule of duty, expreſsly enjoined, and ſtrongly ſanctioned by the revealed will of God. It muſt be an evil, becauſe that rule is of the utmoſt conſequence to the temporal and ſpiritual welfare of mankind; for words are the grand medium of all the influence we have over the happineſs of others, and mutual confidence is neceſſary to this influence, not only in caſes of preſent intereſt, but in thoſe which are moſt cloſely connected with our eternal well being. It muſt be an evil, becauſe that rule is clear and intelligible; admitting of but one meaning, and that perfectly preciſe and definite; becauſe the rule is univerſal in its application, in no caſe made to depend upon conſequences, but abſolute in its injunctions, and in no caſe inconſiſtent with itſelf; becauſe the rule is upheld by the authority of the conſcience, where this is enlightened by Chriſtianity, and cannot be ſlighted without neglecting its dictates; becauſe the rule is ſo ſtrict, preciſe, and extenſive, that ſcarcely any exception can be imagined, which, if allowed to be right, will not juſtify others; and theſe juſtify or palliate others, and ſo on, thereby weakening its authority and its value, and making way for thoſe baneful effects which neceſſarily ariſe from the common neglect of it, in proportion to that neglect; becauſe the obligation of this rule is ſuperior to that of the other rules of ſocial duty, inaſmuch as they require truth, and therefore it has their obligation to ſupport it; and at the ſame time it has an obligation of its own. In moſt caſes benevolence clearly enjoins a ſtrict adherence to truth, and in like manner does juſtice; and juſtice never ſets any limit to its obligation; this of itſelf would make truth a duty; but beſides this, its authority reſts on the ſtrong declarations of the conſcience, and upon the more ſteady unvarying declarations of the law of God, and therefore, upon its powerful and all-important ſanctions.

Againſt all this, he who is determined to adhere to duty cannot, with any conſiſtency, place any ſelfiſh intereſts;—no one at leaſt can ſuppoſe that the greateſt worldly intereſts can *out-weigh* the obligation. But the limits which appear ſometimes to be ſet to it by benevolence, have coſt many a perplexity and many a ſtruggle; and too probably many a departure from truth, and we doubt not many a bitter pang of remorſe when the mind ceaſed to be guided by the impulſe of feeling, and when the conſcience has become enlightened by a ſteady principle of religious duty: for though we cannot but ſuppoſe that he who knoweth our frame will make every allowance for our wanderings from the narrow path of duty which not ſelfiſh anxiety, but real, though not enlightened, benevolence has produced, yet piety, whenever it gains its full ſway in the heart, will make it feel its weakneſs, if not preſumption, in ſuppoſing that the good of the creature might lawfully be ſought by means which the all-wiſe Creator hath forbidden. The commands of God muſt be a better guide for promoting the welfare of mankind, than thoſe affections which, though implanted by him to excite to promote it, are capable of a wrong direction, and clearly require the ſupport and guidance of a higher principle. Benevolence, conſidered as a *rule* of duty, never can be inconſiſtent in its directions, becauſe it requires us to do the *greateſt* good in our power; and pious benevolence muſt always feel a confidence, that this will be beſt accompliſhed by a ſteady adherence to that courſe of duty which infinite wiſdom and benevolence has preſcribed: but benevolence, as it refers to our own *feelings*, is often inconſiſtent in its directions, and may miſlead us;—it may dwell upon ſome ſuppoſed good or means of good, when ſome other ought in the eye of reaſon to be the end propoſed;—it may be directed to one object, when, if our comprehenſion were enlarged, we ſhould give the preference to another; and, (what is moſt to be apprehended,) where not completely placed under the direction of piety, it muſt often be ſubject to the capricious inconſiſtencies and partialities ariſing from ſelf-love. Where, however, the heart is devoted to do good, and common prudence is employed in effecting it, we need not be afraid of following the dictates of the benevolent affections, unleſs they interfere for the time with ſome higher principles; nor ſhould we be too ſcrupulous in our calculations, leſt we loſe means and opportunities which cannot be recovered; but wherever our feelings prompt us to ſacrifice ſo important a principle of duty as truth, in order to do ſome ſuppoſed good, let benevolence repreſent that it is not immediate good, or temporal intereſts alone, which are to be taken into account, but future evils alſo, and the ſpiritual well-being of others and ourſelves; and if even their conſcience is undecided, let piety ſay, whether in the departure from an acknowledged, ſtrict, expreſs, unlimited rule of duty, we can hope for the approbation of him who ſeeth the heart. One whoſe noble ſacrifices to a ſenſe of duty will ever endear his memory to all who know and can appreciate their value, (we refer to the excellent Lindſey,) has well ſaid, "God does not want our ſinful acts;" and one whoſe authority muſt rank high with the Chriſtian, has taught us not to do evil that good may come. Obedience to the will of God muſt in all caſes be beſt for frail erring man.

We once more return to the ſame point, if any caſe can be pointed out in which, all things taken into account it is right, our duty, to depart from truth, then and then only can ſuch a departure ceaſe to be wrong, and contrary to duty. We can admit of no exception to a rule of duty, which we cannot make itſelf a rule of duty; and to ſo clear and definite a rule as that of truth, no exceptive rule can be admitted, which is not itſelf perfectly clear and definite.

The chief exceptions to the obligation of truth which have been admitted by different moraliſts, are, where falſehood is ſuppoſed to be important to the ſpiritual welfare of others,—in the conduct of wars,—in caſe of immediate danger to our life or the lives of others,—in intercourſe with thoſe who do not poſſeſs the uſe of reaſon, or who have not yet acquired it,—and in the ſick chamber.

1] It is rather ſingular, that in what is, in ſome points of view, the ſtrongeſt caſe, where the benefit to be gained, or the evil to be avoided, reſpects the ſpiritual welfare of others, it is almoſt univerſally allowed that no violation of truth is admiſſible. What were once termed *pious* frauds, are now pretty generally conſidered as *impious* frauds. It is a great and good end, to promote the moral well-being of a fellow creature,—to communicate to him thoſe views and principles, which will preſerve him from vice, and raiſe him in the ſcale of moral worth; and there can be no doubt that this is our duty as far as our influence extends; but we here ſee clearly that we are not to employ unlawful means to promote a lawful end, even though that end be important in the higheſt degree. It is true, increaſed experience and enlightenment give us now the means of perceiving, that, in reality, the evil ſurpaſſes the good; and that the good, if not in the individual caſe, yet, generally ſpeaking, is beſt accompliſhed by employing only the weapons of truth,—is even greatly impeded by employing thoſe of fraud and falſehood; but this could not be perceived when ſuch departures from truth were practiſed by ſome of the Chriſtian fathers, and even applauded by them. They had, however, the expreſs rules of revelation to guide them, as we have; and the immorality of their conduct conſiſted, not in the intentions, and in the end propoſed, but in ſetting up their weak judgments in oppoſition to the commands of God, and doing evil that good might come. We have referred to this caſe, not becauſe any enlightened Chriſtian can now heſitate in believing, that he is forbidden by duty to endeavour to promote the cauſe of Chriſtian truth and practice by means which are inconſiſtent with that ſimplicity and ſincerity which the Goſpel requires; but becauſe ſuch means were once, by great and good men who were heartily devoted to that cauſe, conſidered as allowable and even juſtifiable,—that we now ſee that they were wrong,—and that this ſhould teach us great caution in admitting of any ſpecious exception, ſince the beſt ends will not ſanction bad means. It ſhould be an invariable principle, that unleſs duty *requires* the violation of truth, duty forbids it.

2] With reſpect to the falſehoods employed in the conduct of war, we have but little to ſay. War is in all caſes an evil. It may ſometimes be a neceſſary evil; but in all it is a great one; and in no view greater than as foſtering the evil paſſions, and cultivating the vices of men. In many circumſtances, deceit in actions is a part of the ſyſtem of warfare; and if war itſelf be ever juſtifiable, we ſuppoſe that ſtratagems in the conduct of it, not involving any breach of faith, muſt alſo be ſo. But there is a clear and well-defined diſtinction between ſuch ſtratagems and lying; and the horrors of war would be greatly increaſed and prolonged if falſehoods alſo were employed to deceive. Beſides, it would alſo deſerve conſideration, if the queſtion were not already decided by a general ſenſe of expediency, that the employment of falſehoods, while in a ſtate of warfare, would not be confined to it. The ſoldier would not make thoſe nice diſtinctions which the general might have endeavoured to make, to ſatisfy himſelf that he was not doing wrong; and thus his regard to truth would be weakened. And it may farther be remarked, that the violations of duty practiſed by thoſe whoſe general conduct from any circumſtances excites our admiration, whether obſerved by ourſelves, or read of in the pages of hiſtory, have a great and direct tendency to confound moral diſtinctions in our own minds, to weaken our abhorrence of what is wrong, and to lead to the practice of it. It is not poſſible for any man to know, when he departs from duty, when the ill conſequences ſtop.

3] Caſes have occurred where a perſon has preſerved his life by a breach of truth. In ſuch caſes we muſt leave the culpability of the individual to the deciſions of him who alone can fully appreciate the moral worth of actions; our examination merely concerns his conduct. If it be right to preſerve life by falſehood, it muſt be wrong to forfeit it by adherence to truth; and yet, we conceive, there are few who would not cordially approve and admire the conduct of him who, in ſuch circumſtances, followed truth at the certain riſk of his life. As far as his conduct is known, it neceſſarily tends to produce a ſteady love of duty, a decided attachment to principle; as far as the conduct of the other is known and regarded as juſtifiable, it tends to weaken the ſenſe of the obligation of a virtue, which is of the firſt importance to the well-being of ſociety.

We confine ourſelves to the caſe of ſimple falſehood to preſerve life. If, farther, there be a deſertion of ſome important principle, there are few who can heſitate. The diſciple of him who came to bear witneſs to the truth, and who bore it in the midſt of ſuffering and of death, cannot but regard it as the indiſpenſible duty of every one, who believes he poſſeſſes Chriſtian truth, to ſtand by it at any riſk. It was by this noble determination in the breaſts of the early confeſſors and martyrs, that Chriſtianity made its way in the world: it was by the ſame noble determination in the minds of the firſt reformers and their followers, that Chriſtianity has been freed from its groſſeſt corruptions. But if, in ſuch caſes, we perceive at once that truth is not to be violated, it is only becauſe we ſee the good conſequences of adherence to it in a more obvious and ſtriking light. The preſent evil is the ſame as in the caſe where there is no further deſertion of principle, than what is implied in the ſimple deſertion of truth; and the folly and baſeneſs of it in the one caſe, ſhould make us feel great heſitation in ſuppoſing it to be right in the other; and if it be not right, we muſt pronounce it wrong.

But let us try to trace the conſequences a little. Suppoſe a perſon in ſuch a dreadful ſituation, that a lie appears to be the only means to ſave his life. If he have been habitually accuſtomed to regard a lie with abhorrence, it is extremely improbable that he will be able to tell one in ſuch circumſtances, with that firmneſs and freedom from embarraſſment, which will make it effectual. But allow that he has the requiſite preſence of mind, (which by the way would uſually enable him to obtain the end without falſehood,) what are the effects of ſuch violation of truth on the murderer, on himſelf, and on others. The highway-robber, for inſtance, would take for granted, that if one man may juſtly lie to ſave his life, another will feel at liberty to do the ſame to ſave his money; and though, in the particular inſtance, confidence has been obtained, yet in proportion as this exception to truth is admitted as right, ſo will that confidence be deſtroyed in other caſes, which is often ſo neceſſary to the preſervation of life. There can be no doubt, that if there were not that general degree of confidence, life would often be taken away by the depredators on ſociety, where now they are contented with ſimple robbery. Thus the probable effect of lying to ſave life would, perhaps, univerſally be, to make even truth unavailing to ſave it. But farther, very few inſtances occur in which the ſucceſsful lie does not weaken the individual's general reſpect for truth: but ſuppoſing that this ill conſequence does not follow, and that the individual, being under the influence of a ſtrict regard for truth, has merely departed from it in this extreme caſe, becauſe in this extreme caſe, and this alone, he thought it juſtifiable,—can the limit, which is thus broken down from the laws of duty, be removed to any place a man may chooſe? If one may juſtly lie to ſave his life, why may not another to ſave that which he values more than life, his reputation? why may not a third lie to ſave that on which the comfort of life depends? Indeed, when once we allow exceptions to the rules of duty, which are not rendered neceſſary, (in other words right,) by the obligation of ſome higher duty, there is no knowing where to ſtop. The property, which to one may appear as valuable as his life, and for which he thinks that he may juſtly violate truth, may be a mere trifle to another: but if one may lie to prevent the loſs of a thouſand pounds, why may not another? and if for a thouſand, why not, in correſponding caſes, for a hundred? and ſo on: if one may juſtly lie to preſerve his reputation, or any other poſſeſſion which he values, or thinks he values, as much as his life, why ſhould another be culpable who does the ſame to acquire it?—Inſtances continually occur, in which men riſk their lives to defend their property, or even a comparatively ſmall portion of their property; and yet ſome ſuppoſe that it is juſtifiable to avoid ſuch riſk, where truth muſt for this purpoſe be violated. If it be, then truth is not to be regarded as of the ſame value as money. But, indeed, there is no end to the difficulties and inconſiſtencies in which we muſt be involved in this and every other caſe of moral conduct, by departing from the plain ſtraight forward path of duty. If any one ſhould be expoſed to a trial ſo ſevere as what we have been conſidering, let him call to mind, that there is ſomething more valuable than life and every external means of comfort,—the approbation of our own hearts, and the preſent and final approbation of Him, who is greater than the heart: let him call to mind, that there is ſomething more terrible than death, the anguiſh of a wounded ſpirit, and that which alone need render death terrible, the conſequences which are to follow it.

It may indeed be ſaid, that no one but he who has a conſcience in ſome good meaſure void of offence, could be without that dread which would prevent him from adhering to the ſtrict line of duty at a riſk involving not only life, but intereſts of infinitely more importance. We allow it: but our conſideration here is, what is the ſtrict line of duty in ſuch a caſe; and what courſe a man of uprightneſs, veracity, and fortitude, ought to purſue, and would purſue, under the ſtrong influence of religious principle and regard to the dictates of conſcience; and we ſuppoſe, that he would in ſuch a caſe think he had nothing to do but to do his duty, and humbly leave his own intereſts, and the intereſts of thoſe whom he held moſt dear, in the hands of a gracious and all-wiſe Providence.

4] With reſpect to education, we feel confident that the ſtricteſt truth and ſincerity ought to be employed on every ground, not merely of duty but even of expediency. Children are, at a very early age, aware of deception; and at this point of the mental progreſs, the ſeeds of truth or falſehood are to be ſown. Implicit confidence in the word of a parent, is of the utmoſt conſequence to give that influence, and to produce that obedience, which can never follow from parental authority alone; and he who departs from truth in his intercourſe with his child, will ſome time or other have cauſe to lament his weakneſs and his folly. The habit of truth cannot be begun too early; nor is there any effectual method of producing it as a permanent, conſiſtent, actuating principle, but by ſtrongly impreſſing the mind with an abhorence of falſehood, by making its ill conſequences perceived and felt, and by calling in (on ſuitable occaſions, and in proper degrees) the authority of the divine commandments and the aid of religious principle in general: and all this cannot poſſibly be done with ſucceſs, if truth do not ſtrictly regulate the words of thoſe by whoſe inſtruction, and diſcipline, and example, the principles of moral conduct are to be formed or cultivated. The truth need not always be told to a child; and by proper care and early repreſſing a more prying curioſity, and eſpecially by acquiring their confidence, we may make our children not only ſubmiſſive, but *ſatisfied* without knowing every thing that we know: but falſehood they ſhould *never* be told. See MORAL *Education*, III. 13.

It really ought to make us extremely ſuſpicious of every ſuppoſed reſtriction to the duty of truth, to recollect, that once it was thought *right* to lie in order to promote the ſpiritual welfare of others; and that, even till very lately, it has been repreſented by Chriſtian moraliſts as at leaſt allowable in our intercourſe with children. In the former caſe the folly of ſuch conduct is now univerſally admitted; and, in the latter, we truſt that religious parents, at leaſt, ſee more and more what wiſdom and duty alike require from them. The heathen poet has given them a noble maxim, "The greateſt reverence is due to a child;" teaching us, that in no caſe ſhould we do or ſay in the preſence of children, what will tend to weaken their ſenſe of duty and diſpoſition to practiſe it: and ſhall it be ſuppoſed, that thoſe who are enjoined to bring up their children in religious obedience, can be juſtified in looſer principles of morality?

5] After what has been advanced, eſpecially in reference to the general principle, we think it cannot be neceſſary to ſay much on a caſe of common occurrence, but in moſt inſtances of very eaſy deciſion; we mean, in our intercourſe with the ſick. If, in ſuch circumſtances, the immediate advantage to be gained appear to require a breach of truth, we ſhould call to recollection that it cannot be obtained but by the violation of a ſtrict, and moſt important rule of duty; and if, after this, we cannot reſt ſatisfied without conſidering conſequences, let it be taken into account that, in the particular inſtance, every ſuch departure from truth muſt, as far as it is diſcovered, which it commonly is, directly tend to weaken that confidence which is peculiarly neceſſary to preſerve the mind calm and tranquil, and in its place introduce a haraſſing and injurious ſuſpicion; and alſo to weaken confidence in the other exerciſes of the domeſtic relations; that it contributes greatly, and almoſt inevitably, and far beyond uſual eſtimation, to leſſen the regard to truth in thoſe around us; that there can be no reſtriction to ſuch departures, and that in proportion as they become frequent, they muſt defeat their own purpoſe, and at any rate muſt often make truth unavailing where it is of the utmoſt conſequence for peace of mind, and even for the continuance of life.

We cannot poſſibly ſee the whole reſult of our actions; and without perplexing ourſelves too much with the difficulties of particular caſes, it is beſt to go on, without the wavering of uncertainty, ſatisfied that all we have to do, is to exerciſe ourſelves to that prudence and ſelf-control which will make the conſequences of truth as little injurious as poſſible. If there are any extreme caſes of the above deſcription, where a departure from it becomes our *duty*, it muſt be included in the claſs which we are about to conſider.

We have proceeded thus far, not without difficulty, but with ſatisfaction. We have not been without the apprehenſion that we ſhould appear to ſtrain the principles of duty too far; and are well aware that if we really did ſo, we ſhould do injury, rather than ſervice to its cauſe. We can only ſay that we have allowed this apprehenſion its full influence. We have examined the ſubject at different intervals, and with various degrees of experience; and our ideas remain radically unchanged, and our conviction in the juſtneſs of them in ſeveral inſtances more ſatisfactory. With reſpect to the caſes of moſt conſtant occurrence, we have no difficulty remaining; with reſpect to the extreme caſe (ſtated in No. 3,) there it appears to us that every ſelfiſh intereſt is to be given up; but it is only becauſe we deem this an inevitable conſequence from principles which appear to us indiſputably true. If any bias has exiſted reſpecting it, it has been what we have above ſtated. If we ſaw reaſon to think it right, we ſhould willingly give it up, as being, in appearance, little calculated for actual practice. But we ſee no line which can be drawn to exclude it from the general obligation; which will not, at the ſame time, exclude thouſands of inſtances in the daily occurrences of life, where, nevertheleſs, no doubt can exiſt in the mind of any one whoſe conſcience is at all guided by our rule of duty. We are farther ſatisfied that the admiſſion of the exception would, in almoſt all inſtances, defeat its own purpoſes; and we know that it is a principle of Chriſtianity that our preſent intereſts are never to be placed in competition with our duty; and we ſee that benevolence requires this as well as religion.

6] After deliberate re-examination, however, of our own difficulties, in thoſe caſes where a departure from truth may be neceſſary for the preſent welfare of others, we think we perceive a rule which may guide us, ſo as to ſuit the actual condition of human nature, without leading us too far. When conſidering it for their own ſatisfaction, we entreat our readers to apply our principles. If theſe exclude it, let the caſes it includes remain among the difficulties of duty which we have at preſent no means of ſatisfactorily removing. Feeling ourſelves the force of the obſervations ſtated in different parts of this ſection, it is with much heſitation that we propoſe, as a reſtrictive rule, that wherever the evil attending a ſtrict adherence to veracity affects *others*, and is otherwiſe *unavoidable*, and *abſolutely irremediable* there, and, as it appears to us, there only, we ſhould do *right* to depart from it. This limit *ſeems* to be required by benevolence in ſuch caſes as theſe; where, by departing from veracity, we could ſave the life of a perſon who, we had reaſon to believe, was in a ſtate utterly unfit for death; or, of an excellent parent on whom a young and numerous offſpring abſolutely depended for ſupport and for training up in the way of duty; or where, by ſuch means, we could prevent an irretrievable injury to the moral purity of one whoſe chaſtity was yet unſtained. And if it be really required by benevolence in ſuch caſes as theſe, we know no reſtriction which will not include every caſe affecting others, where the evil is otherwiſe *unavoidable* and abſolutely *irremediable*. We have reaſon to rejoice that ſuch caſes are extremely rare, and can ſcarcely occur more than once in the courſe of any one's experience; and they might therefore have been paſſed unnoticed, but that we are deſirous fairly to meet the difficulties of the ſubject. And while propoſing this reſtrictive rule, we do not forget that what, in his ignorance of futurity, a perſon might aim thus to promote, might eventually be injured by it. Any thing ſhort of unavoidable and (eſpecially) *irremediable* injury, our rule does not extend to. By a ſtrict adherence to truth, I may ſubject a man to great loſs or inconvenience; and it may be required by benevolence to do what I can to remedy it, by my exertions and ſacrifices; and if I have increaſed the injury by a want of prudence or preſence of mind, more may reaſonably be expected from me; but it never can be required from me that I ſhould do any thing really wrong for the benefit of another.

If after due conſideration of the exceptive rule which we have here propoſed, it ſhould appear to be excluded by the general principles already laid down, we ſhall willingly relinquiſh it; and we cannot help ſuppoſing that the time will come, when, as in the caſe of the other ſuppoſed exceptions to truth, this will be ſeen to be by no means required by duty. At preſent the conſequences appear to us, in this claſs of circumſtances, to be of that nature, that the more urgent claims of benevolence, without *any* reference to perſonal conſiderations, require the ſuſpenſion of the claims of truth, and that a departure from it is right. We wiſh it, however, to be well conſidered, that this exceptive rule tends, in the caſes to which it is applicable, to defeat its own purpoſes, and to prevent the beneficial conſequences of truth and confidence. And if, after all, it do appear to be a right one, we muſt repeat, that it can only be defined and limited, by extending it to thoſe caſes alone where the evil affecting others is otherwiſe unavoidable and abſolutely irremediable.

7] As to the caſe of intercourſe with thoſe who labour under mental derangement, we have not ſufficient knowledge of circumſtances to ſpeak with confidence. We are fully aware that ſuch circumſtances are of too extraordinary a nature to come within the common rules of duty; but we are inclined to believe that the injury done by violations of veracity in ſuch caſes, muſt, on the whole, be ſuch as, in general, to exclude them, except in caſes which come under the laſt head. And it is probable, that by ſkill and prudence, the neceſſity of all direct breaches of truth may, in all others, be prevented. It may ſometimes be neceſſary to fall in with the train of ideas paſſing in the mind of the patient; but, with caution and good ſenſe, it can ſeldom be even apparently neceſſary to go any farther.

If caſes occur of the extreme kind, included under the ſixth claſs, the individual who is influenced in them by a real regard to duty, will do his beſt to ſhew upon what principle he has proceeded, to make it manifeſt that the ſuppoſed neceſſity was extremely painful to him,—and to prove by his conduct that he does in no way conſider it as furniſhing any reaſon for departures from the ſtrict principles of veracity in caſes of a leſs urgent nature, and where the evil was not abſolutely irremediable.

In thoſe caſes of the 5th or 7th claſs where departures from ſtrict truth appear unavoidable, it ſhould be regarded as an indiſpenſible duty, not to expoſe thoſe to ſuch ſituations whoſe moral principles are weak;—that, in particular, the young ſhould be kept aloof from them;—that they ſhould not be made the ſubject of converſation in their preſence;—and that, if mentioned, they ſhould be repreſented as diſtreſſing to the moral feelings, and only practiſed becauſe apparently unavoidable;—and the young ſhould be convinced, by ſtrict and invariable regard to truth in other caſes, that this is the only motive. By ſuch means, much of the evil ariſing from them may be prevented: but when they are not employed, (in caſes, eſpecially, of a domeſtic nature,) the evil is often greater than could poſſibly be produced by a ſtrict obſervance of truth, under the guidance of firmneſs and diſcretion.

To conclude: we are fully aware, that to adhere ſteadily to this branch of duty, often requires conſiderable fortitude; and ſometimes, to make truth really beneficial in the particular inſtance, much preſence of mind: but it is not the only caſe in which theſe important qualities are requiſite. Real fortitude is eſſentially neceſſary in almoſt every department of duty: and nothing contributes more to produce it, and at the ſame time to produce a proper degree of prudence and preſence of mind, than having fixed principles of moral conduct, and propoſing to ourſelves nothing more than a ſingle ſteady aim to diſcharge our duty,—nothing, we ſhould ſay, except that which is itſelf of the firſt conſequence to the means as well as to the end, an humble dependence upon Him who condeſcends to call himſelf our father, a conſtant regard to his will, and the deſire of his approbation as our chief good.

PHILOSOPHY, *Natural*. See NATURAL.

PHILOSOPHY is alſo frequently uſed for the particular doctrine or ſyſtem of opinions, broached by ſome conſiderable philoſopher, and eſpouſed and adhered to by his followers. In this ſenſe we ſay,

PHILOSOPHY, *Arabian*, *Ariſtotelian*, *Carteſian*, *Epicurean*, *Hermetical*, *Leibnitzian*, *Newtonian*, *Oriental*, *Platonic*, and *Socratic*. See PERIPATETIC, &c.

PHILOSOPHY is alſo uſed for a certain manner of philoſophizing; or certain principles, upon which all the enquiries thereby made do turn. In this ſenſe we ſay,

PHILOSOPHY, *Corpuſcular* or *Atomical*, *Mechanical*, and *Experimental*. See the adjectives.

PHILOSOPHY, again, is conſidered with regard to the age, or the place, in which it was taught. In this ſenſe we ſay,

PHILOSOPHY, *New*, &c. See MECHANICAL *Philoſophy*.

PHILOSOPHY, *Scholaſtic*, or *School*. See SCHOLASTIC.

PHILOSTORGIUS, in *Biography*, an eccleſiaſtical hiſtorian of the fourth century, was born at a village in Cappadocia, about the year 368. When he was in his twentieth year he went to Conſtantinople, in order to acquire literary improvement under the moſt celebrated profeſſor in that city. He wrote an "Eccleſiaſtical Hiſtory," in twelve books, containing the hiſtory of affairs from the commencement of the Arian controverſy, or about the year 300, to the year 425, when it was publiſhed. This work, which was written to vindicate the Arian hypotheſis, was condemned and proſcribed by the Catholic party, who were ſo active in ſuppreſſing it, that no entire copy of it has reached modern times. Large extracts from it are preſerved in Photius' "Codex," which were publiſhed at Geneva by James Godfrey, accompanied with a Latin verſion, notes and long diſſertations, in 1643. About thirty years after, the learned Henry de Valois having collated the original with different manuſcripts corrected the text, and having given a new tranſlation of the whole, publiſhed theſe extracts at Paris, together with the eccleſiaſtical hiſtories of Euſebius, Socrates, Sozomen, Theodoret, &c. in 3 vols. folio, followed by a ſupplement of additional fragments from Suidas and others. This edition was reprinted at Cambridge in 1720.

PHILOSTRATUS, FLAVIUS, a celebrated ſophiſt, was born either at Lemnos or Athens. He reſided at Rome in the reign of Severus, and was employed by the empreſs Julia to compile a life of the famous philoſopher Apollonius of Tyana. He wrote likewiſe a work entitled "Icones," being a collection of deſcriptions in a florid but pure and elegant ſtyle. His nephew, who flouriſhed in the time of Heliogabalus, wrote the lives of the ſophiſts. The beſt edition of the works of Philoſtratus is that of Leipſic, in 1709.

PHILOTERA, in *Ancient Geography*, a town in the vicinity of the Troglodytes, placed by Ortelius on the Cimmerian Boſphorus, in the environs of Caucaſus.—Alſo, the name of a town placed by Polybius on the lake of Tiberias.

PHILOTHEUS, in *Biography*, a celebrated patriarch of Conſtantinople in the 14th century, was a native of Greece, who embraced the religious life in the monaſtery at mount Sinai: he afterwards became abbot of the monks at mount Athos, and before the year 1354, was made archbiſhop of Heraclea. In the following year, upon the depoſition of Calliſtus from the patriarchate of Conſtantinople, he was raiſed to that dignity, which, however, he was obliged to quit to make room for Calliſtus, when he was reſtored to favour. Upon the death of that prelate, in 1356, the emperor John reſtored Philotheus to his former dignity, and ever afterwards treated him with diſtinguiſhed favour. He retained the patriarchal chair till his death, which happened about the year 1371. He was author of a great number of works, enumerated by Fabricius, and he is ſpoken of by Cantacuzenus, as a perſon who was highly reſpected for the ſanctity of his life, and for the eloquence with which he was gifted.

PHILOXENUS, a dithyrambic poet of Cythera, lived at the court of Dionyſius of Syracuſe, who baniſhed him to the ſtone quarries for cenſuring his verſes. He died at Epheſus about the year 380 B.C. He was the rival of the elder Timotheus and of Polyides, dithyrambic poets of great reputation. His innovations in muſic are ſtigmatized by Plutarch.

PHILOXERUS, in *Botany*, from φιλος, *a lover*, or *friend*, and ξηρος, *dry*, or *burnt up;* alluding to its native climate, and favourite places of growth. Brown Prodr. Nov. Holl. v. 1. 416. Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Holeraceæ*, Linn. *Amaranthaceæ*, Brown.

Eſſ. Ch. Calyx in five deep ſegments. Corolla none. Stamens five, combined at the baſe into a ſmall entire cup, ſhorter than the germen. Anthers of one cell. Stigmas two. Capſule membranous, ſingle-ſeeded, without valves.

Obſ. This genus is next akin to GOMPHRENA, and, according to Mr. Brown, differs from LITHOPHILA only in the number of *ſtamens*, and the equal *perianth;* ſee thoſe articles.

The name is well contrived to keep in view its analogy with the latter genus, whoſe reputed natural order, as well as its generic deſcription, given by Swartz, require correction. The ſpecies of *Philoxerus* have oppoſite *leaves;* ſhort denſe terminal *ſpikes;* and three *bracteas* to each flower. We preſume the latter have been taken in *Lithophila* for a *calyx*, and the true *perianth* for a *corolla*.

1. Ph. *conicus*. Br. n. 1.—Spikes conical; ternate or ſolitary. Calyx woolly. Leaves linear, revolute. Stem erect.—Found by Mr. Brown, in the tropical part of New Holland.

2. Ph. *diffuſus*. Br. n. 2.—Spikes ſtalked, ſolitary. Calyx very ſmooth. Leaves lanceolate, downy on both ſides. Stem proſtrate, woolly.

3. Ph. *vermiculatus*. (Illecebrum vermiculatum; Linn. Sp. Pl. 300. Gomphrena vermicularis; Swartz. Obſ. 101. Willd. Sp. Pl. v. 1. 1322. Amaranthoides humile curaſſavicum, cepeæ foliis lucidis, capitulis albis; Herm. Parad. 15. t. 15. f. 2.)—Spikes ſeſſile, ſolitary, ovate. Calyx ſmooth. Leaves linear, ſpatulate, ſmooth. Stem creeping. —Native of the ſandy ſea-ſhores of the Weſt Indies, and South America.

4. Ph. *braſiliana*. (Gomphrena braſiliana; Linn. Sp. Pl. 326. Willd. Sp. Pl. v. 1. 1322. Jacq. Ic. Rar. t. 346.) —Leaves elliptic-oblong. Spikes aggregate, ſeſſile or ſtalked. Bracteas pinnatifid. Stem erect.—Native of the Braſils. Much larger than any of the foregoing. *Stem* bent, aſcending, three feet high, ſomewhat ſhrubby. *Leaves* drooping, four or five inches long, acute, ſmooth, with downy ribs. *Spikes* numerous, crowded, partly ſtalked, ovate, white, briſtly. *Bracteas* and *calyx* pinnatifid and fringed.

Theſe two laſt ſpecies are referred hither at the ſuggeſtion of Mr. Brown. See GOMPHRENA.

PHILPOT, JOHN, in *Biography*, an Engliſh divine, was born in Hampſhire, and educated in New college, Oxford. He became a zealous reformer in the reign of Edward VI., and was made archdeacon of Wincheſter. At this period he was ſo inflamed with zeal for orthodoxy, that having been engaged in a diſpute with an Arian, he ſpit in his face, to ſhew the great deteſtation which he entertained againſt that hereſy. He afterwards wrote a treatiſe to juſtify this unmannerly expreſſion of his zeal, ſaying that he was led to it, to relieve the ſorrow he had conceived from ſuch horrid blaſphemy, and to ſignify how unworthy ſuch a miſcreant was of being admitted into the ſociety of any Chriſtian. In the reign of Mary, Philpot fell into the hands of people as zealous as himſelf, but more powerful, and, being a Proteſtant, was condemned to the flames. He ſuffered in Smithfield in 1555. Hume's Hiſt.

PHILTER, PHILTRE, *Philtrum*, in *Pharmacy*, &c. a ſtrainer, or *filter;* which ſee.

PHILTER, Φιλτρον, formed of φιλεω, *I love*, is alſo uſed for a drug, or preparation, or charm, which it is pretended will excite love.

Philters are diſtinguiſhed into true and ſpurious: the ſpurious are ſpells or charms, ſuppoſed to have an effect beyond the ordinary laws of nature, by ſome magic virtue; ſuch are thoſe ſaid to be given by old women, witches, &c.

The true philters are ſuppoſed to produce their effect by ſome natural and magnetical power. There are many enthuſiaſtic authors, who believe in the reality of theſe philters; and allege matter of fact in confirmation of their opinion: among the reſt is Van Helmont, who ſays, that, upon holding a certain herb in his hand for ſome time, and taking afterwards a little dog by the foot with the ſame hand, the dog followed him wherever he went, and quite deſerted his former maſter.

He accounts for the phenomena of love tranſplanted by the touch of an herb; by aſſerting, that the heat communicated to the herb, not coming alone, but animated by the emanations of the natural ſpirits, determines the herb towards the man, and identifies it to him: having then received this ferment, it attracts the ſpirit of the other object magnetically, and gives it an amorous motion. But all this is mere cant; and all philters, whatever facts may be alleged in their favour, are mere chimeras.

Naturaliſts aſcribe an effect, ſomewhat of kin to that of a philter, to cantharides taken inwardly: theſe, it is true, tend to excite love, or rather luſt; but it is luſt in the general, not determined to any particular object; and they do it no otherwiſe than by irritating the fibres of the nerves and muſcles, by whoſe action the emiſſio ſeminis is effected. See Filter.

PHILTRATION, or Filtration. See Filtration.

PHILYCA, in *Botany*. See Phylica.

PHILYDRUM, received that appellation from ſir Joſeph Banks and Dr. Solander, in alluſion to the watery ſituations in which it delights; the word being compoſed of *φιλεω*, *to love*, and *ὑδωρ*, *water*. Willdenow unaccountably prints it *Phylidrum*.—Gærtn. v. 1. 62. t. 16. Schreb. 782. Willd. Sp. Pl. v. 1. 17. Mart. Mill. Dict. v. 3. Brown. Prodr. Nov. Holl. v. 1. 264. Ait. Hort. Kew. v. 1. 9. Roſcoe Tr. of Linn. Soc. v. 8. 342. t. 20. f. 5. Lamarck Illuſtr. t. 4. (Garciana; Loureir. Cochinch. 14.)—Claſs and order, *Monandria Monogynia*. Nat. Ord. *Scitamineæ*, Roſcoe. *Junceæ?* Brown.

Gen. Ch. *Cal.* none: unleſs the bractea be taken for a ſheath. *Cor.* Petals two, inferior, vertical, oppoſite, divaricated, ovate, withering. *Stam.* Filaments three, combined at their lower part, inſerted into the baſe of the upper, or outer, petal, ſhorter than the corolla; the two lateral ones leafy, jagged, abortive, (ſometimes diſtinct, very rarely furniſhed with anthers, *Brown*); the perfect one linear, abrupt, pointleſs; anthers of two ſeparate oblong lobes, parallel, united to the upper part of the filament in front. *Piſt.* Germen ſuperior, ovate, compreſſed; ſtyle thread-ſhaped, erect, rather longer than the filament, embraced by the lobes of the anther; ſtigma dilated, capitate. *Peric.* Capſule oblong, with three furrows, of three cells and three valves, the partitions from the centre of the valves. *Seeds* cylindrical, numerous, inſerted horizontally, in ſeveral rows, into the inner margins of the partitions.

Eſſ. Ch. Calyx none. Petals two, oppoſite. Barren filaments two, leafy. Anther two-lobed, embracing the ſtyle. Capſule ſuperior, of three cells and three valves. Seeds numerous.

Obſ. Mr. Brown has, with great judgment, pointed out the collateral affinity, at leaſt between this very ſingular genus and the no leſs puzzling, hitherto miſunderſtood, *Burmannia*, as well as their common relationſhip, in ſome degree, to *Xyris*. They are all extremely curious, and *Philydrum* in particular betrays ſome odd affinities, which render its natural order highly problematical. We ſtill incline moſt to our excellent friend Roſcoe's opinion on this ſubject; the ſtructure of the ſtamens and anther, the preſence of barren filaments, with the poſition of the ſtyle, being ſo very like the *Scitamineæ*, and ſo unlike every thing elſe.

1. Ph. *lanuginoſum*. Woolly Philydrum. Gærtn. v. 1. 62. Willd. n. 1. Ait. n. 1. Brown. n. 1. Curt. Mag. t. 783. (Garciana cochinchinenſis; Loureir. Cochinch. 15.)—Bracteas, flowers, and capſules woolly. Lobes of the anthers ſpiral.—Gathered by Loureiro in watery places in Cochinchina, as well as near Canton; by ſir J. Banks about Endeavour river; by Dr. White and Mr. Brown, at Port Jackſon, New South Wales, as well as by the laſt mentioned botaniſt in the tropical part of New Holland. It is ſaid to have been introduced by ſir J. Banks into the ſtoves at Kew in 1801; but was firſt figured from Mr. Woodford's collection, near Vauxhall, in 1804, where it flowered in June. *Root* fibrous, biennial. *Stem* three or four feet high, erect, leafy, round, alternately branched in the upper part, where it becomes purpliſh and woolly. *Leaves* ſword-ſhaped, long and narrow, entire; the radical ones largeſt; the reſt ſheathing, alternate. *Spikes* long, terminal, ſolitary, erect, ſimple, many-flowered, woolly. *Bracteas* ovate, long-pointed, reflexed while the flower is expanded, then again erect, as at firſt. *Flowers* yellow, without ſcent, expanding about an inch. Mr. Brown obſerved the lobes of the *anthers* in this ſpecies to be ſpiral. The *ſeeds* are rough with tubercles, and crowned each with a cup-like border.

2. Ph. *pygmæum*. Dwarf Philydrum. Brown n. 2.—Bracteas, flowers, and capſules ſmooth. Lobes of the anthers kidney-ſhaped.—Diſcovered on the ſouth coaſt of New Holland, by Mr. Brown, who, beſides the differences indicated in the ſpecific character, found the *ſeeds* ſmooth or even, and deſtitute of a terminal crown.

PHILYRA, in *Natural Hiſtory*, a name given to the ſubſtance on which ſome of the moſt ancient books are written. It is the inner bark of the tilia, or common lime-tree. The emperor's library at Vienna has a book, written by Tully, never yet publiſhed, which is written on this ſubſtance.

PHIMOPOLIS, in *Ancient Geography*, a town of Thrace, at the mouth of the Euxine ſea. Pliny. Ptolemy.

PHIMOSIS, or Phymosis, from *φιμοω*, *to tie up*, in *Surgery*. When the opening of the prepuce is ſo much contracted that this part cannot be drawn backward ſufficiently to uncover the glans penis, the complaint is termed by ſurgeons *phymoſis*. The diſeaſe often ariſes from a thickening of the cellular ſubſtance of the prepuce, brought on by ſome kind of irritation. It moſt frequently owes its origin to a chancre; in many inſtances, it is an effect of gonorrhœa, or of ſimple inflammation and excoriations beneath the prepuce. The latter part is often ſeverely inflamed, and preſents an anaſarcous appearance, occaſioned by the extravaſation of ſerum.

Numerous ſubjects are born with a contraction of the aperture of the prepuce, and the caſe is then called a *natural* or *congenital* phymoſis.

Sometimes, in adults, and particularly in old perſons, the prepuce contracts ſo much, without any evident cauſe, that its cavity becomes filled with urine during the act of making water, and great pain is the conſequence.

In caſes where the opening is exceedingly ſmall, and the diſorder is either congenital, or has occurred without obvious inflammation, it is by no means an uncommon circumſtance for calculi to be formed under the prepuce. Theſe ſometimes reſemble in ſhape the glans, on which, as it were, they are moulded.

When the phymoſis is congenital, and has exiſted a long while, it frequently happens, that in conſequence of inflammation, adheſions have taken place between the glans and the prepuce, and, in this event, it may not always be in the power of the ſurgeon to effect a cure. The poſſibility of doing ſo muſt depend, in a great meaſure, upon the extent and firmneſs of the adheſions. According to Richerand, it is ſeldom practicable to deſtroy them, after the patient has attained the age of puberty.

In ſome caſes, a phymoſis is productive of very bad conſequences, eſpecially when it is accompanied with chancres behind the glans; for as the latter part is ſituated between the ſores and the orifice of the prepuce, it frequently hinders the pus from finding its way outward; conſequently, there is an accumulation of matter behind the corona glandis; and this kind of abſceſs produces ulceration on the inſide of the prepuce. When the matter has made its way out, the glans often protrudes through the opening, throwing the whole prepuce to the oppoſite ſide.

No operation ought to be practiſed on children for the natural phymoſis, unleſs preſſing inconvenience ſhould immediately ariſe from the malformation. The conſtriction generally goes off, as ſuch ſubjects approach the adult ſtate.

When a phymoſis originates from the irritation of a chancre, a gonorrhœa, or excoriation beneath the prepuce, the beſt treatment conſiſts in making the patient remain quietly in bed, in injecting very frequently the ſaturnine lotion underneath the prepuce, and in applying round the penis linen wet with the ſame remedy. Theſe meaſures are not to interrupt the exhibition of mercury, when a chancre is known to be preſent. When the patient is not taking the latter mineral, his bowels muſt be kept well open with a ſolution of the magneſiæ ſulphas in the infuſum ſennæ. When a phymoſis is occaſioned by the lodgment of acrid ſebaceous matter beneath the prepuce, nothing gives relief more expeditiouſly than uncovering the corona glandis, if poſſible, and waſhing the parts well with ſoap and water. Then the employment of the ſaturnine lotion, both as an injection and an application for keeping the inflamed parts cool, and the exhibition of a ſaline purgative, or two, will ſoon accompliſh a cure.

As in caſes of phymoſis, extenſive ſloughing is not an uncommon conſequence of operations performed on the prepuce, during its inflamed and œdematous ſtate, the writer of this article has ever entertained an averſion to the practice. In his opinion, no inflamed phymoſis can ever require the employment of the knife, if we exclude the particular inſtance in which the matter accumulates under the prepuce, and cannot make its eſcape, except by ulceration. The application of dreſſings to ſores is never a ſufficient reaſon; for theſe may be waſhed and kept clean, by frequently injecting ſuitable lotions under the prepuce; and if they are chancres, they will almoſt always heal when thus treated, and a due quantity of mercury has been exhibited.

When matter is completely confined beneath the prepuce, behind the glans, a puncture may be made into the collection of pus with a lancet, and through this opening proper lotions ſhould be injected.

The caſes which truly demand an operation, are ſuch as are natural, and do not amend as the patient advances to the adult ſtate; ſuch as occur without acute inflammation, and to all appearances ſpontaneouſly; and others, which ariſe from the puckering of the prepuce, in conſequence of former ulcerations.

At one time it was the ordinary practice to perform the operation, by ſlitting open the prepuce with a curved biſtoury, a little on one ſide of the centre of its upper part.

The deformity of the prepuce, occaſioned by this mode of operating, and the annoying friction to which the angles of the part are continually expoſed, have been ſuch as to induce ſome ſurgeons to recommend an attempt to unite the divided part again. Fabricius ab Aquapendente adviſed a patient, who was thus incommoded, to ſubmit to an operation, reſembling that for a hare-lip; but the author does not ſtate whether it was actually performed. Bertrandi, however, was acquainted with a ſurgeon at Paris, who endeavoured to reunite the part by means of the twiſted ſuture; but could not ſucceed.

The moſt judicious ſurgeons now prefer circumciſion. The prepuce is taken hold of with a pair of forceps, and as much of the part being left out as ſeems neceſſary to be removed, the ſurgeon cuts a complete circle of it off by one ſtroke of the knife, and if the inner membrane of the prepuce ſhould ſtill appear to be too tight, it muſt be divided. The external ſkin of the part is then generally kept from becoming ſeparated from the inner membrane by means of a fine ſuture. The bleeding veſſels do not often require ligatures: Bertrandi cut off the whole prepuce in three inſtances, but without any hemorrhage of importance. Conſult Hunter on the Venereal; Fabricius de Chirurg. Operationibus, cap. 61; Bertrandi Traité des Operations de Chirurgie; Samuel Cooper's Firſt Lines of Practice of Surgery, chap. 55, edit. 3, &c. &c.

PHINTONIS Insula, in *Ancient Geography*, an iſland of the Mediterranean, between Sardinia and Corſica. Ptolemy and Pliny.

PHIPPS's Island, in *Geography*, an iſland in the Mergui archipelago, about eight miles in circumference. N. lat. 10° 8′.

PHIRSOVA, a town of Ruſſia, in the government of Irkutſk, on the Amur; 20 miles N. of Stretenſk.—Alſo, a town of Ruſſia, in the government of Toboſk; 20 miles E.N.E. of Iſchim.

PHISON, in *Ancient Geography*, a town of Aſia, in Armenia; 8 miles N.W. of Martyropolis.

PHITIUSA, or Pitiusa, an iſland of the Ægean ſea, in the vicinity of the Peloponneſus.

PHLA, an iſland of Africa, in the Triton lake, in Libya, according to Herodotus.

PHLAGUSA, a town in the neighbourhood of that of Troy, ſituated in the Cherſoneſus.

PHLASMA, from φλαω, *to bruiſe*, in *Surgery*, a contuſion.

PHLEBOCARYA, in *Botany*, from φλεψ, φλεβος, *a vein*, and καρυον, *a nut*. Brown Prodr. Nov. Holl. v. 1. 301.—Claſs and order, *Hexandria Monogynia*. Nat. Ord. *Hæmodoraceæ*, Brown.

Eſſ. Ch. Petals ſix, ſuperior, beardleſs, permanent. Stamens inſerted into the baſe of each petal. Anthers ſquare, nearly ſeſſile. Germen of one cell, with three ſeeds. Style thread-ſhaped. Stigma ſimple. Nut coated, crowned, ſingle-ſeeded.

1. Ph. *ciliata*. Gathered by Mr. Brown on the ſouth coaſt of New Holland. A perennial herb, with ſcarcely any *ſtem*. *Leaves* in two rows, equitant, narrow-ſword-ſhaped, fringed. *Panicle* nearly ſeſſile, ſhorter than the leaves. *Flowers* ſmall, with a ſolitary *bractea* to each. Nothing is ſaid of the colour of the *flowers*. We have called *petals* what Mr. Brown terms a *perianth*, to preſerve the neceſſary analogy with Hæmodorum; ſee that article, and Hæmodoraceæ.

PHLEBOLITHIS, from φλεψ, φλεβος, *a vein*, and λιθις, *a little ſtone*, was ſo called by Gærtner, on account of the numerous white veins, lining the hard ſhell of the nut. He took his deſcription and figure from a ſpecimen in the collection of ſeeds at the Amſterdam garden, without knowing any thing of the plant, or even the entire fruit to which it belonged. Juſſieu obſerves, Gen. 453, that this ſeed ſeems akin to *Mimuſops*, Gærtn. t. 42; and indeed the author himſelf had already advanced the ſame opinion. See Gærtn. v. 1. 201, 202. t. 43. f. 2. *Ph. indica*.

PHLEBORRHAGIA, from φλεψ, *a vein*, and ρεω, *to flow*, in *Surgery*, bleeding from a vein.

PHLEBOTOMUS, a lancet, or fleam for bleeding.

PHLEBOTOMY, from φλεψ, *a vein*, and τεμνω, *to cut*, the operation of opening a vein; veneſection. See Bleeding.

PHLEGM, Φλεγμα, in *Chemiſtry*, an aqueous and inſipid fluid, ſuppoſed to be found in all natural bodies, and obtained from them by diſtillation or otherwiſe; coinciding with what the other philoſophers call *water*.

Phlegm makes the fourth of the chemical elements, or elementary principles. But the term is now litttle uſed.

Phlegm, Φλεγμα, in *Medicine*, called by the Latins *pituita*, ſeems to be derived from φλεγω, *I burn*, yet its ſignification is very oppoſite to that of inflammation. The ancient phyſicians ſpoke of phlegm, as one of the four humours exiſting in the body, and giving the qualities of cold and moiſture to the conſtitution; whence the *phlegmatic* temperament ſtood in oppoſition to the *ſanguine*, and phlegm was ſuppoſed to predominate in dropſical diſeaſes. The later writers ſpoke of phlegm as a crude, aqueous, mucous fluid, of an excrementitious nature, which prevailed before the proper concoction took place. By the older chemiſts, the term phlegm was applied to the pureſt ſtate of water, when deprived by diſtillation of all heterogeneous matter.

PHLEGMAGOGUES, from φλεγμα and αγω, *I expel*, an epithet given to ſuch purgative medicines as were ſuppoſed to occaſion a particular evacuation of pituitous or watery humours. Theſe were purgatives of a violent and draſtic nature. See CATHARTICS.

PHLEGMASIA, φλεγμασία, ſignifies *inflammation*, or fever accompanied with inflammation, the derivation from φλεγω being here adopted. Sauvages conſtituted his third claſs, comprehending inflammatory diſeaſes, with the title of *Phlegmaſiæ;* and Dr. Cullen adopted the ſame appellation for his ſecond order of Febrile Diſeaſes, which includes all the *inflammatory* fevers. See their reſpective ſyſtems of noſology. See alſo NOSOLOGY.

PHLEGMATIA, from φλεγμα, *pituita*, as alſo *leucophlegmatia*, is ſynonimous with *œdema* and *anaſarca*, or dropſy of the ſkin. Whence

PHLEGMATIA *Dolens* has been appropriately applied to denote a peculiar and painful ſwelling, occurring in one of the lower extremities in women, during their confinement in child-bed.

This diſeaſe is not of very frequent occurrence; and hence it appears to have been altogether overlooked, or but very ſlightly noticed, by the older writers on the diſeaſes of puerperal women. Mr. White of Mancheſter was the firſt to point out fully the nature and appearances of the diſorder to the notice of medical men in this country, in his work publiſhed in 1784, entitled "An Inquiry into the Nature and Cauſe of that Swelling in one or both of the Lower Extremities, which ſometimes happens to Lying-in Women." In the year 1792, the ſubject was again taken up by Mr. Trye, of Glouceſter, who publiſhed a ſmall eſſay, under a ſimilar title. Since that period Dr. Ferriar, in the third volume of his Medical Hiſtories and Reflections, and Dr. Hull, in a ſeparate work, have diſcuſſed the nature of the diſeaſe. Several of the continental writers, however, had been acquainted with this diſorder; and even our own countrymen, Wiſeman, ſir Richard Manningham, and others, had curſorily noticed it. But the firſt ample account of the diſeaſe appears to have been drawn up by Puzos, a celebrated Pariſian accoucheur, who died in 1753, in his "Mémoires ſur les Dèpôts laiteux," printed at the end of his "Traité des Accouchemens." About the ſame time, another eminent accoucheur in France, Levret, deſcribed the diſeaſe at conſiderable length, under the appellation of "Engorgemens laiteux dans le Baſſin et aux Extrémités inferieures." (See his "Art des Accouchemens," part iii. chap. 3. § 7.) The diſeaſe was alſo noticed by Aſtruc, Lieutaud, Sauvages, Selle, and others, under correſponding appellations, in conſequence of their adoption of the ſame hypotheſis reſpecting its nature and origin; namely, that it was occaſioned by metaſtaſis of the milk, which was ſuppoſed to be *depoſited* in the cellular membrane of the pelvis and lower extremities, inſtead of being carried to the breaſt, or to be taken up from the breaſts by the abſorbent veſſels, and carried thither. Sauvages has included the various forms of this *infiltration laiteuſe*, or milky depoſit, under two or three different genera in his noſology, calling it Phlegmatia lactea, Iſchias ab Sparganoſi, Hyſteralgia lactea, and Hyſteralgia ab Sparganoſi, reſpectively. (See his Noſol. Method. See alſo Calliſeu, Syſt. Chir. Hodiern. p. ii. § 34—39. Van Swieten, Comment. ad Aph. 1329. Plenck, Inſt. Chirurg. p. 378, ed. 3.) It is not now neceſſary to enter into any refutation of this hypotheſis, which the more accurate anatomical inveſtigations of modern times have entirely diſproved, and which all Engliſh writers, from Mr. White downwards, have juſtly diſcarded. We ſhall, therefore, proceed to relate the ſymptoms of the diſeaſe.

In about twelve or fifteen days after delivery, the patient is ſeized with great pain in the groin of one ſide, accompanied with a conſiderable degree of fever, which, however, is ſeldom preceded by rigor or ſhivering. This part ſoon becomes affected with ſwelling and tenſion, which extend to the labium pudendi of the ſame ſide only, and down the inſide of the thigh, to the ham, the leg, the foot, and the whole limb: the progreſs of the ſwelling is ſo quick, that in a day or two the limb becomes twice the ſize of the other, is moved with great difficulty, and is hot and exquiſitely tender, but without any external appearances of inflammation. The pain in the groin is generally preceded by a pain in the ſmall of the back, and ſometimes by a pain at the bottom of the belly on the ſame ſide: the parts which ſuffer the moſt pain, are the groin, the ham, and the back part of the leg about its middle. The pain indeed extends over the whole limb, in conſequence of the ſudden diſtention; but in a day or two it becomes leſs ſevere. The ſwelling is general and equal over the whole limb; it is much harder and firmer than in anaſarca, in every ſtage of the diſorder; it is not ſo cold, in any ſtate of the diſeaſe, as the dropſical ſwelling, nor ſo much diminiſhed by a horizontal poſition, neither does it *pit* when preſſed upon by the finger, nor does any water iſſue from it when it is punctured by means of a lancet. The ſurface is very ſmooth, ſhining, and pale, and is even and equal to the touch in every part, except where the conglobated glands are ſituated, which in ſome caſes are knotty and hard, as in the groin, the ham, and about the middle of the leg, at its back part.

This diſorder generally comes on in the ſecond or early in the third week after parturition. But Mr. White mentions one inſtance in which it commenced as early as twenty-four hours after delivery, and another as late as five weeks: but theſe are rare and extreme occurrences. The diſeaſe ſubſides in the following order: firſt the pain and ſwelling of the groin and labium pudendi begin to remit, next thoſe of the thigh, and laſtly thoſe of the leg.

The fever in ſome patients ſubſides in two or three weeks, in others it continues ſix or eight weeks, attended with quick pulſe and hectic ſymptoms. The diſeaſe ſometimes attacks both extremities; but this rarely happens, perhaps not in one caſe in ten. After the diſorder has exiſted a week or two, it is not uncommon for the ſound leg to ſwell towards evening, and become œdematous; but then the groin and thigh are not affected on that ſide, and the leg is much ſofter to the touch than the other, and pits when preſſed upon by the finger. Mr. White affirms, that he has never known it to ſuppurate or prove fatal, or to be followed by any material inconvenience, after a few months were elapſed, except a little ſwelling of the leg after fatigue, particularly after walking.

Neither the prediſpoſing nor the exciting cauſes of this diſeaſe are very obvious. It attacks women who are in full ſtrength, and thoſe who are reduced by flooding; thoſe who have a moderate diſcharge of the lochia, and thoſe who have a ſmall or a large quantity; thoſe who give ſuck, and thoſe who do not, whether their breaſts be drawn or not, and whether they have a great deal or little milk. It attacks women in whatever poſition they have been delivered; but of thoſe who were delivered on the ſide, it appears that the greater number were affected on that ſide in which they lay at the time of delivery. It attacks women of all ranks and of different habits, both the rich and the poor; the moſt healthful, as well as thoſe who have laboured under chronic diſeaſes; the ſtrong and the weak, the lean and the corpulent; the ſedentary and the active; the young and the middle-aged; after the firſt or any other labour, and whether the labour be natural or preternatural. It happens at all ſeaſons of the year indiſcriminately; and in the country as well as in large towns. It never attacks either of the arms, or other parts of the body; and though it ſometimes occurs in both the lower extremities, in the ſame or in different lyings-in, it never attacks the ſame limb more than once.

In a ſubſequent publication on the diſeaſe, Mr. White ſtates more ſtrongly, that the limited ſwelling of the labium pudendi on one ſide only, is to be conſidered as conſtituting the principal diagnoſis of the phlegmatia dolens. The ſwelling is ſo exactly confined, he ſays, to the labium pudendi of that ſide, that if a line were drawn from the navel to the anus, it would be found never to go beyond that line, in the ſmalleſt degree; and this pathognomonic ſymptom, he adds, is never wanting in any caſe whatever. "About nine times out of ten it attacks one ſide only, and the limits are ſo exactly drawn, that in no caſe whatſoever does the ſwelling riſe higher than the loins and the hypogaſtric region, nor ſpread wider than the ſpine and linea alba; and this is ſo conſtantly and invariably the caſe, that it may be confidently ſaid, *ſo far ſhalt thou go, and no farther.*" See an Inquiry into the Nature, &c. of that Swelling in one or both the Lower Extremities, &c. part ii. p. 7. (1801), and part i. p. 7. 1792.

This limited ſtate of the ſwelling has led modern authors in general to conſider the diſeaſe as principally ſeated in the lymphatic veſſels and glands. The exact ſtate of theſe parts, however, has not been clearly made out, and the different writers above quoted have attempted to explain it in different ways; all of them, however, ſpeaking conjecturally, and none of them appearing to make out an hypotheſis ſatisfactory in all its parts. Mr. White conſiders the ſwelling of the limb to be occaſioned by an obſtruction in the trunks of the lymphatic veſſels, and the conſequent detention and accumulation of the lymph in the limb. This obſtruction, he conjectures, may be occaſioned by inflammation in the trunk or trunks of theſe veſſels, brought by preſſure during parturition, or by actual rupture of them. Mr. Trye is of opinion that the origin of the obſtruction is ſeated ſolely in the lymphatic glands in the groin, which are inflamed, and therefore incapable of admitting the tranſit of the lymph through them. To this ſuppoſition, however, it is juſtly objected, that inflammation in the inguinal glands is extremely apt to terminate in ſuppuration; whereas ſuppuration does not occur in phlegmatia dolens: not to mention, that a tenderneſs and enlargement of theſe glands, though occaſionally obſerved in this diſeaſe, is not always preſent, is often very ſlight, or does not exiſt at all until the complaint is conſiderably advanced.

Dr. Hull, in an able and learned treatiſe on this diſeaſe, after a conſideration of the unſatisfactory nature of theſe theories, propoſes another explanation of the ſeat and phenomena of the complaint. He conſiders it as conſiſting of a peculiar inflammation, ſeated in the muſcles, cellular membrane, and interior ſurface of the ſkin, and producing a rapid effuſion of ſerum and coagulable lymph from the exhalants into the cellular membrane of the limb. The exquiſite pain, tenderneſs, and heat of the limb, as well as the feveriſhneſs which accompanies it, he thinks, are thus ſatisfactorily explained, independently of any primary affection of the lymphatic ſyſtem, which may be involved in the progreſs of the diſeaſe.

On the whole, this appears to afford the moſt rational explication, both of the ſymptoms of the diſeaſe and of the mode of its occurrence. Dr. Hull remarks, that, under the increaſed irritability and inflammatory diatheſis connected with pregnancy and the puerperal ſtate, various cauſes may excite this ſort of inflammation, eſpecially in the lower extremities, in which a great determination of blood has taken place during the latter months of utero-geſtation; ſuch as contuſions, or even violent exertions of the lower portions of the abdominal muſcles, or thoſe of the pelvis and thighs, cold and moiſture, ſuppreſſion or diminution of the lochia or milk, inducing a plethoric ſtate, too much or too ſtimulating food, too early walking or much ſtanding, &c. As the diſeaſe ſeldom takes place before the twelfth or fourteenth day after delivery, and ſometimes conſiderably later, it is certainly more probable that it ſhould be occaſioned by ſome cauſe ſubſequently applied, than by any injury ſuſtained at the time of parturition.

Of the Cure of Phlegmatia dolens.—The different views which have been taken of the nature of the diſeaſe by different practitioners, have neceſſarily led them to propoſe different methods of treatment. Mr. White juſtly obſerves, that the mode of cure muſt be varied with the different ſtages of the diſorder. The *firſt ſtage*, which may be called the inflammatory, he recommends to be treated in the antiphlogiſtic method; but as he conſiders the inflammation not as the original diſeaſe, but as ſecondary or a ſymptom only, occaſioned by the diſtention of the lymphatic veſſels and glands; ſo he deems it neither neceſſary nor prudent to waſte the patient's ſtrength by large evacuations. He adviſes the uſe of laxative medicines and glyſters, for the purpoſe of keeping the bowels open; the application of bliſters to the upper part of the thigh, with the view of evacuating ſome of the effuſed fluids and relieving irritation in the part originally affected; and the adminiſtration of opiates internally, together with the external uſe of anodyne fomentations, and of the warm and vapour bath, for the purpoſe of alleviating the pain. At the ſame time, he preſcribes cooling diaphoretic medicines, with acidulated drinks, fruit and cool air, in order to moderate the general feveriſh diſpoſition. In the *ſecond ſtage*, when the violence of the pain abates, and the ſwelling and tenſion of the groin, labium, and upper part of the thigh begin to leſſen although ſome degree of feveriſhneſs remains, he recommends a fuller diet, and a more tonic medicine, with an occaſional ſmall doſe of calomel. He adviſes alſo, that gentle friction ſhould be employed upon the limb, with warm oil, and that the patient ſhould uſe the Buxton bath, or water heated to 82 degrees Fahrenheit's thermometer, which may be gradually lowered to 76, the temperature of that of Matlock. The *third*, and laſt ſtage, may be ſaid to take place, when the pain and fever have entirely left the patient, and no complaint remains except the ſwelling of the limb, and ſome degree of debility. He then preſcribes the cinchona, with or without chalybeates, together with ſea-bathing, or the cold-bath at home, where a reſort to the ſea is inconvenient. He recommends alſo embrocations with camphorated ſpirit, or diſtilled vinegar, dipping the limb in cold water, gentle friction upwards, the uſe of a calico bandage, carefully and properly applied, and exerciſe on horſeback; and conſiders much walking as injurious in every ſtage of the diſeaſe.

Mr. Trye's method of treatment differs from that of Mr.

White, principally in the more active employment of local evacuations from the groin, as he conſiders the inflammation of the lymphatic glands to be the primary cauſe of the diſeaſe. He therefore applies both leeches and bliſters to the part, while he adminiſters laxatives and emetics internally; and, in more obſtinate caſes, introduces mercury ſo as to make it paſs through or near the glands and lymphatic trunks affected.

Dr. Hull divides the diſeaſe into three ſtages, after the manner of Mr. White, and treats the *firſt*, or inflammatory ſtage, upon the ſame antiphlogiſtic principles, applying leeches and bliſters to moderate the local action, and emollient fomentations, liniments, and ointments, to relieve the tenſion of the ſkin. The *ſecond* ſtage does not require or bear evacuations; but the other parts of the antiphlogiſtic treatment, ſuch as reſt, the removal of irritations, gentle diaphoretics and ſedatives, the warm bath, &c. muſt be continued; and the topical affection is to be remedied by gently ſtimulating liniments. The *third*, or *aſthenic* period, requires the adminiſtration of tonics, and ſtimulants, and exerciſe, eſpecially in a carriage; while at the ſame time the topical affection muſt be treated, by the application of a tight bandage, by the cold bath, or cold water daſhed on the limb, and by remedies which may increaſe the action of the abſorbents, ſuch as bliſters, friction, heat, electricity, &c. and by the internal medicines, which excite abſorption, ſuch as mercury, digitalis, alkalies, &c. Theſe remedies, particularly the evacuants, will of courſe be regulated according to the vigour and habit of the patient.

There is, in fact, little eſſential difference in the practice recommended by the different writers on this ſingular diſeaſe, which is often very obſtinate and of long continuance, notwithſtanding the vigorous application of the remedies above-mentioned. Of a diſeaſe of comparatively rare occurrence, (for of 1897 women delivered at the Weſtminſter General Diſpenſary, only five were affected with this malady, and of 8000 delivered in Mancheſter, only four,) any individual practitioner cannot have witneſſed a ſufficient number, to enable him to appreciate ſatisfactorily the moſt effectual mode of practice. In three or four caſes, which we have ſeen, the importance of free purging appeared to be decidedly eſtabliſhed; and while, in the firſt, the uſe of warm fomentations, ſo far from alleviating the pain in the early ſtage, ſeemed to aggravate the ſufferings of the patient; in the caſe laſt treated, both the violence of the pain and the duration of the diſeaſe, appeared to be greatly diminiſhed, by cooling the limb by frequent *tepid* and *cold waſhing*. See Report of the Diſpenſary in Carey-ſtreet, in the Edin. Med. and Surg. Journal for Jan. 1807, vol. iii. Alſo, An Eſſay on the Swelling of the Lower Extremities incident to Lying-in-women, by Charles Brandon Trye, 1792, and an Eſſay on Phlegmatia Dolens, by John Hull, M.D., Mancheſter, 1800.

PHLEGMATIC, an epithet given to one of the four temperaments by the ancients, in which the prevalent humour was conſidered to be *pituita*, or *phlegm*; whence the diſeaſes to which the phlegmatic temperament was ſubject, were ſaid to be defluxions, rheums, and other cold diſcharges. See TEMPERAMENT.

PHLEGMON, or PHLEGMONE, from φλεγω, *to burn*, a term ſignifying common, or healthy, acute inflammations. See INFLAMMATION.

PHLEGON, in *Biography*, one of the freedmen of the emperor Adrian, who was brought up to letters, and ſurvived to the 18th year of Antoninus Pius. He was author of various works, of which the moſt important was entitled, "Olympiads," or "Chronicles," in ſixteen books, brought down to the year 137 of the Chriſtan era. This contained an account of the remarkable events occurring in every year of the Olympiads. Phlegon alſo wrote a work "De Mirabilibus," and another, "De Longævis." Of his "Opuſcula," the beſt editions are that of Meurſius, and that of Franzius, the former printed in 1620, and the latter in 1775.

PHLEGRÆI CAMPI, *Phlegrean* or *Burnt Fields*, in *Ancient Geography*, a diſtrict of Campania, or Campagna, in Italy, of which the ancient mythologiſts have given very pompous deſcriptions. This, they ſay, was the ſcene of the combats between the giants and the gods, and of the victory over them gained by Jupiter. The territory thus denominated appears to have experienced in a great degree the deſtructive effects of ſubterranean fires. Accordingly we here find Veſuvius, the Solfatara ſtill ſmoking, as the poets have pretended, from the effects of Jupiter's thunder; the Monte Nuovo, which was ſuddenly thrown up from the bowels of the earth on the day of St. Michael's feaſt, in the year 1538, as if the ſons of Titan had intended to renew the war; the Monte Barbara, formerly Mons Gaurus, the favourite of Bacchus, the grotto of the Cumæan Sibyl, the noxious and gloomy lakes of Avernus and Acheron, the green bowers of Elyſium, &c. &c. It is not improbable that theſe objects terrified the Greeks, in their firſt voyages to this coaſt; and that they were afterwards embelliſhed and exaggerated by the fancy and fiction of the poets. It remained for the geographer and natural hiſtorian to develope the facts which had been thus diſguiſed by the poets. See TARTARUS and TITANS, and alſo CUMÆ and *Cumæan* SIBYL.

PHLEOS, in *Botany*. See PHEOS.

PHLEUM, φλεον, or φλεως, in Greek, a name adopted by Linnæus for the *Gramen typhinum* of preceding botaniſts, our Cat's-tail-graſs. This indeed has little connection with the ancient plant, except the latter might be, as ſome ſuppoſe, our *Typha*, which the *Phleum* reſembles in ſhape.—Linn. Gen. 33. Schreb. 47. Willd. Sp. Pl. v. 1. 354. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 68. Prodr. Fl. Græc. Sibth. v. 1. 41. Ait. Hort. Kew. v. 1. 145. Schrad. Germ. v. 1. 182. Juſſ. 29. Lamarck Illuſtr. t. 42. Gærtn. t. 1.—Claſs and order, *Triandria Digynia*. Nat. Ord. *Gramina*.

Gen. Ch. *Cal.* Glume ſingle-flowered, oblong, linear-lanceolate, compreſſed, of two, nearly equal, ſtraight, compreſſed, claſping, concave valves, each tipped with a point; their inner membranous margin abrupt or oblique. *Cor.* of two awnleſs valves, ſhorter than the calyx, and concealed within it; the outermoſt embracing the ſmaller inner one. Nectary of two ovate, concave, acute ſcales. *Stam.* Filaments three, capillary, longer than the calyx; anthers oblong, forked at each end. *Piſt.* Germen roundiſh, ſuperior; ſtyles two, capillary, reflexed; ſtigmas feathery. *Peric.* none, the calyx and unchanged corolla enfolding the ſeed. *Seed* ſolitary, roundiſh, clothed with the corolla, but not united to it.

Eſſ. Ch. Calyx ſingle-flowered, of two, nearly equal, awn-pointed valves, encloſing the two-valved awnleſs corolla. Seed inveſted with the unchanged corolla.

Obſ. Much difference of opinion has exiſted among botaniſts, reſpecting the limits between this genus and *Phalaris*, chiefly on account of the abrupt inner margin of the calyx-valves, attributed to *Phleum* by Linnæus. Schreber and Schrader, two excellent judges, though they differ ſomewhat in the denomination of the parts in *Phalaris*, have determined theſe genera on the ſame principles as we have here adopted. Hence numerous ſpecies, hitherto deemed ambiguous, are referred to *Phleum*, with which they agree in habit, though they have not the abrupt calyx. Their ſingle corolla, which does not, as in the real ſpecies of *Phalaris*, become hardened and united with the ſeed, is certainly a much more important and well-defined character. See Phalaris.

1. Ph. *pratenſe*. Common Cat's-tail-graſs. Timothy-graſs. Linn. Sp. Pl. 87. Schrad. n. 1. Schreb. Gram. 102. t. 14. Mart. Ruſt. t. 5. Knapp. t. 6. Engl. Bot. t. 1076. (Gramen typhinum majus et minus; Ger. Em. 11, 12.)—β Ph. nodoſum; Linn. Sp. Pl. 88. Leers 17. t. 3. f. 2. Fl. Dan. t. 380.—Cluſter ſpike-ſhaped, cylindrical, obtuſe. Valves of the calyx abrupt, fringed at the keel. Awns ſhorter than the calyx. – Common in meadows and paſtures throughout Europe; moſt luxuriant in ſuch as are moiſt and rich. In a dry or fluctuating ſoil, the loweſt joints of the ſtem become bulbous, and the whole plant diminiſhed. It is perennial, flowering from June to October; and by means of ſome reports from America, was at one period celebrated by agriculturiſts, under the name of Timothy-graſs, after its introducer, Mr. Timothy Hanſon. Its reputation proved fallacious, as has happened in other ſimilar caſes. The climates of America and Europe, though in ſome reſpects alike, are, in many others, far too different, for the ſucceſs of an agricultural graſs, in one of thoſe countries, affording any probable reaſon for its utility in the other. The plant before us is known from every other common graſs by its denſe cylindrical *ſpike*, (or rather *cluſter*, as the *flowers* are not ſeſſile, but ſtalked and faſciculated,) and the very abrupt inner edges of its *calyx*. The *root* creeps moderately. *Stem* erect, three or four feet high, except when ſtarved, roughiſh, as are alſo the *leaves*, and their long *ſheaths*. *Spike* erect, purpliſh, from two to four or five inches in length, of innumerable fringed *flowers*, whoſe *awns* are half the length of the *calyx*, and ſlightly ſpreading. The tawny *anthers* are large and conſpicuous, hanging looſely out of the *flowers*. The Rev. H. Davies has obſerved the *flowers* to be occaſionally viviparous in Angleſea.

2. Ph. *alpinum*. Alpine Cat's-tail-graſs. Linn. Sp. Pl. 88. Schrad. n. 2. Engl. Bot. t. 519. Fl. Dan. t. 213. Knapp. t. 7. Sm. Tour on the Continent, v. 3. 134. (Gramen typhoides alpinum, ſpicâ brevi, denſâ, et veluti villoſâ; Scheuchz. Agr. 64. Prodr. 17. t. 3.)—Cluſter ſpike-ſhaped, ovate-oblong. Valves of the calyx abrupt, fringed at the keel. Awns about as long as the calyx. Root tuberous.—Native of lofty Alpine paſtures, in Lapland, Germany, Switzerland and Scotland, flowering about the end of July. Its rather tuberous, ſomewhat creeping, but never bulbous, *root*; ſhort ovate *cluſter*; longer hairs and awns of the *calyx*; and long inflated ſheath of the uppermoſt *leaf*; are the ſufficient marks of diſtinction between this and every variety of the preceding. The *flowers* moreover are uſually of a darker purpliſh hue. The height of the *ſtem* is from twelve to eighteen inches.

3. Ph. *felinum*. Briſtly Cat's-tail-graſs. Sm. Prodr. Fl. Græc. v. 1. 42.—Spike ovate. Valves of the calyx abrupt, fringed at the lower part of the keel. Awns longer than the calyx, divaricated, angular, rough. Root fibrous.—Native of Zante, where it is known by the name of μουστάκια του κατζούλιου, or Cat's whiſkers. We have alſo a Sicilian ſpecimen, from Mr. Bivona Bernardi. The *root* is fibrous and annual. *Stem* from one to two feet high, erect, ſmooth, leafy, branched in the lower part. *Leaves* light green, nearly ſmooth; the ſheath of the upper one inflated, ſtrongly ribbed. *Stipula* elongated. *Spike* ovate, about an inch long, pale, denſe. *Calyx-glumes* very abrupt, white, and membranous at their inner edge; their keel denſely fringed about half way up, and continued into a tapering, angular, rough, but not hairy ſpreading awn, uſually longer than the glume itſelf.

4. Ph. *aſperum*. File Cat's-tail-graſs. Schrad. n. 3. Jacq. Ic. Rar. t. 14. Villars Dauph. v. 2. 61. t. 2. f. 4. (Ph. paniculatum; Hudſ. 26. Sm. Fl. Brit. 70. Engl. Bot. t. 1077. Ait. Hort. Kew. v. 1. 145. Phalaris aſpera; Retz. Obſ. faſc. 4. 14. Willd. Sp. Pl. v. 1. 328. Hoſt. Gram. Auſtr. v. 2. 28. t. 37.)—Panicle cylindrical, ſpike-ſhaped. Valves of the calyx wedge-ſhaped, abrupt, naked, rough, pointed; tumid upwards.—In dry open fields, very rare in England, more common in the ſouth of Europe, flowering about July. *Root* annual, of many branched fibres. *Stems* ſeveral, branched, leafy, very ſmooth, near a foot high. *Leaves* ribbed, roughiſh, bright graſs-green, not glaucous; the long ſheath of the uppermoſt often reaching above the baſe of the *panicle*, which is two or three inches long, of the colour of the foliage, lobed, but crowded into a cloſe cylinder, feeling rough, like a file, from the very ſhort rigid awns. The *calyx* is abrupt, minutely rough; angular or furrowed below; remarkably tumid upward. Valves of the *corolla* elliptical. *Anthers* ſhort and pale. Barrelier's t. 28. f. 2. ſurely cannot but be this graſs, though doubted by Schrader.

5. Ph. *Boehmeri*. Purple-ſtalked Cat's-tail-graſs. Schrad. n. 4. (Phalaris phleoides; Linn. Sp. Pl. 80. Willd. Sp. Pl. v. 1. 328. Sm. Fl. Brit. 63. Engl. Bot. t. 459. Knapp. t. 5. Fl. Dan. t. 531. Hoſt. Gram. Auſtr. v. 2. 26. t. 34. Ehrh. Phytoph. n. 61. (Gramen typhinum, ſpicâ conoide ſtriatâ, culmo violaceo; Barrel. Ic. t. 21. f. 1.)—Panicle nearly cylindrical, ſpike-ſhaped. Valves of the calyx lanceolate, abrupt, roughiſh, ribbed, pointed. Stem ſimple. In dry elevated paſtures and hilly ground, eſpecially where the ſoil is ſandy, in various parts of Europe. In ſome parts of Cambridgeſhire and Norfolk, but not frequent, flowering in July. *Root* perennial, of numerous ſmooth fibres. *Stems* ſeveral together, but each of them quite ſimple, twelve or eighteen inches high, erect; leafy below; naked, poliſhed, and uſually conſpicuous for a beautiful purple hue, in their upper part. *Leaves* linear, rough, acute, rather glaucous; the upper ones ſhort, with very long cloſe ſheaths. *Stipula* very ſhort, abrupt. *Panicle* near two inches long, denſe, a little contracted at each end, glaucous green with a tinge of purple: occaſionally pale. *Calyx* rough, in various degrees, with ſhort hairs; the keel ſomewhat fringed; each ſide marked with a ſtrong rib; the inner margin membranous, ſmooth, coloured, abrupt, or at leaſt oblique, at the top: awns very ſhort, erect. Valves of the *corolla* elliptical. *Anthers* twice the length of the laſt, moſtly purple. We have from Dr. Bellardi a Piedmonteſe ſpecimen of this graſs, marked *Phleum perenne*, which however he does not appear to have publiſhed. It is much to be wiſhed that ſome more expreſſive name could have been found, inſtead of that which we are obliged to adopt; ſuch as *violaceum*, or *purpuraſcens*.

6. Ph. *Michelii*. Michelian Cat's-tail-graſs. Allion. Pedem. v. 2. 233. Schrad. n. 5. t. 1. f. 2. Engl. Bot. t. 2265. (Ph. n. 1532; Hall. Hiſt. v. 2. 246. Phalaris alpina; Hænke in Jacq. Coll. v. 2. 91. Hoſt. Gram. Auſtr. v. 2. 26. t. 35. Gramen typhinum junceum perenne; Barrel. Ic. t. 21. f. 2.) Panicle nearly cylindrical, ſpike-ſhaped. Valves of the calyx lanceolate, taper-pointed, ribbed, with ſhort awns; the keel ſtrongly fringed. Corolla ribbed, hairy. Stem ſimple.—Native of lofty mountains in Germany, Switzerland, Savoy, and Scotland, flowering in July. Mr. G. Don diſcovered it on rocky parts of the hills of Clova, Anguſhire. *Root* perennial,

tufted, ſcarcely creeping. *Stems* a foot or more in height, ſimple, ſmooth, erect, leafy more than half way up. *Leaves* broadiſh, flat, pointed, rough-edged ; their ſheaths ſmooth, the upper ones long, and rather tumid. *Stipula* ſhort, blunt. *Panicle* from one and a half to three inches long, erect, thicker than in the laſt, purpliſh except when it grows under buſhes, by which it becomes pale green and white. The long denſe fringes of the *calyx-keels* give the whole a hairy aſpect. Their taper-pointed figure, without any abrupt termination of the inner edge, diſtinguiſhes this ſpecies from all the foregoing, and indeed has induced ſome perſons to refer it to *Phalaris*. The *corolla* is larger, and has more of the habit of the *calyx*, than uſual in this genus, being ribbed and more or leſs hairy, reſembling the *corolla* of a *Feſtuca*, though more obtuſe. Villars has certainly, as Schrader obſerves, confounded this and the laſt, both in his deſcription and ſynonyms, under his *Ph. phalaroideum*, Dauph. v. 2. 60. Our ſpecimen from himſelf agrees with the laſt, not with the preſent.

7. Ph. *arenarium*. Sea Cat's-tail-graſs. Linn. Sp. Pl. 88. Ehrh. Calam. n. 132. Schrad. n. 6. Fl. Dan. t. 915. (Phalaris arenaria ; Hudſ. 23. Sm. Fl. Brit. 62. Willd. Sp. Pl. v. 1. 328. Ait. Hort. Kew. v. 1. 138. Engl. Bot. t. 222. Knapp. t. 4. Dickſ. H. Sicc. faſc. 18. 2. Gramen typhinum maritimum minus; Pluk. Phyt. t. 33. f. 8.)—Spike ſcarcely panicled, ovato-lanceolate. Valves of the calyx lanceolate, ribbed, with ſhort awns ; the keel ſtrongly fringed. Corolla ribbed, abrupt. Stem branched at the baſe.—Native of the ſandy ſea-ſhores of England, and moſt other parts of Europe. Occaſionally it occurs on dry elevated inland heaths ; flowering in June. Though the ſpecific characters of this and *Ph. Michelii* come near each other, the appearance of the two graſſes is very different. The preſent is annual, of humbler growth, glaucous and pale, ſmooth, branched more or leſs from the very baſe. *Leaves* broadiſh-lanceolate, with long, rather tumid, ribbed, ſmooth ſheaths. *Spike* thick and rather ſhort, bluntiſh, though contracted towards both ends. *Calyx-valves* preciſely lanceolate, not taper-pointed, though tipped with ſhort awns. *Corolla* broad and ſhort, abrupt and ſomewhat crenate, ſmooth, with many ribs.

8. Ph. *dentatum*. Toothed Cat's-tail-graſs. (Phalaris dentata ; Linn. Suppl. 106. Willd. Sp. Pl. v. 1. 327. Thunb. Prodr. 19. Retz. Obſ. faſc. 4. 14.)—Spike ſcarcely panicled, cylindrical. Keel of the calyx-valves ſtrongly and bluntly toothed. Stem branched at the baſe. —Native of the Cape of Good Hope. *Root* fibrous, ſmooth, apparently annual. *Stems* divided at the baſe into ſeveral branches, from three to ſix inches high, very ſmooth and ſhining, ſometimes bent at the joints, and ſtained below them with dark purple. *Leaves* ſhort and almoſt awl-ſhaped, with long, ſlightly tumid, ribbed ſheaths, that conceal nearly the whole ſtem. *Spikes* terminal, ſolitary, about an inch and a half long, obtuſe, ſomewhat lobed, but ſcarcely panicled, ſometimes rather downy, as in the Linnæan ſpecimen ; Retzius found them ſmooth. *Calyx-valves* lanceolate, pale, tumid, and even at the ſides ; their keels green, ſtrongly ribbed, and altogether ſingular in their numerous, prominent, triangular, globular-tipped teeth, which give them an almoſt artificial and very curious appearance.

9. Ph. *tenue*. Slender Cat's-tail-graſs. Schrad. n. 8. (Phalaris bulboſa ; Linn. Syſt. Nat. ed. 10. v. 2. 869. Sp. Pl. 79. Amoen. Acad. v. 4. 264. Bellardi Act. Taurin. v. 5. 213. Willd. Sp. Pl. v. 1. 327, excluding all the ſynonyms except Am. Acad. Ph. tenuis ; Hoſt. Gram. Auſtr. v. 2. 27. t. 36. *Schrad.* Gramen typhinum, longiſſimâ ſpicâ phalaridis, molli, albicante ; Barrel. Ic. t. 14. f. 1.)—Panicle cylindrical, ſpike-ſhaped, very denſe. Valves of the calyx elliptic-oblong, roughiſh, minutely pointed ; their lateral ribs very prominent. Stem branched at the baſe. Corolla obtuſe.—Gathered by Haſſelquiſt in the Levant ; by Bellardi near Saviliano in Piedmont ; by Hoſt in Iſtria, about vineyards, roads, and graſſy places. It flowers from May to July. Nothing can be more unaccountable than the name by which Linnæus has diſtinguiſhed this ſpecies, except that it was, probably, merely taken from the ſynonym of Scheuchzer, which he here erroneouſly applied, and which properly belongs to *Phalaris nodoſa* ; ſee PHALARIS, n. 2. His own ſpecimen, on which the name of *bulboſa* is twice written, and which has all other requiſite marks of authenticity, has nothing bulbous about it. The *root* is ſmall, of a few tapering, partly downy, fibres, and appears to be annual. *Stem* more or leſs branched at the lower part only, above a foot high, ſimple upwards, ſlender, erect, round, leafy ; purple, ſmooth and poliſhed in all the naked parts, with ſlightly tumid joints. Dr. Bellardi's ſpecimen has more ſubdiviſions, though but half ſo tall. *Leaves* linear-lanceolate, graſs-green, roughiſh, with nearly ſmooth cloſe ſheaths. *Panicles* ſolitary, erect, about two inches long, cloſe, and exactly cylindrical, one-fourth or one-third of an inch thick. *Calyx-valves* rather obliquely or unequally elliptical, their inner edge being almoſt ſtraight, and their ſhort points approaching each other ; their whole ſurface is roughiſh with very minute prominences, but no hairs ; the ſolitary ſide-ribs very ſtrong and prominent, reſembling the keel. *Corolla* not half ſo long as the calyx ; its outer valve much the broadeſt, ribbed, very obtuſe, crenate. This ſpecies, ſo long involved in obſcurity, is now made ſufficiently intelligible, and its ſpecific name is no longer a ſtumbling-block, or a contradiction. Willdenow and Schrader have juſtly enough remarked that the *Phalaris bulboſa* of Cavanilles, Ic. t. 64, deſerves that appellation much better than this fibrous-rooted plant ; but Cavanilles's is *Phalaris nodoſa*, as well as *tuberoſa*, of Linnæus, ſo that a third name is quite needleſs. See PHALARIS.

10. Ph. *geniculatum*. Bent Cat's-tail-graſs. Bellardi Oſſerv. Bot. 54. Mem. de l'Acad. de Turin v. 5. 213.—“ Spike nearly ovate. Glumes fringed. Stem bent at the joints.”—Gathered by Dr. Bellardi on Mount Cenis, in barren ground. “ *Root* perennial, not bulbous. *Stems* a ſpan or more in height, with three or four bent joints.” *Bellardi.*

Of this we have no ſpecimen from the author, nor did he advert to it, as a new ſpecies, when, in company with the writer of this, he gathered it in Auguſt 1787. We mention it here merely for future obſervation.

A few other ſpecies either have been referred by authors to this genus, or may ſeem to belong to it. Of the former is *Phleum crinitum* of Schreber, Sm. Fl. Brit. 71, which if not a good *Agroſtis*, as we have conſidered it in Engl. Bot. t. 1704, conſtitutes the genus POLYPOGON of Deſfontaines and Schrader : ſee that article. Among the latter are *Phalaris geniculata* and *vaginiflora*, Sm. Prodr. Fl. Græc. Sibth. v. 1. 38. Theſe, according to our reformed ideas of *Phalaris*, cannot remain there : but we are become perſuaded that *Crypſis* is a good genus, diſtinguiſhed, not indeed by its original trifling, as well as erroneous, character, of two ſtamens, but by the *corolla* being longer than the *calyx*, and, like that, having, to one valve at leaſt, a ſtrong rough keel. On theſe grounds Schrader has admitted it, in his excellent *Flora Germanica*, where three ſpecies are deſcribed, to which we can add a fourth, ſuppoſed to come from Virginia, with a much branched *ſtem*, and long, ſlender, cylindrical, ſpiked *panicles.* We apprehend however that Schrader miſapplies to his *C. ſchoenoides*, Barrelier's t. 54, which more properly belongs to his *alopecuroides*; a plant formerly given us by the celebrated M. Gerard, at Cottignac, as a rare and little known ſpecies. See Crypsis.

Ph. *Gerardi*, Jacq. Ic. Rar. t. 301. Willd. Sp. Pl. v. 1. 355. Schrad. n. 7, ſtill remains in diſpute. Jacquin repreſents it with a bivalve *corolla*, which Schrader confirms. Yet we have found in our ſpecimens, gathered on mount Cenis, only a ſingle valve to that part, which accords with the account of Villars, who had examined living wild plants. Hence we have judged this graſs to be an *Alopecurus*, which is confirmed by the dorſal awn of the *corolla*, omitted by Jacquin indeed, but properly deſcribed in Schrader. This awn is eſſential to an *Alopecurus*, but quite unexampled in *Phleum:* and we are perſuaded our able friend laſt mentioned has for once depended on a leſs important, and, as it ſeems, variable mark, in preference to the more eſſential. The cultivated plant perhaps acquires an inner valve, in conſequence of luxuriance. Our opinion of this plant is ſtrengthened by *Alopecurus anguſtifolius*, Fl. Græc. t. 64, and *lanatus*, Prodr. Fl. Græc. v. 1. 43, which have every character of their genus, and yet are ſo cloſely akin to this reputed *Phleum*, (*Gerardi*,) that no greater violence could be done to nature than to disjoin them.

Phleum, in *Agriculture*, the title of a genus of graſſes, ſome of which have been found uſeful in the field. It is the cat's-tail-graſs.

Phleum *Nodoſum*, the knotty cat's-tail-graſs, which is ſaid by ſome to be a fine exuberant graſs fit for dairy paſtures and where cow hay is required, as it affords rich milk, and cows are fond of it; but horſes and ſheep are ſaid to reject it in favour of the poas, though not in other caſes. It is found in the dry hilly paſtures in moſt places.

Phleum *Pratenſe*, the meadow-cat's-tail-graſs. This is coarſe and late, but anſwers beſt in moiſt ſoils and ſituations. When kept well fed down, it is ſaid to be uſeful on the moiſt loamy ſoils where the ſubſtratum is of the clayey marle kind. It is aſſerted to furniſh a principal part of the herbage in the meadow lands in America. It affords much ſeed, and is the plant known by the title of Timothy-graſs. It is wholly rejected by ſome as unworthy of cultivation, though others think well of it.

PHLIAS, in *Ancient Geography*, an iſland ſituated in the environs of Ætolia.

PHLIUS, or Phliunte, *Staphilica*, a town of Sicyonia, on the river Aſopus, S.W. of Theranda. It was conſiderable in the time of Pauſanias, though it had ſuffered much during the war of Achaia. In the midſt of this place was a brazen goat, to which the inhabitants paid great reſpect. This worſhip, without doubt, began, when the country, thinly inhabited, found itſelf expoſed to the deſtruction and loſs of their vineyards by the ravages of the wild goats, with which the mountains abounded. The Phliuſians having loſt ſight of the original inſtitution of this worſhip, pretended, that the conſtellation of the goat, or Capra, afforded nouriſhment to their vines, and that from this circumſtance originated the worſhip of the goat. They pretended that their town was the centre, or "Omphalos" of the Peloponneſus. The town and citadel were adorned with many monuments. Ganymede or Hebe, for theſe were names of the ſame divinity, had a temple in this place, which was regarded as a ſacred aſylum. They had here alſo a temple of Iſis, who was regarded as the protectreſs of navigation.

Phlius, a maritime town of the Peloponneſus, in the Argolide, ſituated between Nauplia Navale and Hermoine. Here were a cavern and a labyrinth. Ptolemy. Strabo.

PHLOGIDIAUGIA, formed from φλογιζω, *I inflame*, and αυγη, *tranſparence*, in *Natural Hiſtory*, the name of a claſs of inflammable foſſils, of a pure texture, and in ſome degree tranſparent.

Of this claſs are the ſulphurs, orpiments, zornics, and amber.

They are by this name diſtinguiſhed from the phlogiſcieria. Hill.

PHLOGINOS, the name of a ſtone found in Egypt, and called by ſome *chryſitis*, from its colour reſembling gold.

PHLOGISCIERIA, derived from φλογιζω, and σκιερος, *opaque*, the name of a claſs of foſſils, the characters of which are, that the bodies contained in it are inflammable, of a coarſe and impure texture, and not pellucid.

The bodies of this claſs are divided into two general orders, and under thoſe, into five genera. Thoſe of the firſt order are ſuch as are found looſe, and in detached maſſes: thoſe of the ſecond, ſuch as are found conſtituting whole ſtrata. The genera of the firſt order are ambergris, jet, and the aſphalta; and thoſe of the ſecond, cannel and common coal.

PHLOGISTON, a term given by the old chemiſts to what was conceived to be the principle of inflammability. Every ſubſtance capable of combuſtion was ſuppoſed to conſiſt of a certain incombuſtible part, called a baſe, united to phlogiſton, and the phenomena of combuſtion were occaſioned only while the phlogiſton was preſent. Sulphuric acid, for inſtance, was conſidered as a ſimple body, which, when united with phlogiſton, conſtituted ſulphur. On the other hand, the ſulphur, during combuſtion, loſt its phlogiſton, and became ſulphuric acid. The metals were conſidered as earths united to phlogiſton, while the oxyds were conſidered as ſimple bodies. To conceive the true meaning to be given to this imaginary body, we have only to conceive it preſent where oxygen is abſent, and *vice verſâ*. Nothing more was wanting to ſhew the fallacy of the phlogiſtic theory, than weighing the products in which it was ſuppoſed to be preſent. When a body was ſaid to have combined with phlogiſton, it became juſt ſo much lighter as was equal to the oxygen now to be ſeparated, and the contrary. See Combustion.

The proceſs of combuſtion, to an account of which we have juſt referred, is unqueſtionably one of the moſt ſtriking, as well as the moſt familiar of natural phenomena. It has for ages engaged, and ſtill engages, the attention of philoſophers. We ſhall endeavour to ſtate, as briefly as poſſible, the three hypotheſes of modern times on the ſubject. The firſt is the phlogiſtic theory of Stahl, which ſuppoſes that all inflammable bodies, or ſuch as throw out light and heat during their combuſtion, contain a portion of ſubſtance that is at once intangible and imponderable: this is the phlogiſton to which they owe their inflammability. While a body is burning it parts with its phlogiſton, which combines with the ſurrounding air, and by this means it is reduced to an aſh, or, if it be a metal, to a calx or oxyd: both the aſh and the oxyd differ from the original ſubſtances, whether they be wood, coal, iron, &c. in being merely deprived of their phlogiſton. Hence, referring to metal for an example, in order to reduce an oxyd to the metallic ſtate, it is neceſſary to unite it with ſome inflammable ſubſtance, as charcoal, which yields it phlogiſton.

The diſcovery of dephlogiſticated air, or oxygen gas, by Dr. Prieſtley, gave riſe to the theory of Lavoiſier. This philoſopher demonſtrated, that in all caſes of combuſtion the inflammable ſubſtance united with oxygen, and produced either an acid, an oxyd, or water, or a mixture of the three;

and that the weight of the product above that of the ſimple combuſtible, was equal to the quantity of oxygen that had diſappeared. This has been eſteemed as an improvement or addition to Stahl's hypotheſis, by accounting for the increaſe of weight of the product of combuſtion above that of the combuſtible body. But combuſtion implies, as we have ſeen, the diſengagement of light and heat, which is accounted for by Lavoiſier, to the excluſion of phlogiſton, by ſuppoſing oxygen gas to be a compound made up of that intangible ſubſtance oxygen with heat and light. According to this theory, a body, while in the act of burning, abſorbs oxygen from the air, ſeparating it from the heat and light with which it was united, and which eſcaping, then appears in the ſeparate form of fire. Hence the difference between combuſtion and ſlow oxygenation is ſimply this, that, in the former caſe, the proceſs advancing rapidly, the heat and light ſeparated from the oxygen gas appear in the ſhape of flame, and in the latter they eſcape ſo ſlowly, as to be imperceptible to the ſenſes.

There ſeems ſcarcely any doubt that the *heat* given out during combuſtion is derived from the oxygen gas, becauſe the increaſe of temperature is found to be accurately proportioned to the quantity of oxygen conſumed. There are, however, ſeveral objections that oppoſe the ſuppoſition that *light* is alſo a conſtituent part of oxygen gas; of theſe, one of the ſtrongeſt is, that the quantity of light given out in the proceſs is not proportioned to the quantity of heat; and the circumſtance of the various colours which the flame aſſumes, according to the nature of the burning body, would lead one to infer that it is the burning body, and not the oxygen gas, which is the principal ſource of the light. This is the third theory, eſpouſed by M. Gren, Dr. Thompſon and others, and according to this, the proceſs of combuſtion is a double decompoſition, in which the combuſtible body unites with oxygen to form an oxyd, or water, or an acid, according to circumſtances, while the light of the combuſtible body combines with the caloric of the oxygen, and produces flame.

This ſyſtem bears a reſemblance to that of the phlogiſtic theory, becauſe the one and the other ſuppoſe ſomething to be contributed by the combuſtible body towards the compoſition of the fire. There are however many difficulties attached to it, that require experiments to explain and confirm. Sir Humphry Davy has indeed, by his inveſtigations, been led almoſt to conclude that there exiſts a diſtinct inflammable principle, which pervades the whole of nature, which would bring us back, in part at leaſt, to the phlogiſtic theory. See Prieſtley's Doctrine of Phlogiſton eſtabliſhed, &c. 1803. Dr. Thompſon's Syſtem of Chemiſtry, vol. i.

PHLOGITES, in *Natural Hiſtory*, a name given by Pliny and other authors to a ſtone, which they ſay had the appearance of flames of fire, bubbling up and riſing to ſeveral points within it. It is ſometimes called alſo *phlogonites*.

Some have ſuppoſed that the ancients meant no more by this diſtinction than to expreſs a fire-colour lodged in the ſtone.

Pliny ranks the phlogites among the gems, but Sabinus and others place it among the larger ſtones: and we have from ſome parts of Germany, a ſpar, with radiations of a fiery red in a white ground, which looks as like flames as any thing one could expect in a ſtone; but whether this, or ſome other, be the ſtone called petrified flames of fire by the collectors of that nation, we are not aſſured.

PHLOGONIÆ, the name of a claſs of foſſils, uſually included by authors with many others of a very different kind, under the general name pyritæ. Theſe are defined to be compound, inflammable, metallic bodies, found in ſmall maſſes, and of determinately angular figure. Of this claſs of bodies there are three genera, *viz.* the *pyrocubia*; the *pyroctagonia*; and the *pyropoligonia*. See PYRICUBIUM, &c.

PHLOGOSIS, in *Medicine*, from φλογιζω, *to inflame*, ſignifies literally *inflammation*. Sometimes it is employed to denote only the prediſpoſition in the habit to be inflamed, or an inflammatory diatheſis, as it is otherwiſe called; and ſometimes it denotes an actual ſtate of inflammation, being ſynonimous with phlegmon. Dr. Cullen, in his Noſology, makes *phlogoſis* a diſtinct genus, including the varieties of external inflammation, *viz.* boils, pimples, whitlows, chilblains, &c. which he compriſes under two ſpecies, Phlogoſis *phlegmone*, and P. *erythema*. See his Noſol. Method. claſs i. gen. 7.

PHLOMIS, in *Botany*, a name borrowed by Tournefort from the ancient Greeks, when he ſeparated the genus on which he conferred it, from *Verbaſcum*, with which indeed this genus has little or nothing in common, except woolly leaves. Φλομις of the Greeks however is ſuppoſed to be our Cowſlip or Primroſe, and is a diminutive of their φλομος, our *Verbaſcum*, Mullein, of which laſt ſeveral kinds are diſtinctly to be aſcertained in Dioſcorides. The name is ſcarcely an alteration of φλογμος, *a flame*, or *burning*; and is acknowledged to allude to the uſe made of the woolly clothing of the Mullein, from remote antiquity, for wicks of lamps. The very ſame appellation is given by the modern Greeks, not only to the different kinds of *Verbaſcum*, but alſo to ſeveral ſpecies of *Euphorbia*, Spurge. In the latter caſe, we preſume, it applies to the well-known burning or cauſtic quality of thoſe plants. Though they have no characters or ſenſible qualities in common with the Mulleins, both are uſed in Greece at preſent, for the purpoſe of apparently intoxicating, and thus eaſily catching, fiſh. The ſpecies of *Verbaſcum* are ſuppoſed to communicate a poiſonous or narcotic property to the water; for Dr. Sibthorp records that the fiſh caught with *Verbaſcum* ſoon putrify. The *Euphorbia*, of which another ſpecies, the *hiberna*, is put to the ſame uſe in Ireland, as we are informed by Dr. Taylor, may be ſuſpected to act in a different manner. Its milk ſcarcely mixes with water at all. A very few drops will ſpread inſtantaneouſly, in a fine unbroken oily film, over the ſurface of a large extent of water, and by cutting off the communication of the atmoſpheric air, muſt, ſooner or later, deſtroy any fiſh that has no means of eſcape. The ſame application might perhaps kill gnats in their red aquatic ſtate. We are not ſure that the profuſe mucilage of the *Verbaſcum* is not more likely to injure fiſh in this way, by clogging up the water, than the very weak narcotic quality of that genus.—Tourn. t. 82. Linn. Gen. 295. Schreb. 392. Willd. Sp. Pl. v. 3. 117. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 3. 406. Brown Prodr. Nov. Holl. v. 1. 504. Sm. Prodr. Fl. Græc. Sibth. v. 1. 414. Juſſ. 114. Lamarck Illuſtr. t. 510. Gærtn. t. 66.—Claſs and order, *Didynamia Gymnoſpermia*. Nat. Ord. *Verticillatæ*, Linn. *Labiatæ*, Juſſ. Brown.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, oblong, with five angles, permanent; its orifice with five acute, nearly equal, ſpreading teeth. *Cor.* of one petal, ringent, nearly cloſed; tube cylindrical; upper lip vaulted, incumbent, keeled, compreſſed, hairy, notched or jagged; lower about the ſame length, three-cleft, the middle ſegment largeſt, heart-ſhaped, obtuſe, the lateral ones ſmaller and more acute. *Stam.* Filaments four, concealed by the upper lip, two of them longer than the reſt; anthers of two oblong divaricated lobes. *Piſt.* Germen ſuperior, four-cleft;

ſtyle the length and poſition of the ſtamens; ſtigma cloven, acute, its upper ſegment ſhorteſt. *Peric.* none, except the permanent calyx. *Seeds* four, oblong, triangular.

Eſſ. Ch. Calyx with five angles and five teeth. Upper lip of the corolla incumbent, compreſſed, bearded, notched; lower about as long, three-cleft; the middle ſegment largeſt. Lobes of the anthers divaricated. Upper ſegment of the ſtigma ſhorteſt.

Obſ. The Linnæan *Phlomis* is much leſſened by the ſeparation of Leonotis and Leucas from it, ſee thoſe articles. What remains is a very natural genus, chiefly inhabiting warm ſunny countries in the ſouth of Europe, of which Linnæus knew eight or nine ſpecies, and to theſe a few have been added, either by ſubſequent diſcoveries, or by enquiries into what were already publiſhed. *Leucas* is almoſt entirely a tropical genus, and downy or hoary rather than villoſe or woolly in its habit.

1. Ph. *fruticoſa.* Shrubby Phlomis, or Jeruſalem Sage. Linn. Sp. Pl. 818. Sm. Fl. Græc. Sibth. t. 563, unpubl. (Verbaſcum Matthioli; Ger. Em. 767.)—β. Ph. latifolia capitata lutea grandiflora; Dill. Elth. 316. t. 237. γ. Ph. armeniaca; Willd. n. 5. (Ph. orientalis, anguſto et longiore folio, flore luteo; Tourn. Cor. 10. Herb. Tourn.)—Leaves oblong, obtuſe, ſoft, and denſely woolly, crenate. Bracteas lanceolate. Calyx-teeth horizontal. Stem ſhrubby. Native of dry rocky ſituations, eſpecially near the ſea, in Spain, Sicily, Crete, Greece, and the Archipelago. It has, ever ſince the time of Gerarde, been a hardy ſhrub in our gardens, flowering in June and July, and diſtinguiſhed by its hoary denſely woolly aſpect, a peculiar ſoapy ſcent when touched, and terminal whorls of large, golden, woolly-headed *flowers.* The *ſtem* is uſually four or five feet high. *Leaves* various in ſize and breadth, obtuſe, but by no means "roundiſh," as Linnæus defines them. Whether the large handſome variety figured by Dillenius, our β, may not be entitled to the rank of a ſpecies, we do not feel quite certain. The γ appeared to us, in Tournefort's herbarium, a ſlight variety only of the common kind, though profeſſor Willdenow has made it a ſpecies.—*Ph. fruticoſa* is doubtleſs the Φλομος αγρια, or Wild Mullein, of Dioſcorides, clearly enough deſcribed by him.

2. Ph. *purpurea.* Purple Phlomis. Linn. Sp. Pl. ed. 1. 585. Syſt. Nat. ed. 10. 1101. Willd. n. 2. Ait. n. 2. Sm. Spicil. 6. t. 7. (Ph. fruticoſa luſitanica, flore purpuraſcente, foliis acutioribus; Tourn. Inſt. 178. Barrel. Ic. t. 405.)—Bracteas lanceolate, acute, ſpinous. Angles of the calyx acute; teeth erect, ſpinous. Leaves moſt woolly beneath. Stem ſhrubby.—Native of Spain and Portugal. Sometimes ſeen in gardens, where it is a humble hardy ſhrub, flowering in ſummer; but the authority of Plukenet for its having been cultivated here about 1661, refers to the following ſpecies. Every part is ſmaller than in the foregoing, and the *corolla* is of a fine light purple. *Leaves* reſembling thoſe of Sage, eſpecially their upper ſurface; but the under is more woolly and white. The *calyx-teeth* are large and ſpinous, ſpreading but little.

3. Ph. *italica.* Italian Phlomis. Linn. Syſt. Nat. ed. 10. 1102. Sm. Spicil. 6. Willd. n. 3. (Ph. purpurea; Linn. Sp. Pl. ed. 2. 818, deſcr. Mill. Ic. t. 202. Verbaſcum ſubrotundo ſalviæ folio; Bauh. Pin. 240. Pluk. Phyt. t. 57. f. 6.)—Bracteas lanceolate, obtuſe, without ſpines. Calyx abrupt, unarmed. Leaves woolly on both ſides. Stem ſomewhat ſhrubby.—Native of Italy and Portugal. Frequent in gardens. This was confounded with the laſt by Linnæus, as it ſeems to be in the new edition of Hort. Kew. though diſtinguiſhed in Donn's Hort. Cant. Nothing can be more diſtinct, as the abrupt unarmed *bracteas* and *calyx*, and more woolly *leaves*, abundantly prove. The *calyx* is correctly drawn by Plukenet. Miller's figure is leſs exact, and perhaps doubtful.

4. Ph. *Niſſolii.* Niſſolian Phlomis. Linn. Sp. Pl. 819. Willd. n. 4. Ait. n. 3. Mill. Ic. t. 204.—Bracteas ſetaceous, minute. Calyx-teeth erect, oblong, obtuſe, unarmed. Leaves woolly on both ſides; the lower ones deeply heart-ſhaped; the upper elliptic-lanceolate.—Native of the Levant. Linnæus had it from Arduino. It was cultivated by Miller, and is kept under the protection of a frame at Kew, flowering in June and July. The *root* is perennial. *Stem* herbaceous, very woolly, as are the younger *leaves*, and the *calyx*. *Flowers* yellow, in numerous leafy whorls. *Bracteas* certainly preſent, though ſo ſmall and ſlender as to be buried in the ſurrounding ſtellated wool.

5. Ph. *lychnitis.* Lamp Phlomis. Linn. Sp. Pl. 819. Willd. n. 6. Ait. n. 4. Sims in Curt. Mag. t. 999, excluding Miller's ſyn. (Verbaſcum anguſtis ſalviæ foliis; Ger. Em. 767.)—Leaves linear-lanceolate, hoary; the floral ones dilated at the baſe. Bracteas ſetaceous, clothed, like the calyx, with long ſimple hairs.—Native of Spain, Portugal, and the ſouth of France, on dry open hills. It is rare in our gardens, and kept in the greenhouſe, where it blooms about July. The *ſtem* is ſomewhat ſhrubby. *Leaves* moſt hoary beneath; the floral ones gradually ſhortened, and extremely dilated at their baſe. *Flowers* yellow, remarkable for the copious, long, ſimple, ſilky hairs, which clothe their *bracteas* and *calyx*. When Linnæus wrote that "the *flowers* are ſcarcely bigger than the *calyx*," he ſeems to have adverted to the *floral leaves*, which in his ſpecimen are about the length of the *flowers*.

6. Ph. *crinita.* Thick-leaved Hairy Phlomis. Cavan. Ic. v. 3. 25. t. 247. Willd. n. 9.—Leaves heart-ſhaped, obſcurely crenate, denſely woolly; floral ones ovate. Bracteas ſetaceous, clothed, like the calyx, with long compound hairs.—Found by Cavanilles on hills in Spain, growing along with *Ph. purpurea.* The *ſtem* is herbaceous. *Leaves* very thick and woolly on both ſides, ſnow-white, heart-ſhaped, acute, finely crenate, on longiſh woolly *ſtalks.* *Flowers* pale orange, in numerous whorls, accompanied by ſeſſile ovate *leaves*, leſs denſely woolly than the proper foliage. *Bracteas* and *calyx* thickly clothed with long, compound, entangled hairs.

7. Ph. *ſamia.* Samian Phlomis. Linn. Sp. Pl. 819. Willd. n. 8. Ait. n. 5. Sm. Prodr. Fl. Græc. Sibth. n. 1378. Fl. Græc. t. 564, unpubl. Venten. Choix, t. 4. Andr. Repoſ. t. 584. Desfont. Atlant. v. 2. 25. (Ph. ſamia herbacea, lunariæ folio; Tourn. Cor. 10.)—Leaves heart-ſhaped, crenate, downy beneath. Bracteas in three deep, awl-ſhaped, ſpinous ſegments, the length of the calyx.—Native of Greece and the north of Africa. Miller cultivated it, but his plants were killed by the froſt of 1740. Dr. Sibthorp reſtored this fine plant to the Oxford garden. The *root* is perennial, and ſurvives our ordinary winters in the open ground. *Stem* herbaceous, three feet or more in height, erect, ſtraight, quadrangular, hairy. *Leaves* heart-ſhaped, dark green and hairy above, more woolly, and paler, beneath; the radical ones a ſpan long, on ſtalks of a ſtill greater length. *Flowers* dull purple, large, in ſeveral denſe leafy whorls. *Calyx* ſpinous. The deeply three-cleft narrow *bracteas* conſtitute an important character. The information of Desfontaines, that the ſynonym of Tournefort belonged to a very different plant, induced us in the Prodr. Fl. Græc. to transfer that ſynonym to the next ſpecies; but Ventenat has aſſerted that ſuch information was founded in error, and we here correct our

miſtake. We are certain of the plant of Linnæus and Sibthorp.

8. Ph. *lunarifolia*. Honeſty-leaved Phlomis. Sm. Prodr. Fl. Græc. Sibth. n. 1379; excluding Tournefort's ſynonym.—Leaves heart-ſhaped, crenate, downy beneath. Bracteas ovato-lanceolate, undivided, ſpinous, fringed with tufts of hairs.—Gathered by Dr. Sibthorp in Greece, and on Mount Athos. Like the laſt in general appearance, but diſtinguiſhed by its broad undivided *bracteas*, which are denſely fringed with cluſters of briſtly hairs. Teeth of the *calyx* rigid and ſpinous, ſpreading horizontally. The *corolla* appears to be yellow.

9. Ph. *biloba*. Cloven Phlomis. Desfont. Atlant. v. 2. 25. t. 127. Willd. n. 10.—Leaves ovate, hoary, nearly entire. Bracteas linear, hairy, as well as the deeply five-cleft calyx. Upper lip of the corolla deeply divided.—Gathered by Desfontaines, near Mayane on Mount Atlas. *Root* perennial. *Stems* herbaceous, erect, two or three feet high, woolly, with four obtuſe angles. *Leaves* rugoſe, ovate, or ovate-oblong, ſcarcely crenate, clothed with ſhort, branched, hoary hairs; the lowermoſt ſtalked. *Flowers* purple, few together, in numerous leafy whorls. *Bracteas* very narrow, undivided, clothed with long denſe hoary hairs, and about as long as the *calyx*, which is ſimilarly clothed, and divided half way down, into five upright lanceolate ſegments. The upper lip of the *corolla* is compreſſed, as in all the genuine ſpecies of *Phlomis*, but remarkable for being often divided lengthwiſe to the very bottom.

10. Ph. *pungens*. Needle-pointed Phlomis. Willd. n. 11. (Ph. orientalis, hormini folio, flore minore, calyce glabro; Tourn. Cor. 10. Ph. hormini folio anguſtiore, ſubtùs incano, flore minori purpuraſcente; Amm. Ruth. 41.)—Leaves oblong-lanceolate, ſerrated towards the point; rough above; downy beneath; the upper ones entire. Bracteas awl-ſhaped, deeply three-cleft. Teeth of the calyx horizontal, awl-ſhaped, pungent.—Native of Armenia, Perſia, and Siberia. *Root* perennial. *Stems* obtuſely quadrangular, purpliſh, with many oppoſite leafy *branches*, clothed with minute ſtarry pubeſcence. *Leaves* on ſhort ſtalks, ſpreading, two or three inches long, the lower ones only partly ſerrated; all green and rough above; clothed with hoary ſtellated pubeſcence beneath. *Flowers* purple, in numerous whorls. *Calyx* hoary; ſometimes rather hairy. *Bracteas* in three deep awl-ſhaped ſegments, like thoſe of *Ph. ſamia*. Linnæus conſidered this as not ſpecifically diſtinct from the following, in which opinion he may poſſibly be correct, though the breadth, as well as ſerratures, of their *leaves*, appear conſiderably different.

11. Ph. *Herba venti*. Rough-leaved Phlomis. Linn. Sp. Pl. 819. Willd. n. 12. Ait. n. 6. Sm. Fl. Græc. Sibth. t. 565, unpubl. (Herba venti; Lob. Ic. 532. Marrubium nigrum longifolium; Ger. Em. 701.)—Leaves ovate-oblong, ſerrated; rough above; downy beneath. Bracteas awl-ſhaped, deeply three-cleft, hairy, as well as the ſtem. Calyx hairy, its teeth awl-ſhaped, pungent, ſpreading.—Native of hedges and banks, in Spain, Italy, and the ſouth of France, as well as in Greece and Aſia Minor. It is hardy with us, flowering in July and Auguſt. The *leaves* are furniſhed with numerous cloſe ſerratures, and their form is ovate, at leaſt at the baſe. Whole plant larger than the laſt, and more hairy, eſpecially the *bracteas* and *calyx*. The teeth of the latter appear to us ſcarcely leſs ſpreading than in the foregoing. The upper lip of the *corolla* is conſiderably cloven.

This is the laſt of the true and indubitable ſpecies of this genus. The following recede ſomewhat from the proper character, having an oval, not compreſſed, upper lip, ſingularly briſtly within, approaching in their *corolla*, as well as habit, to LEONURUS; ſee that article. They ſeem however to have the unequal *ſtigma*, as well as the proper *calyx* and *bracteas* of *Phlomis*.

12. Ph. *laciniata*. Jagged-leaved Phlomis. Linn. Sp. Pl. 819. Willd. n. 7. Ait. n. 8. (Ph. orientalis, foliis laciniatis; Tourn. Cor. 10.)—Leaves alternately pinnate; leaflets laciniated. Calyx abrupt, woolly, with ſpinous upright teeth.—Gathered by Tournefort in the Levant. Miller cultivated it in 1731, but we much fear this handſome plant is loſt to our gardens, nor do we any where find a figure of it. The *root* is either biennial, or perennial. *Stem* two or three feet high, ſquare, woolly. *Leaves* chiefly radical, a foot long, nearly ſmooth, pinnate, deeply but obtuſely jagged and toothed, on long ſtalks. *Flowers* in numerous, looſely but copiouſly woolly, whorls. *Bracteas* linear-lanceolate, with ſpinous points; they appear to us ſimple. *Corolla* large, purple; its upper lip ſhaggy, lined with denſe, ſtraight, ſhining, parallel hairs, projecting beyond the margins.

13. Ph. *tuberoſa*. Tuberous Phlomis. Linn. Sp. Pl. 819. Willd. n. 14. Ait. n. 7. Schkuhr. Handb. v. 2. 160. t. 163. (Galeopſis maxima, foliis hormini; Buxb. Cent. 1. 4. t. 6.)—Radical leaves heart-ſhaped, rough; three-ribbed at the baſe: floral ones lanceolate, almoſt entire. Bracteas deeply three-cleft, awl-ſhaped, briſtly. Stem herbaceous, ſmooth.—Native of fields in Siberia. Buxbaum found it about hedges in Iberia, flowering in June. Miller cultivated this ſpecies, and it is marked by Mr. Aiton a hardy perennial, flowering from June to October. The *root* ſhould ſeem by the name to be tuberous. *Stem* a foot high, ſquare, ſmooth, purple. Radical *leaves* on long ſtalks, heart-ſhaped, acute, ſtrongly crenate, ſix inches long, and four broad, veiny, roughiſh; paler beneath; remarkably hollowed out at the baſe up to the ſide ribs. *Flowers* numerous, light purple, in many denſe whorls, accompanied by lanceolate, wavy, ſcarcely crenate, ſomewhat haſtate, ſmooth, ſtalked *leaves*. *Bracteas* very narrow, rough with horizontal briſtles. *Calyx* ſlightly angular, ſmooth, except at the margin and teeth, which laſt are lanceolate and ſpreading. Upper lip of the *corolla* downy, with a toothed or jagged edge, and denſe prominent internal hairs. Theſe *flowers* are but one-third the ſize of the laſt.

14. Ph. *alpina*. Alpine Phlomis. Pallas in Act. Petrop. for 1779. v. 2. 265. t. 13. Willd. n. 13. (Ph. hormini folio, floribus parvis, ſuavè rubentibus, villoſiſſimis; Amm. Ruth. 39.)—Radical leaves heart-ſhaped, downy; floral ones lanceolate, ſerrated. Bracteas deeply three-cleft, linear-awl-ſhaped, hairy, as well as the ſtem.—Native of the Altaic mountains, and various parts of Siberia, in a rich ſoil, flowering in June and July. Linnæus conſidered this as not diſtinct from his *tuberoſa*. His ſpecimen wants the radical *leaves*, but the floral ones are very unlike thoſe of the preceding, being much larger, and very deeply as well as ſharply ſerrated. The *bracteas* are ſomewhat broader, and much more hairy. *Flowers* large, the edge of their upper lip deeply jagged. The *root* is ſaid to be fibrous, and the *ſtem* ſometimes above five cubits high; both very remarkable differences from the humble *Ph. tuberoſa*. The downineſs of the *ſtem* is but ſlight in our plant, which was gathered by Gerber in the deſerts of Tula, Jebz, &c. towards mount Taurus.

PHLOMIS, in *Gardening*, contains plants of the ſhrubby and under-ſhrubby evergreen kinds, of which the ſpecies cultivated are; the ſhrubby phlomis, or Jeruſalem ſage (P. fruticoſa); the ſharp-leaved purple phlomis (P. purpurea); the blunt-leaved purple phlomis (P. italica); the ſage-leaved phlomis (P. lychnitis); the jagged-leaved phlomis (P. laciniata); the tuberous phlomis (P. tuberoſa); the white phlomis (P. zeylanica); the cat-mint-leaved phlomis (P. nepetifolia); the narrow-leaved phlomis, or lion's-tail (P. leonurus); and the dwarf ſhrubby phlomis (P. leonitis).

There are of the firſt ſort two varieties; the narrow-leaved ſhrubby phlomis, or Jeruſalem ſage, which does not riſe ſo high as the other variety; the branches are weaker; the leaves longer, narrower, and rounder; the whorls of flowers ſmaller; but the flowers of the ſame ſhape and colour. Theſe have been long cultivated under the title of French ſage, &c.

The broad-leaved ſhrubby phlomis has a ſhrubby ſtalk, ſending out branches on every ſide; the leaves hoary, broader than the former, of an oblong ovate form, on pretty long footſtalks, and whiter; the whorls large, with bigger flowers, the upper lip of which is very hairy.

Of the ninth ſort there is a variety with variegated leaves.

Method of Culture.—All theſe plants may be increaſed by layers and cuttings. The two firſt hardy ſorts in particular grow freely by the firſt method; the young branches ſhould be choſen, and laid in the common way, any time in autumn, ſpring, or ſummer; when they readily ſtrike root, and commence proper plants by the autumn following, when they ſhould be planted where they are to grow.

The cuttings ſhould be made from the young ſhoots in ſpring and ſummer, being planted in a ſhady border, giving plenty of water in dry weather; when many of them will take root, and make good plants by the autumn following. The cuttings of the greenhouſe kinds ſhould, when made in the ſpring, be planted in pots, in order to be continued in ſhelter until May; or if the pots be plunged in a hot-bed, it will greatly forward their rooting; though, when the young ſhoots are planted in June or July, in a bed or border of rich earth, many of them take root, but may be much forwarded if covered down cloſe with hand glaſſes, removing the glaſſes when the cuttings begin to ſhoot.

The fifth may likewiſe be increaſed by ſlips planted at the ſame time; and the ſixth by offſets. The ſeventh ſhould be preſerved in the bark-ſtove.

Theſe are all very ornamental plants in the borders, greenhouſe, and ſtove collections, according to the kinds.

PHLOMON STEPHANOMATICON, in the *Botanical Writings of the Ancients*, a name given to the common white mullein. The upper part of the thyrſus, or ſpike of flowers of this plant, was frequently uſed in the garlands and coronæ of the ancients; and it is named by Dioſcorides and others among the yellow flowers in general uſe on that occaſion.

PHLORGIA, in *Ancient Geography*, a town of Africa, in Mauritania Cæſarienſis. Ptolemy.

PHLOX, in *Botany*, an American genus of plants, on which Linnæus has, apparently with great impropriety, beſtowed an ancient Greek name. Neverthelеſs, the aſſociation of ideas which ſeems to have induced this meaſure, may well excuſe it. The φλοξ of Theophraſtus is ſuppoſed by Dodonæus to be the *Viola tricolor;* but moſt critics have referred it to ſome kind of *Lychnis*, or *Agroſtemma;* and the name, which is ſynonimous with *flame*, has been imagined to allude to the bright or fiery hue of the flowers. A recent French author, De Théis, even aſſerts that the appellation in queſtion was given, by modern botaniſts, to the genus that now bears it, on account of the flame-colour of one of its ſpecies. For this we find no authority. The genus was termed *Lychnidea* by Plukenet and Dillenius, becauſe of its reſemblance to *Lychnis*. But a name ſo conſtructed being againſt rule, Linnæus evidently took up the idea of λυχνιν, as alluding either to the ſhape or to the wick of a lamp, (ſee LYCHNIS and PHLOMIS,) and adopted *Phlox* as a word nearly expreſſive of the ſame thing.—Linn. Gen. 86. Schreb. 115. Willd. Sp. Pl. v. 1. 839. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 1. 324. Juſſ. 136. Lamarck Illuſtr. t. 108. Michaux Boreal-Amer. v. 1. 142. Gærtn. t. 62.—Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Rotaceæ*, Linn. *Polemonia*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, with five angles, and five deep acute teeth, permanent. *Cor.* of one petal, ſalver-ſhaped: tube cylindrical, longer than the calyx, contracted downwards, incurved; limb flat, in five deep, equal, obtuſe ſegments, ſhorter than the tube. *Stam.* Filaments five, capillary, within the tube of the corolla, two of them longer, and one ſhorter, than the reſt; anthers in the throat of the corolla. *Piſt.* Germen ſuperior, conical; ſtyle thread-ſhaped, the length of the ſtamens; ſtigma in three acute ſegments. *Peric.* Capſule ovate, with three angles, three cells, and three valves. *Seeds* ſolitary, ovate. *Recept.* central, large, with three prominent angles.

Eſſ. Ch. Corolla ſalver-ſhaped. Stamens unequal. Stigma three-cleft. Calyx priſmatic. Capſule of three cells. Seeds ſolitary.

A handſome tribe of hardy, perennial, herbaceous, entire-leaved plants, valuable in our gardens for their copious ſhowy flowers, which are adorned with various hues of purple or pink, and in one inſtance are of a brilliant white. The 14th edition of Linn. Syſt. Veg. contains ten ſpecies. Willdenow has twelve; the recent edition of Ait. Hort. Kew. fourteen. All, except *Ph. ſibirica*, are natives of North America, and, as far as we know, of no other country.—Michaux has ten ſpecies only in his *Flora*, and three of thoſe are not cited by the above authors. He calls them *triflora*, *latifolia*, and *ariſtata*. They are each probably referrible to ſome one or other known ſpecies, though we cannot preciſely aſcertain to which they belong. The following examples will ſuffice.

Ph. *paniculata*. Great Common Phlox, or Panicled Phlox. Linn. Sp. Pl. 216. Willd. n. 1. Ait. n. 1. Mill. Ic. t. 205. f. 2. (Lychnidea folio ſalicino; Dill. Elth. v. 1. 205. t. 166. f. 203.)—Leaves lanceolate, flat, rough-edged. Stem ſmooth. Corymbs panicled, denſe, many-flowered. Segments of the corolla rounded.—Native of North Carolina. Cultivated in the Eltham garden in 1732, and now common in every border and ſhrubbery, flowering in Auguſt. It requires frequent ſupplies of water to appear to advantage; but in a favourable ſoil the *ſtems* are three or four feet high, crowned with immenſe cloſe tufts of innumerable bloſſoms of a fine lilac hue, without ſcent, which continue in beauty for above a month.

Ph. *ſuaveolens*. White Phlox. Ait. Hort. Kew. ed. 1. v. 1. 206. ed. 2. n. 3. Willd. n. 3.—Leaves ovato-lanceolate, ſmooth in every part. Stem very ſmooth. Cluſter panicled.—Introduced from North America about 1766, by the celebrated P. Collinſon. It is an elegant hardy perennial, requiring rather a moiſt ſoil to be laſting, and flowering in July or Auguſt. The *root* is ſomewhat creeping. *Stems* but half the height of the former, and the *flowers* much leſs numerous, though larger. Their delicate fragrance, and pure brilliant whiteneſs, render the plant very deſirable. The *flower-ſtalks* are finely downy, as in the former.

Ph. *pyradimalis*. Pyramidal Phlox. Donn. Cant. ed. 5. 39. Ait. n. 5. Sm. Exot. Bot. v. 2. 55. t. 87. (Lychnidea mariana, &c.; Pluk. Almag. 122.)—Leaves ovate or heart-ſhaped, pointed, ſmooth. Stem rough. Flowers in a denſe pyramidal cluſter. Calyx-teeth nearly ſtraight.—Introduced from North America by Meſſrs. Lee and Kennedy, before the year 1800. The purple-ſpotted ſtem, and denſe pyramidal *cluſter* of rich purple honey-ſcented *flowers*, render this a very ornamental ſpecies. We ſuſpect it to be what is figured in Jacq. Hort. Vind. v. 2. t. 127, for the Linnæan *maculata*, a more ſlender and narrow-leaved ſpecies, frequent in gardens, diſtinguiſhed by the recurved teeth of its *calyx*. Miller ſent Linnæus a ſpecimen of our *pyramidalis*, with the above ſynonym of Plukenet, and perhaps had the plant growing.

Ph. *divaricata*. Early-flowering Phlox. Linn. Sp. Pl. 217. Willd. n. 8. Ait. n. 9. Curt. Mag. t. 163. Mill. Ic. t. 205. f. 1.—Leaves broadly lanceolate; the uppermoſt alternate. Stem divided. Flower-ſtalks in pairs.—This pretty ſpecies was introduced in Miller's time, and ſtill continues to ornament the Chelſea garden profuſely, flowering in May. We believe it requires, like the reſt of the genus, a rather moiſt ſoil, and hence is not ſo well calculated, as has been ſuppoſed, to adorn rock-work. The *ſtem* is about a foot high, roughiſh, as well as the *leaves*. *Flowers* diſtinguiſhed by a peculiar light, but brilliant, greyiſh-blue; the buds being of a violet hue. The ſegments of the *corolla* are inverſely heart-ſhaped, tapering at their baſe.

Ph. *ſtolonifera*. Creeping Phlox. Sims in Curt. Mag. t. 563. Ait. n. 11. (Ph. reptans; Michaux Boreal-Amer. v. 1. 145. Vent. Malmaiſ. t. 107.)—Scyons creeping. Leaves obovate, ſomewhat ſpatulate.—Found by the late Mr. J. Fraſer in Georgia. Michaux ſays it grows on lofty mountains, in the weſtern part of Carolina. It is ſuppoſed to be hardy, flowering from June to September, and was expected to prove a valuable plant for rock-work; but whether for want of due ſupplies of water, or from any other cauſe, we have not found it laſting. The copious rough leafy *ſhoots* from the *root* trail and throw out radicles in every direction. From the crown ariſes an erect *ſtem*, a ſpan high, bearing a cymoſe *panicle*, of ſeveral handſome deep-blue *flowers*, with orange *anthers*.

Ph. *ovata*. Ovate-leaved Phlox. Linn. Sp. Pl. 217. Willd. n. 9. Ait. n. 12. Curt. Mag. t. 528. (Lychnidea fiſtuloſa marilandica, clinopodii vulgaris ſolio, flore amplo ſingulari; Pluk. Mant. 122. Phyt. t. 348. pl. 4.)—Radical leaves ovate, acute, ſomewhat fleſhy, ſmooth; ſtem-leaves ovato-lanceolate. Corymbs level-topped.—Sent by Peter Collinſon to Linnæus, who by a ſtrange inadvertency deſcribed the flowers as ſolitary. To this he ſeems to have been led, rather by an attention to Plukenet's ſtarved figure, than to his own ſpecimen, in which latter they are abundant. This is one of the handſomeſt ſpecies, and diſtinguiſhed by its thick ſmooth ovate *leaves*, of which the uppermoſt, often narrower than the reſt, aſſume a likeneſs to thoſe of Privet. The *calyx-teeth* have taper points. The *corolla* is large, of a fine purple, externally pale. We have never ſeen it of ſo rich a crimſon as is exhibited in the Botanical Magazine.

Ph. *ſetacea*. Fine-leaved Phlox. Linn. Sp. Pl. 217. Willd. n. 12. Ait. n. 14. Curt. Mag. t. 415. (Lychnidea, &c.; Pluk. Phyt. t. 98. f. 3.)—Leaves awl-ſhaped, ſlender, ſmooth; fringed at the baſe. Flower-ſtalks elongated.—Native of Carolina, from whence Mr. Fraſer brought plants in 1786. It flowers in April and May, but requires the protection of a frame in winter. The long weak *ſtems* require ſupport; they are ſlightly hairy, clothed with numerous ſlender ſhining *leaves*, like thoſe of a *Stellaria*. *Flowers* at the ends of the branches, on long ſlender hairy *ſtalks*. *Corolla* of a beautiful light purple, with a dark eye, the ſegments jagged at the end.

This and the other ſlender-leaved ſpecies, *ſubulata* and *ſibirica*, are nearly akin, but the latter, at leaſt, is clearly diſtinct. We have never ſeen it but in the Linnæan herbarium.

Ph. *pinnata*. Cavan. Ic. v. 6. 17. t. 528. f. 1, ſent by the author, appears to us rather an IPOMOPSIS; ſee that article. The pinnate *leaves*, and the membranous *calyx*, do not accord with *Phlox*.—Ph. *linearis*, t. 527 of the ſame work, is very like the Linnæan *piloſa*.

PHLOX, in *Gardening*, compriſes plants of the herbaceous, fibrous-rooted, flowery, perennial kind, of which the ſpecies cultivated are; the panicled lychnidea (P. paniculata); the white-flowered lychnidea (P. ſuaveolens); the ſpotted-ſtalked lychnidea (P. maculata); the hairy-leaved lychnidea (P. piloſa); the Carolina lychnidea (P. carolina); the ſmooth lychnidea (P. glaberrima); and the early-flowering lychnidea (P. divaricata).

Method of Culture.—Theſe are generally inceeaſed by parting their roots, as they do not often produce ſeeds in this climate. The beſt time for performing this is in autumn, when the ſtalks begin to decay. The roots ſhould not, however, be divided into too ſmall heads, when they are expected to flower well the following ſummer; nor ſhould they be parted oftener than every other year, as, when they are too often removed and parted, it greatly weakens the roots, ſo that they ſend out but few ſtalks, and thoſe ſo weak, as not to riſe their uſual height, and the bunches of flowers are much ſmaller.

The large root offſets may be planted out at once where they are to remain; but the ſmall ones in nurſery-rows, for further increaſe in ſize. As ſoon as the roots are parted and removed, it is a good way to lay ſome old tan, or mulch, upon the ſurface of the ground about their roots, to prevent the froſt from penetrating; for, as they will have put out new roots before winter, the froſt, when it is ſevere, often kills the fibres, whereby the plants ſuffer greatly, and are ſometimes wholly deſtroyed.

The firſt and ſixth ſorts may be increaſed pretty expeditiouſly by their ſpreading roots, but the others but ſlowly this way; of courſe it is a better method to have recourſe to cuttings. The beſt ſeaſon for planting the cuttings is about the end of April, or the beginning of the following month, when the young ſhoots from the roots, which are about two inches high, ſhould be cut off cloſe to the ground, and their tops ſhortened, being then planted on a border of light loamy earth, and ſhaded from the ſun until they have taken root; or if they are planted pretty cloſe together, and covered with bell or hand-glaſſes, or in pots, ſhading them every day from the ſun, they will put out roots in five or ſix weeks; but on their beginning to ſhoot, the glaſſes ſhould be gradually raiſed to admit the free air to them, otherwiſe they are apt to draw up weak, and ſoon ſpoil: as ſoon as they are well rooted, the glaſſes ſhould be taken off, and the plants inured to the open air; being ſoon afterwards removed into a bed of good ſoil, planting them about ſix inches diſtance every way, ſhading them from the ſun, and watering till they have taken new root; after which, when kept clean from weeds, they require no other care till autumn, when they ſhould be removed into the borders or other parts, where they are deſigned to remain.

When ſome of the plants are put into pots, and ſheltered under a hot-bed frame in winter, they flower ſtronger the following ſummer.

Theſe plants ſucceed beſt in a moiſt, rich, mellow ſoil, growing taller, and flowering more ſtrongly, and in larger bunches. In poor dry ſoils they often die during the ſummer, when not conſtantly watered with care.

Some of the plants afford ornament in the borders, clumps, and other parts of pleaſure grounds; and thoſe planted into pots to be placed in court-yards, or other places near the habitation, when they are in beauty, and being mixed with other flowers, are highly ornamental, having a fine effect.

PHLYACOGRAPHIA, formed from φλυαζειν, *to trifle*, or φλυαξ, *trifler*, of φλυω, among the *Ancients*, a merry and burleſque imitation of ſome grave and ſerious piece; particularly a tragedy traveſted into a comedy.

The phlyacographia was the ſame thing with the *hilarodia*, or *hilarotragedy*.

There were ſeveral kinds of phlyacography, which had their ſeveral names. See Salmaſius on Solin.

The parodies which have been made of ſome parts of the beſt poets, as the Virgil Traveſty of Scarron and Cotton; the Rival Queens of Cibber, from the Rival Queens of Lee; and ſome pieces of operas, the muſic of which is applied to low and ridiculous words, are comprehended under the notion of phlyacographies.

PHLYCTÆNÆ, φλυκταιναι, in *Medicine*, and ſometimes *Phlyſtænæ*, from φλυω, *I am hot*, ſeem to have ſignified, in the writings of the ancients, all ſmall, inflamed elevations of the ſkin, containing a fluid, ſuch as puſtules, veſicles, blains, &c. By the tranſlators of the Greek writers, the term is generally rendered *puſtules*. *Phlyctænæ* are now, however, generally conſidered to be *veſicles*, that is, ſmall elevations of the cuticle, containing a *watery* fluid, and not *pus*. Hippocrates ſpeaks of phlyctænæ in one or two places, as containing a thin ſanious humour, of an acrimonious quality. (Progn. ii. 60. Epid. l. ii. ſect. i. 5.) And ſome writers have called thoſe veſicles only phlyctænæ, which have a livid baſe.

Phlyctænæ alſo denote little ulcerous veſicles, ariſing ſometimes on the adnata, and ſometimes on the cornea of the eye, like ſo many little bladders full of water: they are popularly called *bliſters in the eyes*.

They appear like grains of millet; and, when produced by a ſharp corroding humour, occaſion violent pain: the puſtules on the adnata are red; thoſe on the cornea are blackiſh, if near to the ſurface; but whiter, if deeper. They are cured by diſcutients and driers.

PHLYCTIS, more commonly uſed in the plural, *phlyctides*, from the ſame root, ſignifies ſmaller veſicles, which uſually cluſter together upon a circular inflamed baſe, the contained ſerum being ſometimes clear and pellucid, and ſometimes milky, whey-like, or pearl-coloured.

PHLYSIS, a term uſed by the ancients to expreſs an eruption on the ſkin, from a redundance of humours.

PHLYSTÆNÆ. See Phlyctænæ.

PHLYZACIUM, φλυζακιον, from φλυω, or φλυζω, *fervere, ebullire, to be hot*, or *to bubble*, a hot and inflamed puſtule on the ſkin. (See Celſus, De Medicinâ, lib. v. cap. 28. § 15.) In attempting to eſtabliſh a more definite nomenclature for the diſeaſed appearances of the ſkin, Dr. Willan appropriated the term *phlyzacium* to one of four varieties of puſtules, and defined it in theſe words: "a puſtule commonly of a large ſize, raiſed on a hard circular baſe, of a vivid red colour, and ſucceeded by a thick, hard, dark-coloured ſcab." See Willan on Diſ. of the Skin, p. i; and Bateman's Practical Synopſis of Cutan. Diſeaſes, p. xxi.

PHOBEROS, in *Botany*, φοβερος, *formidable*, in alluſion to the thorns.—Loureir. Cochinch. 317.—Claſs and order, *Icoſandria Monogynia*. Nat. Ord. . . .

Gen. Ch. *Cal.* Perianth inferior, permanent, in ten ovate, concave, ſpreading ſegments; five alternate ones twice the ſize of the others. *Cor.* none. *Stam.* Filaments near 100, capillary, inſerted into the baſe of the calyx, longer than its ſegments; anthers very ſmall, nearly ovate. *Piſt.* Germen ſuperior, roundiſh; ſtyle thick, the length of the ſtamens; ſtigma thickiſh. *Peric.* Berry ovate, fleſhy, ſmooth, of one cell. *Seeds* about four, nearly ovate.

Eſſ. Ch. Calyx inferior, in ten ſegments. Corolla none. Berry of one cell, with about four ſeeds.

1. Ph. *cochinchinenſis*. Lour. n. 1.—Whole ſtem prickly. Flower-ſtalks terminal.—Native of Cochinchina, where it forms impervious hedges. *Stem* ſhrubby, woody, ten feet high, erect, covered with long, ſtraight, awl-ſhaped, axillary, ſolitary *prickles*. *Leaves* alternate, ovate, flat, hard, ſmooth, ſomewhat ſerrated. *Stalks* terminal, each bearing many white *flowers*.

2. Ph. *chinenſis*. Lour. n. 2.—Lower branches prickly, barren; upper unarmed, flowering.—Native of China, where hedges are made of it, like the foregoing. *Stem* ſhrubby, woody, erect, eight feet high. *Branches* ſpreading; the lower ones only armed with long, ſtraight, moſtly ſolitary prickles. *Leaves* partly ſcattered, partly oppoſite, ſtalked, ovate, entire, flat, ſmooth. *Flowers* pale, many together, on lateral *ſtalks*, from the upper *branches*. *Berry* fleſhy, ſmall, ovate, with few *ſeeds* in its ſolitary cell.—Such is Loureiro's account, the only information we have reſpecting theſe plants. He cites under the 2d Oxyacantha javanica; Rumph. Amboin. auctuar. 39. t. 19. f. 3. This author ſpeaks of the fruit as unwholeſome, cauſing vertigo, and the wounds cauſed by the thorns are ſaid to be dangerous. The plant ſerves for hedges in Java. Rumphius mentions a ſpecies or variety with longer ſpines, which makes formidable walking-ſticks for thoſe who go abroad by night.

PHOBOS, Fear, in *Mythology*, was perſonified by the Greeks, and repreſented with the head of a lion. See Fear.

PHOCA, the *Seal*, in *Zoology*, a genus of the claſs and order Mammalia Feræ. The generic character is as follows: the fore-teeth are acute; the ſix upper teeth are parallel, the outer ones are larger; the lower ſix are parallel, diſtinct, equal, and rather obtuſe; the tuſks are twice as long, acute, robuſt, ſolitary, the upper are remote from the fore-teeth, the lower form the grinders. There are five or ſix grinders which are narrow and tricuſpidate. There are nineteen ſpecies, beſides varieties. This is a dirty, quarrelſome tribe, eaſily tamed, and polygamous; the fleſh is ſucculent, tender, and fat; the ſkin is uſeful; the animals inhabit and ſwim under water; they crawl on land with difficulty, becauſe of their retracted fore feet, and united hind feet; they feed on fiſh and marine productions, and ſwallow ſtones to prevent hunger, by diſtending the ſtomach.

Species.

Ursina; Urſine Seal. The ſpecific character of this is; head with external ears. It inhabits Kamtſchatka, New Zealand, and the adjacent iſlands; ſwims impetuouſly in large families; copulates on ſhore; is fearleſs, biting at whatever is thrown at it; the old ones live by themſelves, and grow very fat; each has a peculiar ſtone for its bed, which it never deſerts; the males fight fiercely for their females and ſtations; their combat is ſingle and fair, two never fighting againſt one; when grieved it ſheds tears abundantly. This is one of the larger ſeals, growing to the length of eight feet, and weighing ſeven or eight hundred pounds. The female is much leſs. Though they lie by thouſands on the ſhore, each family keeps itſelf ſeparate from the reſt, and is ſometimes ſo numerous as to amount to above an hundred. Urſine ſeals are ſeen from June to September, during which time they breed and educate their young. In September they quit their ſtations on the iſlands, and return, ſome to the Aſiatic, and ſome to the American ſhore; but are generally confined to a ſpace in thoſe ſeas between lat. 50° and 56°. They are ſo tenacious of life, as to live a fortnight after receiving ſuch wounds as would inſtantly deſtroy almoſt any other animal.

Leonina; Bottle-noſed Seal. The body of this is brown; the head is creſted on the fore part. It has two teeth in the lower jaw, a little projecting; the eyes are large; the whiſkers white, annulate with red; all the feet are palmate; and there are five toes on each, with nails growing out behind the tip; hind feet ſtretched back; with a tail between, two inches long. There is a pretty good ſpecimen of this ſpecies in the Britiſh Muſeum, which formerly belonged to the Royal Society. It inhabits the ſeas about New Zealand, the iſland of Juan Fernandez, and the Falkland iſlands. During the breeding ſeaſon they are ſeen in great numbers attending their young on the ſhore; they bring two young at a birth: the females are exceſſively fierce during the time of rearing their young; towards evening both the male and female ſwim out a little way to ſea, the female bearing the young on her back, which it is ſaid the male frequently puſhes off, in order to oblige them to eſſay their ſwimming powers. On the arrival of theſe animals on the breeding iſlands, they are ſaid to be ſo exceſſively fat as to reſemble ſkins of oil; the tremulous motion of the blubber being plainly perceivable beneath the ſkin. A ſingle ſeal of this ſpecies has been known to yield a butt of oil, and to be ſo full of blood, that what has run out has filled two hogſheads. The fleſh is eatable.

Jubata; Maned Seal. The neck of the male is covered with a mane of looſe floating hair. It is of a reddiſh colour; the young more duſky, in the female more vivid; it is larger than the P. leonina, being about twenty-five feet long, and ſometimes weighing 1600lbs. The animals of this ſpecies inhabit the Penguin and Seal iſlands, near Cape Deſire, on the coaſt of Patagonia, and are found within the Magellanic ſtraits, and on the Falkland iſlands, but they have not been diſcovered in any other part of the ſouthern hemiſphere, or in any other place nearer than the ſea between Kamtſchatka and America. They live in families diſtinct from the Urſine and other ſeals, though their manners are nearly the ſame. The males utter a ſnorting ſound, and occaſionally roar like bulls; the voice of the females reſembles that of calves, and the young bleat like lambs.

Vitulina; Sea Calf. The head of this ſpecies is without ears; the neck is ſmooth; the body is brown. There are three other varieties.

(1) *Botnica*, in which the noſe is broader; the claws longer; the colour more obſcure.

(2) *Sibirica;* colour ſilvery. It inhabits the lakes of Baikal and Oron.

(3) *Caſpica;* the colour of this is various.

Whiſkers undulate; the eyes have a nictitant membrane; the cryſtalline humour is globular; the tongue is bifid. The legs are ſo very ſhort as to be ſcarcely perceptible; and the hinder ones are ſo placed as to be only of uſe to the animal in ſwimming, or but very little to aſſiſt it in walking; being ſituated at the extremity of the body. When theſe animals collect together in great numbers on the ſhore, they diffuſe a very ſtrong and diſagreeable ſmell, a fact that is noticed by Homer, who repreſents Menelaus relating his adventure on the iſle of Pharos, where he was conſtrained to lie for a time among a flock of ſeals, diſguiſed in the ſkin of one of theſe animals. The ſtructure of the ſeal is ſo ſingular, that, as Buffon obſerves, it was a kind of model on which poets formed their tritons, ſirens, and ſea-gods, with a human head, the body of a quadruped, and the tail of a fiſh. The ſeal is poſſeſſed of a conſiderable degree of intelligence, and may be tamed, ſo as to become perfectly familiar with thoſe to whoſe care it is committed; and even to exhibit tricks and geſticulations. The ſeal is ſuppoſed to be a very long lived animal. Like other quadrupeds, they have various inflexions of the voice, according to the paſſions with which they are inſpired. They are ſaid, however, to differ from them in this, that they delight in thunder ſtorms, and at ſuch periods to ſit on rocks and contemplate with ſeeming delight the convulſions of the elements.

Monachus; Hooded Seal. Head without ears; there are four fore-teeth in each jaw; the fore feet are undivided; the hind feet without nails. This ſpecies has obtained the name of Monachus, or cowled ſeal, from the looſeneſs or width of the ſkin behind the neck, which, when the animal is placed on its back, folds like a monk's cowl. It inhabits the Mediterranean, about the coaſt of Dalmatia, growing to the length of more than eight feet. The head is ſmall, the neck longer than that of the common ſeal; the orifices of the ears not larger than a pea; the hair is ſhort and rude; the colour is duſky, ſpotted with aſh-colour; the toes on the fore feet have nails; but the hind feet reſemble fins, and have no nails. This ſpecies is fully and accurately deſcribed in the 4th vol. of the Berlin Tranſactions.

Grenlandica; Harp Seal. Head ſmooth, without ears; body grey; a lunulate black mark on the ſides. It inhabits Greenland and Newfoundland; it is highly eſteemed on account of the excellence of its ſkin, and the quantity of oil which it yields.

Hispida; Rough Seal. Head ſmooth without; body pale brown, rough, with briſtly hairs. It inhabits Greenland and Labrador, feeds on ſhrimps and ſmall fiſh; it often ſleeps on the ſurface of the water; the fleſh is red and nauſeous; it is only about four feet long. A variety is much larger, and weighs perhaps 500lbs.

Cristata; Creſted Seal. Head on the fore part creſted; body grey. This ſpecies is alſo diſtinguiſhed by a ſtrong folded ſkin on the forehead, which it can at pleaſure draw over the eyes and noſe, to defend them againſt the ſtones and ſands raiſed and ſcattered in ſtormy weather. Its hair is white, with a thick coat of black woolly hair beneath, which makes the animal appear of a fine grey. It is found only on the ſouthern parts of Greenland and Newfoundland; and in the latter it is called the hooded ſeal.

* Barbata, or Great Seal. Head ſmooth, without ears; the body is blackiſh. This is ſimilar to the common ſeal, but grows to about the length of twelve feet, it having been ſhot in the north of Scotland of that ſize. Even when ſo young as to be without teeth it is upwards of ſeven feet long, whereas the common ſeal is at its full growth when it has arrived at the length of ſix feet. It is found in the northern ſeas. The ſkin, which is thick and very ſtrong, is uſed by the Greenlanders for thongs for their ſeal fiſhery. The young ones, when firſt brought forth, are quite white.

Pusilla; Little Seal. Head ſmooth, with the appearance of ears. It inhabits the Mediterranean ſea, Chili, and Juan Fernandez, and is about twenty-eight inches long.

Chilensis. Snout and ears longiſh, toes five on each foot. It inhabits about the coaſt of Chili.

Mutica; Long-necked Seal. Body ſlender, without claws on the fore feet.

Australis. Ears ſhort and pointed; the body is cinereous; hairs tipt with dirty-white; noſe ſet with ſtrong, black briſtles; the upper fore-teeth are tranſverſely furrowed; the lower longitudinally; tuſks with a ſmaller ſecondary tooth on each ſide; grinders conic, with a ſmall proceſs on one ſide near the baſe.

Testudo; Tortoiſe Seal. Head reſembling a tortoiſe; neck ſlender. It is ſaid to inhabit many European ſhores; the ſpecies is, however, but little known.

Fasciata; Ribbon Seal. Body blackiſh; neck, ſide, and haunches with yellow ſtripes reſembling harneſs. It inhabits the Kurile iſlands, and is covered with ſhort, fine, gloſſy, black hair.

Laniger: Leporine Seal. It has four fore-teeth in each jaw; the upper lip is thick, with long thick whiſkers; the fur is ſoft and uneven; the feet have nails, and its length is about ſix feet and a half. It inhabits the White ſea, Iceland, and the Frozen ocean.

Punctata; Speckled Seal. Body, head, and limbs ſpeckled. It inhabits the ſeas of Kamtſchatka, and the Kurile iſlands.

Maculata; Spotted Seal. Body ſpotted with brown. It inhabits the Kurile ſeas, and is very ſcarce.

Nigra; Black Seal. Hind legs peculiarly formed. It is found on the coaſts of the Kurile ſeas; but the ſtructure of its legs has not been accurately aſcertained.

Dr. Parſons derives the generic name *phoca*, from Φωκη, or, according to Dr. Charleton, from βακη, ſignifying a noiſe or kind of grunting made by theſe animals. He alſo reduces to this genus the *manati*, the *ſoil* or *ſeal*, and the *walrus* or morſe. Phil. Tranſ. vol. xlvii. 109, &c.

PHOCÆA, in *Ancient Geography*, a town of Aſia Minor, belonging to the Ionians, ſituated on the ſouthern coaſt of the gulf of Cumæ, N. of the mouth of the Hermus. It had two ports. Its inhabitants had a very extenſive commerce along the Mediterranean; and they founded ſeveral colonies, and among others that of Marſeilles.

PHOCÆNA, or Porpesse. See Delphinus.

PHOCAIS, in *Ancient Geography*, a territory of Aſia, towards the mouth of the Caicus, on the coaſt of Mitylene, according to Thucydides.

PHOCARIA, an iſland of the Ægean ſea, upon the coaſt of Attica. Pliny.

PHOCARUM Insula, an iſland on the coaſt of Arabia. Strabo.

PHOCAS, in *Biography*, Roman emperor of the Eaſt, was a centurion in the army on the Danube at the time of the revolt from the emperor Maurice, A. D. 602, nor is it at all known how he came to be elected emperor; but probably from his becoming a leader in ſome ſedition. On the intelligence of this revolt, the people of Conſtantinople broke out in an inſurrection, and Maurice was obliged to retire into Aſia. Phocas ſoon after entered the capital, and with his wife was crowned by the patriarch. At the public games which he exhibited on the occaſion, a tumult aroſe, in which he was reminded with threats that Maurice was ſtill alive. The death of that unfortunate emperor, with that of his five ſons, ſoon followed. The reign of the infamous Phocas was full of bloodſhed and cruelty, ſo that he has been juſtly ranked among the moſt deteſtable of tyrants. At length he became an object of terror to his own ſon-in law, Priſcus, who entered into a correſpondence with Heraclius, exarch of Africa, for the purpoſe of effecting a revolution. Phocas was, by the arts of Priſcus, kept ignorant of his danger till it was too late for effectual oppoſition. Deſerted by his guards and domeſtics, he was ſeized in his palace, ſtripped of his imperial robes, and carried to the galley of Heraclius, who had been proclaimed emperor. After ſuffering a variety of inſults and tortures, his head was cut off and his body committed to the flames, A. D. 610, in the eighth year of his reign. Univer. Hiſt. Gibbon.

PHOCEAS, in *Ancient Geography*, a town of Sicily, in the territory of Leontium. Thucydides.

PHOCENSES, a people of Greece, between Ætolia and the iſthmus of Corinth.—Alſo, a people of Phocæa, and alſo of Italy, in Etruria. Strabo.

PHOCION, in *Biography*, an Athenian commander, one of the moſt virtuous characters of antiquity, was of humble deſcent, but received a liberal education, and imbibed under Plato, and other philoſophers, thoſe elevated principles of conduct which governed his whole life. As he wiſhed to ſerve his country equally in council and the field, he cultivated the talents adapted to both. He firſt ſerved under Chabrias, a diſtinguiſhed commander, but of an impetuous temper. Phocion gained his eſteem and moderated his violence. He contributed to the naval victory near Naxos, in the year 377 B. C.; and being afterwards ſent in a ſingle veſſel among the iſlands to demand their contributions, he conducted himſelf with ſo much prudence, that he brought back with him all the ſhips and money at which they were aſſeſſed. In the war with Philip of Macedon he obtained a complete victory, and on this occaſion he gave a ſignal proof both of his wiſdom and humanity. Before the battle he freely ſuffered thoſe to depart who had no inclination to fight, leſt their cowardice in action ſhould diſconcert the reſt; and after the victory he releaſed his priſoners, knowing the danger they would incur if brought to Athens, from the violence of the populace. Phocion, though an able general, was the habitual friend of peace. He was too well apprized of the unſtable character of the Athenian democracy, and the talents and reſources of Philip, not to be convinced that a protracted war muſt be fatal to his country; hence he was the conſtant oppoſer of thoſe orators, who never ceaſed to urge the people to hoſtilities, and to diſcountenance all propoſals for accommodation. The pure patriotiſm and integrity of Phocion were founded on their only ſolid baſis, contentment with a little. Amidſt the higheſt honours, his mode of living was as ſimple and frugal as that of any common citizen. He poſſeſſed a little farm, and was not aſhamed to perform domeſtic offices with his own hands. He had a wife who was a worthy partner of his virtues, and placed her glory in his reputation. An Ionian lady once making a diſplay before her of all her jewels and other finery, "My ornament," ſaid the matron, "is my good man Phocion, who is now called for the twentieth time to the command of the Athenian armies." When the people of Megara were privately meditating an union with the Athenians, Phocion zealouſly promoted the meaſure; and, aſſembling a body of volunteers, marched thither, and was joyfully received; and having rebuilt its walls, left it in a ſtate of ſecurity, as a valuable acceſſion to the ſtrength of Athens. When Philip entered Phocis, with the intention of invading Attica, Phocion not confiding in the alliance with the Bœotians meditated by Demoſthenes, was deſirous of an accommodation; but he was over-ruled, and the fatal battle of Cheronea proved the juſtneſs of his apprehenſions. The death of Philip was celebrated with great rejoicings at Athens by Demoſthenes and his party, but Phocion diſcouraged ſuch indecorous triumph, and bid them remember that the victors at Cheronea were diminiſhed only by one man. In the ſame ſpirit of avoiding new hazards he diſapproved of the contemptuous ſpeeches relative to young Alexander, and the attempts to form a confederacy againſt the Macedonian power. At length, after a long life ſpent for the advantage of his country, he was for an error in judgment accuſed of treaſon. The populace ſhewed the greateſt exaſperation againſt him, and would ſcarcely ſuffer him to ſpeak. At length, obtaining an interval from clamour, he cried, "Athenians, I confeſs the crime charged againſt me, and ſubmit to the ſentence of the law; but what have theſe innocent men (pointing to ſome involved in the ſame puniſhment) done to deſerve death." The cry of the people was, "They are your friends, and that is enough." The decree was then paſſed adjudging them all to die, and ſome even propoſed a clauſe for putting Phocion to the torture. The aged patriot, unmoved amidſt the lamentations of his friends and fellow ſufferers, was led away, even his enemies admiring the ſerenity of his demeanour. The popular indignation againſt him denied his body a funeral in his own country, and it was carried by a ſlave and burnt in the territory of Megara. A matron with her maid attended on the obſequies, and raiſing an humble monument on the ſpot, collected his aſhes, and depoſited them under her own hearth, praying the houſhold gods to protect them till they ſhould be reſtored to the ſepulchre of his anceſtors, when the Athenians ſhould have recovered their ſenſes. This event took place; and his countrymen repenting the wrong they had done him, brought home his aſhes at the public expence, erected a braſs ſtatue to his memory, and puniſhed with death his accuſers. This event occurred in the year 318 B. C. Plutarch. Univer. Hiſt.

PHOCIS, the *Phocide*, in *Ancient Geography*, a country of Græcia propria; which extended from the N.W. or the Doride to the S.E., where it touched Bœotia, and to the W. bordering on the Ozole Locrians, to the S.W. as far as the gulf of Corinth, and to the N.E. where were the Opontian Locrians and the Epicnemidian Locrians. Although it was watered by many ſtreams, it formed from the N.W. to the S.E. an extenſive valley, in the middle of which flowed the Cephiſſus. Its other principal rivers were the Pindus and the Cachalis. The chief mountain was Parnaſſus, where were Delphi and the Caſtalian fountain. The moſt conſiderable places were Delphi (Caſtri), Criſſa, Anticyra (Aſpro-Spiria), and Elatia (Turco-Chono), the moſt conſiderable of the towns in the Phocide. The Phocæans, according to Pauſanias, derived their name from Phocus of Corinth, or from Phocus the ſon of Æacus, who came to this country with the Æginetæ, who made themſelves maſters of it, and gave it the name of the Phocide. Pauſanias mentions ſeveral military expeditions of the Phocæans, *viz.* their concurrence in the ſiege of Troy; their war againſt the Theſſalians, in which they gained great honour; and their participation in what was called the ſacred war, in which Philip of Macedon took a part. The Phocæans were ultimately excluded from the council of the Amphictyons.

PHOCLIS, a town of Arachoſia, between Axola and Aricara. Ptolemy.

PHOCRA, a mountain of Africa, in Mauritania Tingitana, which, according to Ptolemy, extended from the leſſer Atlas to the promontory Byſadium.

PHOCUSSA, or Phacussa, an iſland of the Ægean ſea, and one of the Sporades, according to Pliny and Steph. Byz.

PHŒBEUM, a place of the Peloponneſus, in Laconia, in the environs of Sparta. Livy.

PHŒBI Promontorium, a promontory of Africa, in the Iberian ſea, between Jagath and Alyba-Colauna. Ptolemy.

PHŒBIA, a town of Greece, in the Peloponneſus, which, according to Pauſanias, belonged to the Sicyonians.

PHŒBUS, in *Mythology*, a name given to Apollo.

PHŒMIUS (*Phamauh*), in *Ancient Geography*, a river of Africa, in the eaſtern part of Mauritania Cæſarienſis.

PHŒNICA, or Phœnice, a town of Epirus, in Chaonia, according to Ptolemy, Livy, and Polybius.

Phœnica (*Fenck*), a town of Aſia, at ſome diſtance N.N.W. from Tigranocerta; S. of the lake Thoſpitis, and beſieged and taken by Sapor, king of Perſia, as Ammianus Marcellinus reports.

PHŒNICE, Phœnicia, a country of Aſia, commonly named by the Jews *Canaan*, though ſome part of it, at leaſt, was known to them by the name of Syrophœnice. Phœnice was ſometimes extended to all the maritime countries of Syria and Judæa, and Canaan to the Philiſtines, and even to the Amalekites. On the contrary, theſe two names, and the reſt, were moſt generally ſwallowed up by thoſe of Paleſtine and Syria; or rather Phœnice, Paleſtine, and Syria, were promiſcuouſly uſed for each other, and particularly the two former. Stephanus Byzantinus ſays, that Phœnice and Paleſtine are the ſame. Syria, in its largeſt extent, ſometimes comprehended Phœnice and Cœleſyria. The fact is, that the whole coaſt of the Mediterranean ſea from Libanus to Rhincorura, or to mount Caſius, in the vicinity of Egypt, before the departure of the Iſraelites from this laſt country, was inhabited by people of different origin, *viz.* the Canaanites, afterwards called Phœnicians, deſcended from Canaan; and the Philiſtines, ſprung from Mizraim. Theſe people loſt part of their poſſeſſions by the conqueſt of Joſhua, who put the Iſraelites in poſſeſſion of the middle part of this coaſt, from Jamnia to mount Carmel. But when the Iſraelites were carried into captivity by Salmanaſar, 721 years B. C., the portion of the country which they had occupied returned to its firſt maſters, who reunited it to their ancient dominion. From this time the Phœnicians and Philiſtines were ſo united, that they were conſidered as the ſame people, and the whole coaſt was known by the name of Phœnicia. Strabo (l. xvi.) makes Phœnicia to commence, towards the N., at the town of Orthoſia to the S.W. of Aradus; but Ptolemy extends it a little farther to the N., and removes it to the river Eleutherus, which falls into the ſea, N.E. of Aradus, and at a ſmall diſtance from it. The greateſt part of the coaſt of Phœnicia was bounded to the E. by the mountains of Libanus, which are covered with ſnow during the whole winter. This ſnow has ſuch a refrigerating effect on the air, that the country towards the N. is cold; but to the N. and S. of theſe mountains, the air is very temperate.

The proper Phœnice, as far as we can learn from the ancient geographers, lay between the 34th and 36th degrees of north latitude: bounded by Syria on the N. and the E., by Judea on the S., and by the Mediterranean on the W. Ptolemy, as we have already ſaid, reckons the river Eleutherus the boundary of Phœnice to the N., but Pliny, Mela, and Stephanus, place it in the iſland of Aradus, lying N. of that river. On the coaſt of Phœnice, and S. of the river Eleutherus, ſtood the following towns; Simyra, Orthoſia, Tripolis, Botrys, Byblus, Palæbyblus, Berytus, Sidon, Sarepta, Tyrus, Palætyrus. Sidon may be properly called the metropolis of Phœnice. For an account of the principal towns of Phœnice, ſee their reſpective names. In the midland Phœnice Ptolemy reckons the following towns, *viz.* Arca, Palæbyblus, Gabala, and Cæſarea Paniæ. This province was conſiderably extended in the times of Chriſtianity; when being conſidered as a province of Syria, it included not only Damaſcus, but Palmyra alſo.

The ſoil of this country is good, and produces many articles both of food and clothing; the air is ſalubrious, and the climate agreeable. The ſea on this coaſt formerly produced a quantity of ſuch fiſh as yielded great profit to Tyre in particular: ſuch was the murex, with which was dyed the choiceſt purple; and on the ſhore was a ſand with which the firſt and beſt glaſs was made, as a ſtaple manufacture of this country. Although this country has been long deſolate, it exhibits ſome remains of its ancient ſplendour, more eſpecially at Tyre, Sidon, Byblos, &c. which ſee reſpectively.

The Phœnicians were, without doubt, deſcendants of the Canaanites: though, in proceſs of time, their blood was intermixed with that of foreigners, from the natural courſe of their commerce with other countries. Many ſtrange families muſt have ſettled among them, who could conſequently have no claim to this remote origin, how much ſoever they have been called Phœnicians, and reckoned of the ſame deſcent with the ancient proprietors. Bochart indeed inſinuates (vid. Phaleg. lib. iv. cap. 34.) that the Canaanites were aſhamed of their name, on account of the malediction denounced on their progenitor, and that they were terrified by the wars, which had been with equal vigour and ſucceſs waged againſt them by the Iſraelites, becauſe they were Canaanites; and that, therefore, to avoid the ignominy of the one and the danger of the other, they abjured their old name and changed it for Phœnicians, Syrians, Syrophœnicians, and Aſſyrians. Heidegger alſo conjectures, that they were aſhamed of their anceſtor Canaan. As to the etymology of their name, learned writers have ſuggeſted a variety of conjectures. The mythological hiſtorians have traced it to a pretended Phœnix, ſon of Agenor, or to a Phœnix, ſaid to be the ſon of Neptune and Libya. Others have derived it from Φοινιξ, or the palm-tree, with which Phœnice is ſaid to have abounded. Scaliger pretends that the name of Phœnician was formed from *Pinkkas*, or *Pinnhas*, meaning a perſon who inſpires confidence, which as he ſuppoſes was given to Canaan by the Sidonians. The learned Bochart ſeems to have approached nearer to truth in his conjecture. According to him, theſe people had, in ancient times, been called the children of Anak, or "Beni-Anak:" the *beth* being ſoftened, Beni-Anak was changed into "Phenak," in the plural "Phenakim," from which the Greeks formed "Phœnices." We learn from ſcripture, that the ſpies ſent by Moſes found in Hebron and its environs a people called "Anakim," or "Enakim:" and that theſe Canaanites were diſtinguiſhed by their ſtature and ſtrength: of courſe, the other Canaanites who claimed the honour of deſcent from them were alſo denominated "Anakims."

M. l'Abbé Mignot, in his elaborate diſcuſſion of this ſubject, (Mem. Acad. Belles Lettres, tom. xxxiv. &c.) thinks that it is not neceſſary to recur to the word "Beni;" becauſe the Egyptians always prefix the article *phe* to words, ſo that inſtead of "Enakim," they would read "Penakim," or "Phonacim:" and the Greeks becoming acquainted in their firſt maritime expeditions on the coaſt of the country with this word, formed from it Φοινικες, and the Latins "Phœnices."

It has been preſumed by this ingenious writer, who has taken great pains in tracing the origin of the Phœnicians, that a new colony of Canaanites arrived in this country, which drove the ancient inhabitants towards the N., and in proof of this opinion he refers to Gen. xii. and xiii. Theſe new Canaanites he ſuppoſes to have been the Orientals whom authors have diſtinguiſhed by the appellation of "Egyptian Shepherds," and who, after having been driven from the country which they had once poſſeſſed, returned again to Paleſtine. Accordingly he ſuppoſes theſe "Shepherds," of whom we ſhall have occaſion to ſpeak in another article, were the progenitors of the Phœnicians. The kings of the Thebaid, and other princes of Egypt, formed a league againſt them, and carried on a war, which was long and cruel; till at laſt the king Muſphar Muthoſis obliged them to withdraw into a canton, which contained 10,000 arouræ or Egyptian acres. The Shepherds fortified this place and encompaſſed it with walls for the ſecurity of their poſſeſſions. Thummoſis or Thetmoſis, at the head of 480,000 men, beſieged this place; but deſpairing of ſucceſs, he treated with the beſieged, and granted them permiſſion to retire, with their whole property, to any place they might chooſe, without being purſued or diſquieted in their march. The Shepherds accordingly quitted Egypt, and purſuing their route through the deſert, arrived in Syria, and ſettled in the country which was afterwards called Judea. This departure of the Shepherds from Egypt is ſaid to have taken place before the arrival of Joſeph in that country, *i. e.* in the year 1728 B.C. This fragment of ancient hiſtory throws great light, according to the abbé Mignot, on the Egyptian allegories. The ſynchroniſm of the arrival of the Phœnicians in Egypt with the reign of Menes, leads us to imagine, that the whole fable of the war of Typhon againſt Oſiris is an allegory, under which is veiled the hiſtory of the war of the Phœnicians or Canaanites againſt the Egyptians. Typhon was the brother of Oſiris; and he correſponds to the Canaanites, who were deſcended from Canaan, the brother of Mizraim, and who might be called the brethren of the Egyptians, according to Eaſtern uſage: but although brethren they were not born in Egypt, which the fable ſufficiently indicates, by the different colour which it gives to Typhon, who was red. The Egyptians, compared with the Canaanites, were almoſt black. According to the fable, the war between Typhon and Oſiris was long, and terminated by the retreat of Typhon from Egypt, thus characteriſing the expulſion of the Shepherds. Typhon retired to Abaris, which was called the city of Typhon; but he was obliged to leave it and to abandon the whole country: and as he never returned, he is thought to have been drowned in the overflow of the waters of the Sirbonite lake: but his death is ſuppoſed to have been allegorical; for, according to Plutarch, (De Iſ. and Oſir.) he had two ſons, Judæus and Jeralymus; the meaning of which is, that he entered into Syria, and ſettled in the country of Canaan, ſince occupied by the Jews, and in which was the city of Jeruſalem. According to the abbé Mignot, the commencement of the reign of Salatis, the firſt Shepherd king, may be fixed to the year 2078 B.C., and their departure to the year 1793, before the ſame era. The Phœnician Shepherds re-entered the country of Canaan, from which, about three centuries before, they had departed for Egypt, and ſettled towards the ſouth; and, according to Juſtin (lib. xviii. c. 3.) they eſtabliſhed themſelves in the vicinity of the lake of Aſſyria, *i. e.* the lake Aſphaltites; but multiplying there they were under the neceſſity of extending their borders, and taking poſſeſſion of the territory of the ſea-coaſt, which the firſt inhabitants of the country had left vacant; and ſome of them ſettled in the neighbourhood of the Jordan. Their arrival in Paleſtine was the cauſe which induced ſome of the ancient inhabitants to remove towards the north. There they multiplied themſelves to ſuch a degree, that the country, which in the time of Jacob was deſtitute of inhabitants to cultivate the ſoil, was peopled with a race which terrified the ſpies of Moſes by the magnitude of their citics, and by the number and power of thoſe who inhabited them. The Philiſtines alſo are ſaid to have come from Egypt; they were eſtabliſhed to the ſouth of the Canaanites, having, in former times, inhabited Peluſium and its territory. The Caphtorim were alſo of the ſame race; and theſe people, together with the Canaanites, conſtituted the nation, which, in proceſs of time, bore the name of Phœnicians. (See PHILISTINES.) Another French author, *viz.* M. de la Nauze, maintains (Mem. de Let. t. xxxiv. M. p. 175.) that the Phœnicians, who were alſo called Erythræans, were deſcended from Edom or Eſau, and that the Jews conſidered them as brethren. He ſays alſo, that Eſau was the ſame with king Erythras, both names ſignifying red; and that he was one of the firſt kings of this nation. But the reply of the abbé Mignot comprehends the following propoſitions, *viz.* 1. That the principal towns of the country to which the Greeks gave the name of Phœnicia, had for their founders and firſt inhabitants, the children and deſcendants of Canaan. 2. That the inhabitants of Tyre and Sidon, whilſt they were called Phœnicians by the Greeks, were named Canaanites in the original text of ſcripture. 3. That the tranſlators of the bible, which, in the time of Ptolemy Philadelphus, had rendered the Pentateuch into Greek, were perſuaded that the Phœnicians were Canaanites, as they often expreſs the Hebrew word "Kenani" by thoſe of Φοινικες and Φοινισσας, or Phœnicians. 4. That the Phœnicians gave themſelves the name of Canaanites. 5. That ſome profane authors, ſuch as Sanchoniathon and Philo of Biblos, his tranſlator, aſſure us, that Chna, or Canaan, was the father of the Phœnicians: and others have called Phœnicia the land of Canaan.

The Phœnicians were governed by kings, and their territory, ſmall and narrow as it was, included ſeveral kingdoms, *viz.* thoſe of Sidon, Tyre, Aradus, Berytus, and Byblos or Byblus. In this reſpect they imitated and adhered to the primitive government of their forefathers, who, like the other Canaanites, were ſubject to many petty princes, to whom they allowed the ſovereign dignity, reſerving to themſelves the natural rights and liberties of mankind.

As to their *religion*, the Phœnicians, being originally Canaanites, were at firſt worſhippers of the true God. In the time of Abraham the worſhip of the Canaanites was not different from his own. But afterwards they combined with the worſhip of the ſupreme Sovereign, whom they acknowledged to be the firſt cauſe of all things, that of gods, called by the ancients natural and immortal, that is, the ſun, moon, ſtars, and elements. Thus commenced the idolatry of the Phœnicians. They proceeded to reverence as gods thoſe who had rendered any important ſervice to mankind; they decreed to them divine honours; they appropriated temples to their worſhip; they adorned columns, on which their names were inſcribed, and eſtabliſhed ſolemn feaſts in honour of them: and moreover, they gave to theſe new deities the names of the elements, and of thoſe objects to which they had been accuſtomed to attribute divinity. The firſt mortal to whom the Phœnicians paid reverence was *Chryſor*, who had invented the method of founding metals, and applying them to the conſtruction of inſtruments for facilitating agriculture and fiſhing; who had firſt ventured himſelf on the ſea, and who had furniſhed them with the principles of divination. The worſhip of this pretended divinity was eſtabliſhed wherever they had colonies; and a ſimilarity has been obſerved between the Chryſor of the Phœnicians and the *Phta* or Vulcan of the Egyptians. With this deity they aſſociated another called *Agroneros* or *Agrotes*, in honour of whom they erected a ſtatue and a temple, and whom they held in very high eſtimation, as having invented, or at leaſt perfected, the art of tillage.

The other gods of the Phœnicians, named by Sanchoniathon, were *Elioun*, called the υψοσος, or moſt high, and his wife *Berouth*, and his deſcendants, who were regarded as the founders of the Phœnician nation. Elioun and Berouth had four ſons, Iſus, called alſo *Chronos*, *Bethylus*, *Dagon*, and *Atlas*. The wife of Chronos was *Aſtarte*, ſuppoſed to be the ſame divinity with Derceto or Atergates, worſhipped at Aſcalon. Cronos had ſeven daughters, called Artemides and Titanides, and two male children, Pothus or Cupidas, and Eros or Love. Cronos had another wife, called *Rhea*, and a third called *Dioné*. To theſe chief deities they joined marine divinities, ſuch as Nereus, the father of Pontus, from whom ſprung Poſeidon or Neptune. The *Cabiri*, called alſo Dioſcuri, Corybantes, and Samothraces, received divine honours. Sanchoniathon mentions another prince contemporary with Cronos, called *Adad* or *Ædad*. To theſe gods we may join *Adonis*, a Phœnician prince, who had reigned over Libanus, and the *dii pataici*, or tutelary gods of veſſels. The Phœnicians had alſo *Beelſamen*, ſignifying lord of honour, and denoting the ſun; *Baal-Berith*, or the Cronos worſhipped at Berytus, and ſeveral others of the name of *Baal*; *Apollo*, *Melicarthus*, *Melcartus* or *Hercules*. There is reaſon to believe, that the Phœnician idolatry and ſuperſtition were not altogether their own; and that their ſubjection to the Aſſyrians, Babylonians, Perſians, and Greeks, made great alterations in the whole ſyſtem of their religion. How far they retained, or loſt, a due ſenſe and notion of the true God in this their multifarious idolatry, it is not eaſy to determine. It is reported of the Egyptians, that, amidſt their endleſs polytheiſm, they ſtill acknowledged one ſupreme God; and ſince the religion of the old Phœnicians was in ſubſtance ſcarcely different from that of the Egyptians, it is very probable that their theory and doctrine agreed together as well as their practice and traditions. *Baal* had his prophets and prieſts in great number. We read of 450 of them, fed at Jezebel's table only. It was their cuſtom to offer burnt-offerings and ſacrifices to this god, and to dance about the altar with violent geſticulations; thus working themſelves up into a kind of phrenſy, and then cutting their bodies with knives and lances, and pretending to propheſy, or rather ſeeming, as if poſſeſſed by ſome inviſible power. This extravagance, in their early days, was accompanied with the barbarous cuſtom of ſacrificing perſons that were moſt dear to them to appeaſe their falſe gods, when they laboured under any public calamities. This inhuman practice is not only charged upon them by the teſtimony of others, but acknowledged by themſelves; and they had it in common with the Egyptians. But it was diſcontinued here, as well as in Egypt, at an early period. (See ADONIS, ASTARTE, BAAL, and HERCULES.) Among other acts of worſhip performed by the Phœnicians, one of the moſt univerſal was that of ſaluting the ſtatues of their gods, or kiſſing the hand in ſaluting them. The prayers which they addreſſed to their gods were preceded by luſtrations, by waſhing themſelves, and changing their garments. They alſo had ſongs, which they chanted to the ſound of inſtruments. The Phœnicians alſo practiſed various kinds of divinations and enchantments. Herodotus ſuppoſes theſe people to have practiſed circumciſion: but Joſephus aſſerts, that none of the nations included under the vague name of Paleſtine and Syria, uſed that rite, except the Jews: that if the Phœnicians anciently had that cuſtom, they afterward neglected it, and at length wholly laid it aſide. They abſtained from the fleſh of ſwine.

Language and Writing.—Whatever was the origin of the Phœnician language, it is certain that it had no affinity to the other oriental tongues that were uſed in Arabia, Syria, &c. Their language was a dialect of the Hebrew, the ſame with that of the ancient Canaanites, and their letters, or characters, were the ſame or very like to thoſe of the Samaritans. Their alphabet conſiſted of the ſame number of letters with the Hebrew alphabet; the forms of their letters were larger; but they were more conformable to thoſe of the more ancient Greek inſcriptions. The Phœnician character varied in its figure according to the different cantons in which it was uſed. The character of Palmyra more nearly reſembled the Hebrew; that of Carthage or the Panei, and that of Sicily or Spain, had a common origin, and bore affinity to that of the Phœnicians. The character, which was common to the Phœnicians, Hebrews, Arabs, &c. was the origin of that of all the nations which lay to the W. of Aſia; it paſſed into Africa by means of the Carthaginians; it was in uſe in Sicily and Spain before the Romans conquered thoſe countries; Cadmus brought it among the Greeks; it was adopted by the Etruſcans; and at length received among all the nations of Europe. Towards the E., it had been for a long time in uſe in Perſia, and it was not improbably the origin, directly or indirectly, of all writing. The Phœnicians, like the Hebrews, Arabs, &c. wrote from right to left; nor had they any vowels in their alphabet, which proves the antiquity of their language, and as ſome have alleged, that it was the inevitable conſequence of hieroglyphical writing.

Learning and Science.—The Sidonians, under which appellation we may comprehend the Phœnicians in general, were of a peculiarly happy genius: arithmetic and aſtronomy are ſuppoſed to have taken their riſe among them, or were brought by them to great perfection; from them theſe excellent ſciences ſpread into Greece, together with their letters. They were addicted from the beginning to philoſophical exerciſes of the mind; inſomuch, that a Sidonian, named Moſchus, taught the doctrine of atoms before the Trojan war; and Abomenus of Tyre is ſaid to have puzzled Solomon by the ſubtlety of his queſtions. Phœnice continued to be one of the ſeats of learning, and both Tyre and Sidon produced their philoſophers in later ages; ſuch were Boethius and Diodatus of Sidon, Antipater of Tyre, and Apollonius of the ſame place, who gave an account of the writings and diſciples of Zeno.

Manufactures and Arts.—The glaſs of Sidon, the purple of Tyre, and the exceeding fine linen they wove, were the product of their own country, and of their own invention; and for their extraordinary ſkill in working metals, in hewing timber and ſtone, and in a word, for their perfect knowledge of what was ſolid, great, and ornamental in architecture, the reader need only be reminded of the large ſhare they had in erecting and decorating the temple at Jeruſalem under their king Hiram. Their fame for taſte, deſign, and ingenious invention was ſuch, that whatever was elegant, great, or pleaſing, in apparel, veſſels, or toys, was diſtinguiſhed, by way of excellence, with the epithet of "Sidonian."

Commerce and Navigation.—As merchants they may be ſaid to have engroſſed all the commerce of the weſtern world; and as navigators, they were the boldeſt, the moſt experienced, and greateſt diſcoverers, of ancient times: indeed they had, for many ages, no rivals. In planting colonies they exerted themſelves ſo much, that, conſidering their habitation was little more than the ſlip of ground that lay between mount Libanus and the ſea, it is ſurpriſing how they could furniſh ſuch ſupplies of people, and not wholly depopulate their native country. Their vicinity to Syria, which had a very conſiderable and regular trade with the more eaſtern regions, induced them to traffic in foreign commodities; for here they found productions of the natural growth of that ſoil, and many choice and uſeful commodities brought from the Eaſt, which their own ſmall country could not ſupply: and having probably been ſhewn the way by the Syrians, who might have navigated the Mediterranean, they turned their whole attention to trade and navigation, and by an uncommon degree of application, ſoon eclipſed their maſters in that art. The Phœnicians affected no empire but that of the ſea, and ſeemed to aim at nothing but an unmoleſted enjoyment of their trade. This they extended to all the known parts to which they could reach; to the Britiſh iſles, commonly underſtood by the Caſſiterides; to Spain, and other places in the ocean, both within and without the ſtraits of Gibraltar; and, in general, to all the parts of the Mediterranean, the Black ſea, and the lake Mæotis. In all theſe parts they had ſettlements and correſpondents; and thus they exerciſed the great branches included under the term trade, *viz.* importation, exportation, and tranſportation, in full latitude. Beſides this maritime commerce, they had an inland trade in Syria, Meſopotamia, Aſſyria, Babylonia, Perſia, Arabia, and even India, which was of no leſs extent, and which may ſerve to give us an idea of the wealth of theſe people, and how deſervedly their merchants are mentioned in ſcripture as equal to princes. (Iſ. xxiii. 8.) Their country, though ſmall, was the great ſtorehouſe that contained every thing which could adminiſter to the neceſſities or luxuries of mankind, which they diſtributed to others as they judged would be beſt for their own intereſt. Their own commodities were, as we have obſerved already, the purple of Tyre, the glaſs of Sidon, and the exceeding fine linen made in their own country; theſe and other curious pieces of art, in metals and wood, ſeem to have been the chief, and almoſt only commodities of Phœnice itſelf. Their territory was ſo ſmall, as not to afford any export of their own growth; and, indeed, it is more likely that they wanted, than abounded with, the fruits of the earth. Their commerce and navigation derived peculiar advantage from their ſhipping, and they had excellent means for providing themſelves with ſhips. Their larger embarkations were of two ſorts, round ſhips, or gauli, and long ſhips, gallies, or triremes. When they drew up in line of battle, the gauli were diſpoſed at a ſmall diſtance from each other in the wings, or in the van and rear; and their triremes were contracted together in the centre. In order to diſcourage other nations from engaging in commerce, they practiſed piracy, or pretended to be at war with ſuch as they met when they thought themſelves ſtrongeſt. This was a natural ſtroke of policy in people who graſped at the whole commerce of the then known world. At Tyre was the famous fiſhery already mentioned, which contributed ſo much to enrich that city. In connection with the navigation of the Phœnicians, we might mention their voyages in the ſervice of Solomon; and the long voyage which ſome of them are ſaid to have undertaken in the ſervice of Necho, king of Egypt, round Africa, ſailing out of the Red ſea, and returning by the way of the ſtrait's mouth, in which they employed three years.

Hiſtorical Revolutions.—Phœnicia, as we have already obſerved, was divided into ſeveral ſmall kingdoms, of which ſome were confined within the narrow bounds of one city, and its territory. Of all the kings of Phœnicia, thoſe of Sidon, Tyre, and Arad, ſeem to have been the moſt powerful and wealthy, and they certainly make the moſt conſpicuous figure in hiſtory; but their ſucceſſors, and the years of their reſpective reigns, are involved in obſcurity and uncertainty, and interrupted by ſo many chaſms, that it is not poſſible to give a regular detail of their tranſactions. For ſuch an account as authentic hiſtory furniſhes, we refer to the reſpective articles, *Sidon*, *Tyre*, and *Arad*.

After a variety of viciſſitudes, Phœnicia fell under the power of the kings of Babylon. Nabopolaſſar, whoſe reign commenced in the year 626 B.C., became maſter both of Paleſtine and of Egypt. Tyre, after a reſiſtance of 30 years, was taken in the year 573 B.C. But with the death of Baal, the title of king became extinct; and Phœnicia was for a conſiderable time governed by judges. Geroſtratus was the laſt of theſe magiſtrates; and when he died in the year 554 B.C., the Tyrians ſent to Babylon for another governor. Merbal was appointed, with the title of king, and reigned four years. He was ſucceeded by his brother Iram, or Hiram, in 550 B.C.; and in the 14th year of his reign, Cyrus, according to the Phœnician annals, made himſelf maſter of the Perſian empire. At this time Phœnicia comprehended the whole coaſt from the vicinity of Aradus northwards to the frontiers of Egypt. It now became one of the provinces of Perſia, and without making any conſpicuous figure in hiſtory, it ſuſtained itſelf by its commerce. When Phœnicia at a ſubſequent period was joined to Syria, it was governed by preſidents or rulers ſent from Rome. Phœnicia was afterwards one of the provinces which Antony abandoned to Cleopatra; but after the death of both theſe, Auguſtus, who paſſed into Paleſtine with Herod, granted to him ſeveral towns of Phœnicia. This province was one of the ſcenes in which the apoſtles and followers of Jeſus Chriſt preached the doctrines of Chriſtianity; but the hatred of the Jews againſt the Chriſtians excited great troubles: the whole country was in arms, and the Jews revolted againſt the Romans, till at length Jeruſalem was taken by Titus. The ſucceeding emperors diſtinguiſhed ſome of the towns of Phœnicia by their attention. Tyre, among others, received from Adrian, and alſo from Severus, the title of Metropolis; ſo that Phœnicia, having its metropolis, was detached from the government of Syria. Under the reign of Theodore, and under that of Arcadius, this province was divided into two diſtinct parts: one was called "Maritime Phœnicia," or ſimply "Phœnicia;" and the other, "Phœnicia of Libanus." Maritime Phœnicia had for its metropolis Tyre, on which depended Sidon, Ptolemais, Berytas, Biblos, Tripolis, Arca, Orthoſia, Botrys, Aradus, Antaradus, Porphyrion, Paneas, and Sylaminum. Phœnicia of Libanus had for its metropolis Damas, to which were ſubordinate Laodicea, Abila, Heliopolis, Jabrunda, Palmyra, Emiſa, Danaba, Evaria, Comoara, Cotada, and Sarracene. Chriſtianity flouriſhed for ſome time in this province, till at length the Arabs gained poſſeſſion of it; and Phœnicia, having embraced a new worſhip, was governed by different dynaſties of Arabian princes.

PHŒNICE, one of the names which, according to Pliny, was given to the iſle of Tenedos.

PHŒNICIAN CHARACTER. See CHARACTER.

PHŒNICON, in *Ancient Geography*, a town of Egypt, on the route from Coptos to Berenice, between Coptos and Didyme, according to Antonine's Itinerary.

PHŒNICOPTERUS, *Flamingo*, in *Ornithology*, a genus of birds of the order Grallæ, of which the generic character is, bill naked, toothed, bent as if broken; noſtrils linear; feet four-toed, palmate, the membranes ſemicircular on the fore part; the hind toe is not connected with the others. There are two ſpecies mentioned by Gmelin. The birds of this genus combine the characters of the Anſeres and Grallæ. They have long legs and neck; the bill is large; the upper mandible carinate above, and toothed on the edge; lower compreſſed, tranſverſely furrowed; the noſtrils are covered with a thin membrane.

Species.

RUBRA, or Common Red Flamingo. This is ſpecifically deſcribed as having its quill-feathers black. It inhabits Africa and South America. From the top of the bill to the end of the tail it is four feet four inches long, and to the end of the legs ſix feet; it feeds on aquatic inſects and fiſh; perpetually twiſts its neck about when eating, ſo that the upper mandible touches the ground; it makes its neſt on hillocks in ſhallow water, on which it ſits with the legs hanging down, like a man ſitting upon a ſtool; it lays two white eggs; is very impatient of cold; the fleſh is good, eſpecially the tongue; it changes its colour with its age, being the firſt year of a white aſh, the ſecond roſy, the third full ſcarlet; tongue covered with about twelve papillæ, which are hooked backwards, and cartilaginous at the tip. The young ones run about with great ſwiftneſs, but are unable to fly till they have attained nearly their complete growth. They ſubſiſt chiefly on ſmall fiſhes, ova, and water inſects; and frequent during the day the borders of rivers and lakes, withdrawing at night to the high grounds, and lodging amidſt long graſs. Flamingoes are extremely ſhy, and are ſaid almoſt always, unleſs in the breeding ſeaſon, to keep together in flocks, having a centinel ever vigilant at his poſt, by whom the ſlighteſt approaching danger is announced, by intimations which produce immediate flight. Their fleſh is thought by ſome not to be inferior to that of the partridge.

CHILENSIS; Chili Flamingo. Quill-feathers white. It inhabits Chili; it is five feet long from the bill to the claws; the bill is covered with a reddiſh ſkin; head ſubcreſted.

PHŒNICOPUS GALLINULA, a name by which ſome authors have called a bird, more uſually known by the name tringa.

PHŒNICUM, in *Ancient Geography*, a town of Arabia Felix, upon the coaſt of the Elanitic gulf, between Hippos and Ahaunathi. Ptolemy.

PHŒNICURUS, in *Ornithology*, a ſpecies of *Motacilla*; which ſee. See alſo MOTACILLA *Erithacus* and *Suecica*.

PHŒNICUS MONS, in *Ancient Geography*, a mountain of Aſia Minor, in Lycia. According to Strabo, it was alſo called Olympus.

PHŒNICUS *Portus*, a port of the Peloponneſus, in Meſſenia, near the promontory Acritas, ſouth-weſt of Colonis.—Alſo, a port of the ſea, on the eaſt coaſt of Sicily, near the promontory Pachynus. Ptolemy.—Alſo, a port of the nome of Libya. Ptol.—Alſo, a port on the ſouthern coaſt of the iſle of Crete. Ptol.—Alſo, a port of Aſia Minor, on the coaſt of Lycia, two miles from the town of Patara. Livy.—Alſo, a port of Aſia Minor, on the coaſt of Ionia, at the foot of the promontory Mimas.

PHŒNICUSA, or PHŒNICODES, one of the ſeven Æolian iſles of the ancients, called *Felicuda*, ſituated towards the weſt, to the eaſt of the iſle of Ericuſa. It took its name, according to Strabo, from its production, which was the phœnix or palm-tree. See FELICUDA.

PHŒNICUSSÆ, a town of Aſia, in Syria, which belonged to the Phœnicians.—Alſo, the name of two iſlands, placed by Steph. Byz. on the coaſt of Africa, in the gulf of Carthage.

PHŒNIGMUS, φοινιγμος, in *Medicine*, from φοινιξ, *red*, ſignifies properly that *redneſs of the ſkin*, which is occaſioned by certain ſtimulating ſubſtances, muſtard, cantharides, &c. which have been therefore called *rubefacients*. The appellation of *phænigmus* has alſo been ſometimes given to the rubefacient ſubſtance itſelf.

Sauvages has applied the term to a diſeaſe, which conſiſts of red or purple ſpots or blotches upon the ſkin, without any elevation, inflammation, or fever. His phœnigmus is, in fact, the *petechiæ ſine febre* of ſome writers, and the Purpura ſimplex of Dr. Willan. See PURPURA. See Sauvages, Noſol. Method., claſs x. gen. 32.

PHŒNIX, Φοινιξ, in *Aſtronomy*, a conſtellation of the ſouthern hemiſphere; unknown to the ancients, and inviſible in our northern parts.

The number of ſtars in this conſtellation is thirteen. See CONSTELLATION.

This conſtellation took its name and form from that of a bird famous among the ancients; but generally looked upon by the moderns as fabulous.

The naturaliſts ſpeak of this bird as ſingle, or the only one of its kind. They deſcribe it as of the ſize of an eagle; its head finely creſted, with a beautiful plumage; its neck covered with feathers of a gold colour, and the reſt of its body purple; only the tail white, intermixed with carnation; and its eyes ſparkling like ſtars. They hold, that it lives five or ſix hundred years in the wilderneſs; that, when thus advanced in age, it builds itſelf a funeral pile of ſweet wood, and aromatic gums; then it fires it with the waſting of its wings, and thus burns itſelf; and from its aſhes ariſes a worm, which, in time, grows up to be another phœnix.

Hence the Phœnicians gave the name phœnix to the palm-tree; becauſe, when burnt down to the very root, it naturally riſes again fairer than ever.

Ancient hiſtorians reckon four appearances of the phœnix: the firſt, in the reign of Seſoſtris; the ſecond, in that of Amaſis; the third, in that of the third Ptolemy; and the fourth, according to Dion Caſſius, as a preſage of the death of Tiberius, but Tacitus refers it to Egypt under the empire of Tiberius, and Pliny to the conſulate of Quintus Plancius, which took place A.D. 36.

The ancients, however, ſpeak of the phœnix as a fabulous bird.

The ancient Chriſtians refer to the phœnix in ſome of their accounts of the reſurrection.

PHŒNIX, in *Botany*, φοινιξ of the ancient Greeks, the Date Palm-tree; from which, as a primitive word, Phœnicia, the land of Palm-trees, ſeems to have derived its name; as likewiſe perhaps the red colour *phœniceus* or *puniceus*, from the hue of the ſheath when arrived at maturity; which etymology ſeems to us the more probable, as *puniceus* is ſometimes made ſynonimous with *croceus*, ſaffron-coloured. Linn. Gen. 573. Schreb. 776. Willd. Sp. Pl. v. 4. 730. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 5. 369. Juſſ. 38. Lamarck Illuſtr. t. 893. Gærtn. t. 9.—Claſs and order, *Dioecia Triandria*. Nat. Ord. *Palmæ*.

Gen. Ch. Male, *Cal.* General ſheath of one valve, including a branched ſtalk. Perianth deeply three-cleft, minute, permanent. *Cor.* Petals three, concave, ovate, rather oblong. *Stam.* Filaments three, very ſhort; anthers linear, quadrangular, the length of the corolla.

Female either on a different plant, or on the ſame common ſtalk. *Cal.* and *Cor.* as in the male. *Piſt.* Germen ſuperior, roundiſh; ſtyle awl-ſhaped, ſhort; ſtigma acute. *Peric.* Drupa ovate, of one cell. *Seed* ſolitary, bony, elliptic-ovate, marked with a longitudinal furrow, nearly oppoſite to the dorſal embryo.

Eſſ. Ch. General ſheath of one valve.

Male, Calyx in three deep ſegments. Petals three.

Female, Calyx in three deep ſegments. Petals three. Piſtil one. Drupa ovate.

1. Ph. *dactylifera*. Common Date Palm-tree. Linn. Sp. Pl. 1658. Ait. n. 1. Stokes Mat. Med. v. 4. 519. (Palma; Kæmpf. Amoen. 667. t. 1, 2, 3. Matth. Valgr. v. 1. 198, 200. Camer. Epit. 124. Ger. Em. 1517.)—Leaves pinnate, without thorns; leaflets linear-lanceolate, folded, ſtraight.—Native of the Levant. Though it has been cultivated in our ſtoves for above 200 years, no individual has yet been preſerved long enough to bloſſom, and very few have become cauleſcent. In the ſouth of France this plant forms a handſome tree, but brings no fruit to perfection. It is well known, that as the male and female flowers are generally the produce of diſtinct individuals, the two ſexes require to be cultivated together, in order to obtain good fruit; and in this chiefly conſiſts the culture of the Palm-tree. Hence the Linnæans have derived one of their moſt ſtriking proofs of the ſexes of plants, the fact being recorded by thoſe who were not inſtructed in that doctrine. (See FECUNDATION, and SEXES *of* PLANTS.) For an account of the fruit, ſee DATE. The tree is of ſlow growth, but gradually attains a very lofty ſtature, conſiſting of a ſtraight ſimple ſcaly *trunk*, crowned with a noble ſpreading evergreen tuft of long, pinnate, rigid, ſmooth *leaves*. (See PALMÆ.) Several axillary drooping bunches of innumerable white *flowers*, each bunch enveloped in a large coriaceous *ſheath*, proceed from the crown of the *ſtem*, and produce an ample crop of *dates*, which are gathered in the Eaſt with great care and ceremony, conſtituting an important article of food, as well as of commerce. Their quality is as various as that of apples, or any other cultivated fruit. An ample and complete hiſtory of this valuable tree, and its whole economy, is to be found in Kæmpfer.

2. Ph. *reclinata*. Reclining Date Palm-tree. Jacq. Fragm. 27. t. 24. Ait. n. 2.—Leaves pinnate, without thorns; leaflets linear-lanceolate, folded, looſely ſpreading.—Native of the Cape of Good Hope, whence it was ſent to Kew by Mr. Maſſon, in 1792. It is kept in the greenhouſe, but has not flowered.

3. Ph. *farinifera*. Small Date Palm-tree. Roxb. Coromand. v. 1. 53. t. 74. Ait. n. 3.—Leaves pinnate, without thorns; leaflets linear-awlſhaped, folded. Flowers with ſix ſtamens and three ſtyles.—Native of Coromandel, chiefly found in dry barren ſandy places, not far from the ſea, flowering in January and February, and ripening fruit in May. The *trunk* is not above one or two feet high, and entirely enveloped in *leaves*, which reſemble thoſe of the firſt ſpecies in general appearance, but are more pointed, and of a much deeper green. The common flower-ſtalk, or *ſpadix*, bears numerous ſimple *branches*, each from eight to twelve inches long, beſet with a great number of ſeſſile *flowers*; the male white; the female green, on a ſeparate tree. The *ſtamens* are ſix, with a three-cleft rudiment of a *piſtil*. The *piſtil* of the female flowers is three-cleft, and there are rudiments of three *ſeeds*, as Dr. Stokes well remarks; all which does not accord with the generic character, taken from the firſt ſpecies. Yet Dr. Roxburgh ſays the *piſtil* is "as in *Phœnix dactylifera*." Probably the character of the latter requires emendation, for which we can only look to ſome tropical botaniſt. The *fruit* of the preſent ſpecies is a purple ſingle-ſeeded *drupa*, the ſize of a large French bean, containing a ſmall quantity of ſweet

mealy pulp, and is eaten by the natives of the coaſt of Coromandel, without any preparation. The *ſtem* of the plant contains a large quantity of farinaceous ſubſtance, among the woody fibres, affording an inferior ſort of ſago, to which recourſe is had in times of ſcarcity; but Dr. Roxburgh deſcribes it as bitteriſh, and inferior in nutritious qualities to real ſago. This ſpecies is cultivated at Kew, having been procured from India in 1800, by Sir Joſeph Banks.

Ph. *puſilla*, Lour. Cochinch. 614. Gærtn. v. 1. 24. t. 9, anſwers very nearly to the deſcription of the laſt, except that the *ſtyle* is ſaid to be ſhort, and *ſtigma* ſimple. Perhaps the young *ſtyles* cohere, and appear to be only one. Gærtner's figure indicates the rudiments of three *ſeeds* in the *germen*, as in Roxburgh's plant.

PHŒNIX, in *Gardening*, contains a plant of the evergreen exotic tree kind, of which the ſpecies cultivated is the date palm-tree (P. dactylifera).

Method of Culture.—This plant may be increaſed by ſeed, procured from abroad, or taken out of the fruit, which ſhould be ſown as ſoon as poſſible in pots of light rich earth, plunging them in a tan hot-bed in the ſtove, giving moderate waterings; when they ſoon come up. And when a few inches high, they ſhould be pricked out into ſeparate ſmall pots, plunging them into the hot-bed or bark-bed, where they muſt remain, giving frequent waterings, and ſhifting them into larger pots, according as their progreſs of growth may require. When they are removed, great care ſhould be taken not to injure their large roots, or to over-pot them.

This, like the reſt of the palm tribe, has no other branches than its large leaves, each of which is compoſed of a leaf and branch, always ariſing from the top; and as the old leaves fall, the ſtem forms itſelf, and advances in height. But although the leaves grow very tall in a few years, the ſtem advances but ſlowly, and can never be expected to arrive at a flowering and fruiting ſtate in this climate: it, however, merits a place in the hot-houſe collections for its ſingularity.

The berries of this tree are the dates of the ſhops, which are imported from Africa, and the countries in the Levant.

PHŒNIX, φοινιξ, among the *Ancients*, a muſical inſtrument, not unlike the *cithara;* which ſee. See alſo PHÆNIX.

PHŒNIX, in *Geography*, a port of Aſia Minor, on the coaſt of Lycia.—Alſo, a mountain of Aſia, in the Doride.—Alſo, a town of Italy, according to Appian.—Alſo, a river of Greece, in Theſſaly, which ran into the Apidanus.—Alſo, a river of the Peloponneſus, in Achaia, which had its mouth ſouth-weſt of the gulf of Corinth.

PHŒOPUS, in *Ornithology*, a name uſed for two different birds; the one called by the Germans *brachvogel*, and the other the *whimbrell*, or *arquata minor*, the ſmall curlew of authors.

The firſt of theſe, or the *brachvogel*, is of a deep black colour, ſpotted with a yellowiſh and reddiſh-brown; its beak is long, ſlender, and black, and is moderately bent; its neck is grey, tending to reddiſhneſs towards the bottom; and its belly is white. Mr. Ray ſuſpects this not eſſentially to differ from the other, but the ſight of the bird alone can determine that. See SCOLOPAX *Arquata*.

PHOGOR, in *Ancient Geography*, a mountain of Paleſtine, on the other ſide of Jordan.—Alſo, a town of Paleſtine, in the tribe of Judah, near Bethlehem.—Alſo, another town north-eaſt of the Dead ſea and of Livias.

PHOKWARAH, in *Geography*, a town of Hindooſtan, in Lahore; 50 miles E. of Sultanpour.

PHOLAS, in *Conchology*, a genus of the claſs and order Vermes Teſtacea. The generic character is, animal an aſcidia; ſhell bivalve, divaricate, with ſeveral leſſer differently ſhaped acceſſory ones at the hinge; the hinge recurved, united by a cartilage; in the inſide, beneath the hinge, is an incurved tooth. There are twelve ſpecies. The inhabitants of this genus all perforate clay, ſpongy ſtones, and wood, while in the younger ſtate; and as they increaſe in ſize, they enlarge their habitation within, and thus become impriſoned. They contain a kind of phoſphoric liquor, of great brilliancy in the dark, which illuminates whatever it happens to fall on.

The word pholas is derived from the Greek φωλεω, and ſignifies no more than any thing which is hidden; the name was given to this genus of ſhell-fiſh from their cuſtom of making themſelves holes in earth, ſand, ſtones, or wood, and living hidden in them. Many being of opinion, that theſe could not work themſelves into the ſubſtance of hard ſtones, have thought that they were hatched in holes accidentally formed in ſtones, and that the ſhells naturally grew of ſuch a ſhape as was neceſſary to fill the cavity. Nor is this the only error propagated concerning the pholas; for as all that was ſignified by the name being only that the ſhell was hidden in ſome ſolid ſubſtance, whenever an author found a ſhell-fiſh of whatever kind thus buried in ſtone, he deſcribed it under the name of pholas.

Species.

* DACTYLUS. Shell oblong, with reticulate ſubſpinous ſtriæ on the upper part. It is found among rocks in this country, and other parts of Europe, and ſhines by night. It is about five inches long; entirely white, with ſometimes an ochraceous caſt, thin, fragile, elongated, and wedge-ſhaped on the fore part, convex behind, the margin inflected; it is marked with ſubſpinous ſtriæ, which become gradually more indiſtinct; the hinge reſembles a ſpoon, and there are four acceſſory valves.

COSTATA. Shell ovate, and ſtriate with elevated ribs. It inhabits the American ſeas. It is white, and almoſt ſix inches long; the ribs are oblique, and armed with elevated ſcales or obtuſe ſpines.

STRIATA. Shell ovate, and multifariouſly ſtriate. This ſpecies is found in ſome of the ſouthern parts of Europe and India, and the coaſt of Barbary. The ſtriæ are occaſionally decuſſate; the part near the hinge is glabrous, and without ſtriæ.

CANDIDA. Shell oblong, and muricate on all parts with decuſſate ſtriæ. This inhabits European and American ſeas, and is very thin; it is ſilvery within, and more glabrous; rounded at each end; tooth of the hinge is ſlender and cleft; length near an inch, the breadth an inch and a half.

PUSILLA. Shell oblong, rounded with arched ſtriæ. It is found in different parts of India and America, and penetrates the bottoms of ſhips. The ſhell is browniſh or white, gaping on the fore part, globular under the top, and marked with reticulate knotty ſtriæ.

* CRISPATA. Shell oval, the part next the hinge more obtuſe, waved, and ſtriate; teeth of the hinge curved, large, and ſtrong. A variety is known by the ſhell being thinner and ſmaller; the tooth alſo is ſlender and oblique. It inhabits European ſeas, is about two inches long, and three and a half broad. The primary ſhells are divided by a tranſverſe wrinkled groove in the middle; the acceſſory ones are ſmall.

Orientalis. Shell oblong, with a ſtraight margin; one-half of it is quite ſmooth, the other with reticulate ſtriæ. It inhabits Siam and Tranquebar; is large and thin; the ſhells gape at one end only, and they are marked within with reticulate ſtriæ.

Campechiensis. The ſhell of this ſpecies is narrow, white, and very finely ſtriate. It inhabits the bay of Campeachy. It is probably not a diſtinct ſpecies.

Cordata. Shell ſhort, turgid, and furrowed with fine elevated tranſverſe ſtriæ; aperture heart-ſhaped. It is found affixed to the Corals. The ſhell is very thin, fragile, and of a dirty white; the fore part is ſmooth, except a few arched ridges.

Chilensis. Shell oblong, a little depreſſed, with diſtant longitudinal ſtriæ. It is found about the rocks of Chili. The ſhell is five inches long, with minute appendages.

Teredula. Shell oblong, white, with a longitudinal brown granulate future. It inhabits the Belgic ſhores, and penetrates timber.

Hians. Shell bivalve, white, with tranſverſe arched ſtriæ; above connivent, convex in the middle, beneath wedge-ſhaped, with a very large oval aperture. It inhabits the American iſlands, and perforates calcareous rocks and corals.

As to the luminous quality of this ſpecies of ſhell-fiſh, obſerved by Pliny, and by modern naturaliſts, ſee Dactylus.

For an account of a particular ſpecies of pholas, called by Dr. Parſons *pholas conoides*, by others *pholas lignorum*, and in Dutch *wood-muſcle*, becauſe it is found burrowed in timber, ſee Phil. Tranſ. vol. lv. p. 1, &c.

PHOLIDIA, in *Botany*, from φολις, φολιδος, *the ſcale of a fiſh or ſerpent;* alluding to the ſcalineſs of the corolla. Brown Prodr. Nov. Holl. v. 1. 517.—Claſs and order, *Didynamia Angioſpermia*. Nat. Ord. *Myoporinæ*, Br.

Eſſ. Ch. Calyx deeply five-cleft, unchanged in the fruit. Corolla funnel-ſhaped; tube longer than the calyx; throat dilated, tumid at one ſide; limb ſhort, irregular; its upper lip two-lobed, recurved; lower ſpreading, in three deep equal ſegments. Stamens included. Anthers bearded. Stigma capitate, emarginate. Drupa dry, of four cells, with four ſeeds.

1. Ph. *ſcoparia*. Found by Mr. Brown, on the ſouth coaſt of New Holland. A ruſh-like ſhrub, with oppoſite awl-ſhaped *leaves*. *Stalks* ſingle-flowered, axillary, ſolitary, without *bracteas*. *Corolla* blue, clothed externally with minute ſcales. *Albumen* thin.

PHOLIS, in *Natural Hiſtory*, the name of a genus of foſſils of the claſs of the gypſums or plaſter-ſtones, the diſtinguiſhing characters of which are, that the bodies of it are conſiderably hard, compoſed of ſomewhat broad particles, and of a bright cryſtalline luſtre.

The word is derived from φολις, *a ſcale*, or *ſmall flake*, from theſe bodies being compoſed of particles of that form.

The ſpecies of this genus are the moſt valuable of all the gypſums, as burning to the beſt and fineſt plaſter; but ſo far as is yet known, there are but two of them: the fine plaſter-ſtone of Montmartre in France, called by us *plaſter of Paris ſtone*, and *parget;* and the other the coarſer and ſomewhat reddiſh kind, common in many parts of England, and called *hall plaſter*. Hill. See Parget.

Pholis, in *Ichthyology*, the name of a ſmall anguilliform fiſh, the back of which is brown, the belly white, and the whole back and ſides ſpotted, and the ſkin ſoft and not covered with ſcales, but with a tough mucilaginous matte like the eel.

This moſt of all approaches to the alauda, and though uſually ſomewhat larger, yet Mr. Ray doubts whether it really differs from it in any thing eſſential; its great diſtinction being its colour, which, though a very obvious, is a very precarious one.

This is the Blennius *Pholis* of Gmelin, and the blennius of Artedi, with the top of the head acuminated, and the upper jaw the larger, the alauda non criſtata of Rondeletius and Geſner, the mulgraave and bulcaud of Willughby and Ray, and the ſmooth blenny of Pennant. It is found on the ſhores of the European ocean and Mediterranean ſea, and at the mouths of rivers among rocks and algæ, &c. See Blennius.

PHOLLIDES, a word uſed by the ancient phyſicians for ſoft and fungous tumours of the legs, ſuch as thoſe of people in an anaſarca, or leucophlegmacy.

PHOLLIS, as a coin. See Folis.

PHOLOC, in *Ancient Geography*, a mountain of Triphylia, ſouth of Onus.—Alſo, a mountain of Greece, in Theſſaly, where Hercules is ſaid to have ſlain the Centaur. —Alſo, a ſmall town of the Peloponneſus, in Arcadia, weſt of the river Erymanthe, according to Pliny and Mela. A mountain of the ſame name was ſituated near it to the weſt, which was the boundary of the Elide.

PHOMOTHIS, a town of Aſia, in the Mareotide, according to Ptolemy.

PHONASCIA, Φωνασκια, derived from φωνη, *voice*, the art of forming the human voice.

In ancient Greece, there were combats or conteſts eſtabliſhed for the voice, as well as other parts of the gymnaſtice.

The combats continued to be held in the time of Galen; and they were theſe that brought the phonaſcia into vogue. Hence the maſters of this art, and thoſe who taught the art of managing the voice, were called *phonaſci*, φωνασκοι; and under their tutorage were put all thoſe deſtined to be orators, ſingers, comedians, &c.

PHONIA, in *Geography*, a town of European Turkey, in the Morea; 22 miles W.S.W. of Corinth.

PHONICS, Φωνικη, derived from φωνη, *voice*, or *ſound*, the doctrine or ſcience of *ſounds* (which ſee); otherwiſe called *acouſtics;* which ſee.

Phonics may be conſidered as an art analogous to optics; and may be divided, like that, into *direct*, *refracted*, and *reflected*. Theſe branches the biſhop of Ferns, in alluſion to the parts of optics, denominates *phonics*, *diaphonics*, and *cataphonics*.

Phonics is improveable, both with regard to the object, the medium, and the organ.

As to the object, ſound, it may be improved, both with regard to the production and the propagation of ſounds. The firſt, in ſpeaking or pronouncing, in whiſtling or ſinging, or hallooing or luring, which are all diſtinct arts, and all improveable. The ſecond, by the poſition of the ſonorous body.

With regard to the medium, phonics may be improved by the thinneſs and quieſcency thereof, and by the ſonorous body being placed near a ſmooth wall, either plane or arched, eſpecially cycloidally or elliptically: whence ariſes the theory of whiſpering places.

Add to theſe, that by placing the ſonorous body near water, its ſound is mollified; that by placing it on a plain, the ſound is conveyed to a greater diſtance than on uneven ground, &c.

As to the organ, which is the ear, it is helped by placing it near a wall, eſpecially at one end of an arch, the ſound beginning at the other; or near the ſurface of water, or that of the earth.

And alſo by inſtruments, as the ſtentorophonicon, or ſpeaking-trumpet.

Alſo by an inſtrument to help weak ears as ſpectacles do eyes; by an inſtrument to take in vaſtly remote ſounds, as teleſcopes do objects; by a microphone, or magnifying ear-inſtrument; and by a polyphone, or multiplying ear-inſtrument.

Cataphonics, or reflected hearing, may be improved by ſeveral kinds of artificial echoes; for, in general, any ſound falling, either directly or obliquely, on any denſe body of a ſmooth ſurface, whether plain, or arched, is beat back again, or reflected, *i. e.* it echoes more or leſs. See ECHO.

PHONICUM CENTRUM. See CENTRUM.

PHONOCAMPTICUM CENTRUM. See CENTRUM.

PHOORY, in *Geography*, a town of Hindooſtan, in Baglana; 28 miles S. of Zolnani.

PHORA, in *Ancient Geography*, a town of Aſia, in Greater Armenia, between Taſco and Mapa, according to Ptolemy.

PHORAGA, a town of Aſia, in Aria. Ptolemy.

PHORBÆ, a town of Theſſaly, which belonged to the Achæans; called alſo *Phorbas*.

PHORBANTIA, an iſland on the coaſt of Sicily. Ptolemy.

PHORBANTIUM, a mountain of Theſſaly, in the Trazena. Steph. Byz.

PHORBEIA, φορβεια, a muſical inſtrument of the ancients, implies a *capiſtrum* or leather bandage, with which the players on the flute ſurrounded their heads. The phorbeia was placed before the mouth of the muſician, oppoſite to which was a ſlit for the reed to paſs through. See FLUTE.

This bandage was uſed for the purpoſe of augmenting the force of the wind, and not only to prevent the ſwelling the cheeks of the performer, but to prevent the wind from eſcaping at the ſides of the reed. See CAPISTRUM.

PHORCYNUS, in *Ancient Geography*, a port of the iſle of Ithaca, mentioned by Homer, and alſo by Strabo.

PHORIMOS, a name given by ſome authors to roch alum.

PHORINE, a word uſed by ſome authors to expreſs the ſkin of a hog; ſome alſo underſtand it to mean a ſkin of any kind, extending it even to the human cutis.

PHORMINX, an ancient muſical inſtrument, ſeems to have been the largeſt kind of lyre. See LYRE.

PHORMIUM, in *Botany*, a name adopted by Forſter from the ancient Greeks, whoſe φορμιον was uſed for making mats, or baſkets, being ſo called from φορμος, *a baſket* or *pannier*. Forſter's plant ſerves for ſimilar purpoſes in New Zeeland. Forſt. Gen. t. 24. Linn. Suppl. 28. Schreb. 799. Willd. Sp. Pl. v. 2. 171. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 2. 284. Juſſ. 52. (Lachenalia; Lamarck Illuſtr. t. 237. f. 2. Chlamydia; Gærtn. t. 18.)—Claſs and order, *Hexandria Monogynia*. Nat. Ord. *Coronariæ*, Linn. *Aſphodeli*, Juſſ.

Gen. Ch. *Cal.* none. *Cor.* Petals ſix, obliquely aſcending, oblong, converging into a tube, united at the baſe, unequal; the three outermoſt acute, keeled; the three innermoſt longer, reflexed rounded and vaulted at the extremity, ſlightly emarginate. *Stam.* Filaments ſix, thread-ſhaped, aſcending, longer than the corolla; anthers erect, nearly triangular. *Piſt.* Germen ſuperior, oblong, obtuſely triangular; ſtyle thread-ſhaped, nearly erect, rather ſhorter than the ſtamens; ſtigma ſimple. *Peric.* Capſule oblong, pointed, with three furrowed angles, three cells and three valves; the partitions from the middle of each valve. *Seeds* numerous, imbricated in two rows along each partition, ovate, black and ſhining, compreſſed, bordered.

Eſſ. Ch. Corolla inferior, of ſix petals; the three inner ones longeſt. Stamens prominent. Capſule oblong, triangular. Seeds compreſſed, bordered.

1. Ph. *tenax*. New Zeeland Flax. Forſt. Prodr. 25. Linn. Suppl. 204. Cook's Voyage, v. 2. 96. t. 96. J. Mill. Ic. t. 2.—Native of New Zeeland and Norfolk Iſland. Hardy in our climate, flowering in June and July, but rarely. *Root* perennial, long, with many ſtrong fibres. *Stem* none. *Leaves* radical, numerous, erect, linear, acute, keeled, entire, ſmooth, four or five feet long, tough and rigid, of a glaucous green; ſtained with orange-colour about the lower part. *Flower-ſtalk* radical, branched, many-flowered. *Flowers* yellow, each about an inch and a half long. *Capſule* three inches long. Very ſtrong and good thread may be manufactured from the fibres of the leaves.

PHORMORAPHIS, in the *Materia Medica*, a name often uſed by the later Greek writers, and generally looked on as one of their unintelligible words, or the name of ſome drug not known at this time. See CARPESIA.

PHORONICUM, in *Ancient Geography*, a name given by Pauſanias and Steph. Byz. to a town of Argos, the capital of the Argolide.

PHORONOMIA, derived from φορα, *motion*, and νομος, *law*, is a ſcience comprehending the laws of motion, both of ſolids and fluids. The work of Hermannus, printed at Amſterdam in quarto, in 1715, under this title, is well known.

PHORONTIS, in *Ancient Geography*, a town of Aſia Minor, in Caria. Pliny.

PHORUM, a port of Greece, in Attica, in the vicinity of Pſyttalia. Strabo.

PHOS, a word uſed by ſome medical writers to expreſs a diſtemperature of the eye, in which there is ſeen a black circle wholly ſurrounding the pupil.

PHOSCAS, in *Ornithology*, a name of a freſh-water fowl of the duck kind, and of the ſize of the common wigeon. Its body is remarkably flat; its beak and legs are blue; its head and neck are of a browniſh colour, variegated all over with numerous triangular black ſpots.

PHOSGENE GAS, in *Chemiſtry*, a ſpecies of gas lately diſcovered by Mr. John Davy, in his efforts to unite together the carbonic oxyd and the oxymuriatic gaſes. Some unſucceſsful attempts had been made for this purpoſe by Meſſrs. Gay-Luſſac and Thénard, and afterwards by Mr. Murray of Edinburgh. Mr. Davy accompliſhed this object apparently without any difficulty. The gaſes were put in contact and expoſed to a bright light for a quarter of an hour; when the mixture was diminiſhed to half its original bulk, and a gas was left, which poſſeſſed ſeveral remarkable properties. It is compoſed of equal volumes of chlorine and carbonic oxyd gaſes, condenſed into half their bulk. It is colourleſs; and has a ſtrong diſagreeable ſmell. Its ſpecific gravity is 3.669; and 100 cubic inches, under a mean temperature and preſſure, weigh 111.91 grains; hence it is by far the heavieſt gas at preſent known. It reddens vegetable blues. It combines with ammonia, condenſing four times its bulk of that gas, and forming a peculiar neutral ſalt. Phoſgene gas is decompoſed by water, and by moſt metallic bodies. It is an acid of a very peculiar nature, and deſerves a much more complete examination. As this gas has been hitherto produced only by the action of light, Mr. Davy propoſed to name it "phoſgene." Phil. Tranſ. for 1812, part i.

PHOSPHATS, are ſalts formed by the phoſphoric acid, with the different ſaline bodies. See the reſpective baſes, as Potash, Soda, &c.

PHOSPHITES, ſalts formed by the phoſphorous acid combining with the baſes of ſalts.

PHOSPHOLITE. See Apatit.

PHOSPHORI, or *Phoſphoreſcent Subſtances*, may be diſtributed into three claſſes. The firſt comprehends thoſe which require a previous expoſure to the ſolar or other light, in order to become luminous; on which account they are called "ſolar phoſphori." See Phosphorus.

The ſecond claſs includes thoſe which, without any neceſſary previous expoſure to light, become luminous when moderately heated; theſe, by way of diſtinction, may be denominated "phoſphori from heat." Theſe differ from the former in that, after having been continued at any particular temperature till their luminouſneſs is exhauſted, they are incapable of becoming again luminous, except at a greater heat than that to which they were firſt ſubjected. The range of temperature at which theſe bodies become luminous, commences at about 400° Fahr., and terminates at the loweſt viſible red heat. In ſome the light is almoſt momentary; in others it remains many minutes. The intenſity of the light appears to be unalterable, whether the body that emits it be in a Torricellian vacuum, or plunged in any of the natural or artificial gaſes. The following ſubſtances are arranged by Mr. T. Wedgwood, according to the brilliancy of their light. See Phil. Tranſ. vol. lxxxii. p. 28.

The moſt phoſphoreſcent of all ſubſtances by heat, is that variety of the blue fluor of Derbyſhire, which when ſcraped or ſtruck emits a fetid bituminous odour; it glows, when moderately heated with a pale emerald green light, ſufficiently intenſe to be very viſible even in day light. To the ſecond rank belong the common ſwine-ſtone, the common blue fluor, and red felſpar, all of which, as well as thoſe that follow, exhibit a white or reddiſh light. The third claſs includes the diamond, the ruby, carbonated barytes, chalk, colourleſs calcareous ſpar, ſea-ſhells, granite, and white fluor. The fourth claſs comprehends white ſand, carbonated magneſia, heavy ſpar, flint, white marble, quartz, porcelain, and earthen ware. The fifth claſs includes moſt of the metals, ſulphat of potaſh, borax, white paper, white linen, ſawduſt, and aſbeſtos. Under the ſixth and laſt claſs are comprehended oil, wax, ſpermaceti, and butter when nearly boiling. To exhibit with the greateſt effect the luminous property of theſe bodies, the harder ones ſhould be coarſely pulveriſed and ſprinkled in a dark room on the ſurface of a thick metallic plate, heated below redneſs. A very ſtriking exhibition of the phoſphoreſcence of the fetid blue fluor may be made by heating ſome oil in a clear flaſk till it becomes luminous, and then dropping in about a teaſpoonful of pulveriſed fluor; at the inſtant when this latter comes in contact with the hot liquid, a bright flaſh of green light is given out, which may be renewed for many times, by repeatedly ſhaking the veſſel. Moſt of the ſubſtances above mentioned, are phoſphoreſcent alſo by friction. Sir H. Davy has alſo obſerved, that if fluor be heated till it ceaſed to become luminous, it is ſtill capable of producing light by colliſion; and it is obſerved, that certain other bodies, as tremolite, and a particular variety of blende, give out much light even from the ſcratch of a pin.

The third claſs of phoſphoreſcent ſubſtances, conſiſts of thoſe which, belonging to the animal and vegetable kingdoms, emit light ſpontaneouſly at the common temperature, without the neceſſity of previous expoſure to light: theſe may be denominated "ſpontaneous phoſphori." Animal ſubſtances exhibit this appearance before the commencement of putrefaction; and it ceaſes when the putrefaction is complete. Among thoſe who have directed their attention to this ſubject, we may reckon Boyle, Canton, and Dr. Hulme. See Light.

PHOSPHORIA, Φωσφορια, in *Antiquity*, a feſtival in honour of Phoſphorus or Lucifer.

PHOSPHORIC Acid, in *Chemiſtry*. This acid is found in combination with lime, ſoda, and ammonia in animal ſubſtances, and is alſo a component part of ſeveral minerals. It may be obtained, but not in a ſtate of purity, from the bones of animals. For this purpoſe, the bones are firſt burned to whiteneſs in a red heat, and then reduced to a fine powder. This powder is decompoſable by the ſulphuric acid, by which means the phoſphoric is ſet free in the liquid form, while the ſulphat of lime is inſoluble. This liquid, however, is found not to contain the phoſphoric acid pure, but combined with ſome lime. Hence this proceſs is not reſorted to for getting pure phoſphoric acid. The following is unobjectionable.

Into ſome hot nitric acid project ſmall bits of phoſphorus, till no more efferveſcence takes place. The nitric acid is decompoſed, giving the whole of its oxygen to the phoſphorus, while the nitrogen which conſtitutes the efferveſcence eſcapes in the form of gas. A thickiſh fluid reſults from this proceſs, which, when evaporated in a platina crucible, ſtill thickens till it is raiſed to a red heat. On cooling it aſſumes the ſolid form, and is tranſparent like glaſs. This is the pure phoſphoric acid, which in this form is alſo called phoſphoric glaſs. It poſſeſſes all the eſſential properties of an acid. It has a ſharp acid taſte, and changes vegetable blues to red.

Its affinity for water is ſuch that it ſoon deliqueſces in the air, exhibiting the ſame viſcid oily appearance which it poſſeſſed before evaporation. It has no ſmell, not being volatile at leſs than a red heat, when it exhales in the form of white ſmoke.

In the ſtate of glaſs its ſpecific gravity is 2.516, which will be leſs in the liquid form as it contains more water.

It diſſolves readily in water, producing heat, though much inferior to that produced by the combination of the ſulphuric acid with water; a proof that the former has leſs attraction for water.

This acid is known to conſiſt of 1 atom of phoſphorus to 2 of oxygen. The atom of phoſphorus being 9, and that of oxygen 7, will make the acid $9 + 14 = 23$, which is near the truth. It does not combine with more oxygen, although its affinity is great for that ſubſtance.

It is not decompoſed in the cold by any of the inflammable bodies, the alkaline and earthy baſes excepted. Charcoal, zinc, and iron decompoſe it, when aſſiſted by a ſtrong heat in a cloſe retort, ſetting the phoſphorus free. It is in this way that phoſphorus is obtained. In its dilute ſtate it acts on ſeveral of the metals, as zinc, tin, and iron. They are firſt oxydated by the water, when hydrogen gas is evolved. The acid then combines with the oxyd, forming ſalts, which are deſcribed under their reſpective baſes. It combines with the alkalies, earths, and the reſt of the metallic oxyds.

The experiments of Lavoiſier and Dalton agree in making the proportion of oxygen to be what has been already ſtated. The former chemiſt found that 114 of the acid contained 69.375 of oxygen.

Phosphoric *Matches*, or *Tapers*, are prepared by the following ſimple proceſs. Take a glaſs tube, four inches long, and one line in diameter, cloſed at one end. Introduce a ſmall quantity of phoſphorus into the tube, and puſh it to its farther end; after which, a taper covered with a ſmall quantity of wax is introduced into the ſame tube. The open end is then hermetically ſealed, and the other end is plunged into boiling water; upon which the phoſphorus melts, and fixes itſelf upon the match. A line is drawn at one end of the length of the tube, with a flint, that it may be broken, as occaſion may require. The match is to be drawn out quickly to inflame the phoſphorus.

The proceſs of M. Lewis Pegle for making the inflammable bougies conſiſts in taking a glaſs tube, five inches long, and two lines wide, one end of which is ſealed with a blowpipe. Small tapers of wax are prepared, with three double threads of cotton twiſted together. The extremity of the match or taper is half an inch long, and muſt not be covered with wax. A piece of lead is laid in a ſaucer filled with water; and upon this the phoſphorus is cut, beneath the water, into fragments of the ſize of a grain of millet. One of theſe grains is to be dried, and introduced into the tube of glaſs; after which the fortieth part of a grain of very dry ſulphur is to be added, that is, half the weight of the phoſphorus. One of the bougies is then taken, and its extremity dipped in very clear oil of wax. If too large a quantity riſes, it muſt be dried with a cloth. The match is introduced into the tube with a turning or twiſting motion between the fingers. The bottom of the tube muſt then be plunged into boiling water, to ſoften the phoſphorus; obſerving to keep it no longer than three or four ſeconds in the water. The other extremity of the tube is afterwards ſealed. Theſe bougies muſt be kept in a tin tube, to avoid the danger of inflammation.

Phosphoric *Bottles*, are formed by heating a glaſs bottle, and fixing it in a ladle full of ſand; and then two or three ſmall pieces of phoſphorus are introduced into it. A ſmall red-hot iron wire is uſed to ſtir the phoſphorus about, and cauſe it to adhere to the internal ſurface of the bottle, where it forms a reddiſh coating. The heated wire is introduced repeatedly; and when all the phoſphorus is thus diſtributed within the bottle, it is left open for a quarter of an hour. and afterwards corked. When this is uſed, a common match tipped with ſulphur is introduced into the bottle, turned round, and quickly drawn out. The phoſphorus which ſticks to the ſulphur takes fire, and lights the match.

The theory of this phenomenon depends upon the circumſtance, that the phoſphorus is ſtrongly dried, or half calcined, and needs only the contact of air to ſet it on fire.

As phoſphorus is ſoluble in oils, more eſpecially the volatile oils, theſe oils become luminous. If this ſolution be kept in a bottle, a phoſphoric flaſh, which emits a ſmall quantity of light, will be ſeen every time the bottle is opened. The oil of cloves is uſed in this operation. The combination of phoſphorus and oil appears to exiſt naturally in the glow-worm, or "lampyris ſplendidula" of Linnæus. Forſter of Gottingen obſerves, that the ſhining matter of the glow-worm is liquid. If the glow-worm be cruſhed between the fingers, the phoſphoreſcence remains on the finger. Henckel reports, in his eighth diſſertation of his "Pyritologia," that one of his friends of a ſanguine temperament, after having danced much, perſpired to ſuch a degree, that he thought his life in danger. While he undreſſed, lines of phoſphoric flame were ſeen on his ſhirt, which left yellow red ſpots behind them, reſembling the reſidue of burned phoſphorus. This light was long viſible.

A phoſphoric gas may be extracted from phoſphorus, which takes fire by the mere contact of air. It is to the diſengagement of a gas of this nature, that we may attribute the ignes fatui which play about burying grounds, and generally in all places where animals are buried and putrefy. It is to a ſimilar gas, that we may refer the inflammable air which conſtantly burns in certain places, and upon the ſurface of certain cold ſprings. Chaptal's Elem. of Chemiſtry, vol. iii.

PHOSPHORICAL Column. See Column.

PHOSPHOROUS Acid, in *Chemiſtry*. When phoſphorus is expoſed to the air in an open veſſel for a length of time, it gradually aſſumes the form of a thick fluid, of the appearance of oil. This is the phoſphorous acid. The ſlowneſs with which it combines with oxygen only allows it to combine with 1 atom of oxygen, by which it is conſtituted. Its atom is, therefore, 9 of phoſphorus with 7 of oxygen, equal to 16.

It is of a viſcid oily conſiſtence, having an acid taſte, and the ſmell of garlic.

When expoſed to heat ſome of the water evaporates, but the acid does not become concrete like the phoſphoric. In this ſituation the water is decompoſed. The oxygen combines with one portion of the phoſphorous acid, forming the phoſphoric acid. An atom of phoſphorus combines with the hydrogen, forming phoſphuret of hydrogen, which eſcapes in the form of gas. So that out of three atoms of phoſphorous acid, and one of water, two atoms of phoſphoric acid, and an atom of phoſphuretted hydrogen, are formed.

If the phoſphorous acid be expoſed to the air for a conſiderable length of time after it is formed, it is converted into phoſphoric acid.

When this acid with water is poured upon zinc, tin, or iron, the water is decompoſed as with the phoſphoric acid, but the hydrogen combines with phoſphorus, forming phoſphuretted hydrogen, which is known by the ſmell.

The ſulphuric acid, when aided by heat, gives an atom of oxygen, which converts it into the phoſphoric acid, while the ſulphurous acid eſcapes in the form of gas. The nitric acid produces a ſimilar change.

PHOSPHORUS, Φωσφορος, formed from φως, *light*, and φερω, *I bear*, a matter, which ſhines, or even burns, ſpontaneouſly, and without the application of any ſenſible fire.

Phoſphori are either *natural*, or *artificial*.

Phosphori, *Natural*, are matters which become luminous at certain times, without the aſſiſtance of any art or preparation.

Such are the glow-worms, frequent in our colder countries; lantern-flies, and other ſhining inſects, in hot countries; rotten wood; the eyes, blood, ſcales, fleſh, ſweat, feathers, &c. of ſeveral animals; diamonds, when rubbed after a certain manner, or after having been expoſed to the ſun or light; ſugar and ſulphur, when pounded in a dark place; ſea-water, and ſome mineral waters, when briſkly agitated; a cat's or horſe's back, duly rubbed with the hand, &c. in the dark; nay, Dr. Croon tells us, that upon rubbing his own body briſkly with a well-warmed ſhirt, he has frequently made both to ſhine; and Dr. Sloane adds, that he knew a gentleman of Briſtol, and his ſon, both whoſe ſtockings ſhone much after walking.

All natural phoſphori have this in common, that they do not ſhine always; and that they never give any heat.

The natural phoſphori are either foſſile, vegetable, or animal.

The foſſile are, though very different in degree, ſome ſorts of earths, white ſand, limeſtones, ſtalactites, and ſeveral other figured ſtones, iſland cryſtals, flints, ſome ſpecies of agates, white arſenic ; but no ſort of metals, metallic or ſulphureous bodies, as jet, amber, except the before-mentioned arſenic.

On the other hand, ſalts imbibe light, provided they are diveſted of every metallic principle ; otherwiſe not, though as pellucid as poſſible. For this reaſon none of the vitriols will imbibe light ; but other ſalts will though with a conſiderable difference as to quantity ; for ſal gem and rock ſalt imbibe very little ; ſea ſalt, if dry, and in cryſtals, much more ; and, in like manner, ſal ammoniac, ſal catharticum, and nitre yet more. This power is weak in the natron of the ancients, and alum ; but brighteſt of all in borax.

In the vegetable kingdom we find very few phoſphori ; that of dry rotten wood is weak and not laſting ; it appears chiefly upon the edges and inequalities of the ſurface. But this is moſt remarkable in the rotten wood of the fir-tree, and ſome others, where, in the dark, you ſee ſhining ſpots as big as tares ; whereas in full light the whole ſurface appears alike. Some few bars are luminous, but not conſiderably ſo ; but no fruits, ſeeds, or their meals. Cotton, and the cryſtals of tartar, appear very bright, but fine loaf-ſugar appears the moſt luminous of all both without and within ; gums and reſins retain no light.

There is a vaſt variety of phoſphori in the animal kingdom, ſuch as the bones and teeth ; to theſe may be added the ſhells of fiſh, egg-ſhells, the human calculus, bezoar, and thoſe parts of animals in which the terreſtrial principle is very predominant. But where there is a conſiderable quantity of oily matter, as in the hoofs, horns, and feathers, no light is manifeſt, or at leaſt in a ſmall degree. Light is viſibly retained by the ſkins of ſeveral living animals. Water cannot be made to imbibe light, though ice does exceedingly well, and eſpecially ſnow.

Beccarius propoſes ſome queries concerning the natural phoſphori, of which the firſt is, in what and how great a light the object ought to be placed ? He tried different phoſphori, in different degrees of light, and found them imbibe moſt light from the ſun itſelf ; next in quantity when the ſky was clear ; and the leaſt in foggy weather. Theſe experiments ſhould be made in the open air, and not in a houſe with the glaſs-windows ſhut ; becauſe many bodies appear luminous when the light has come directly to them, which will not have that appearance when the light has paſſed through the glaſs. He laſtly tried what light they would imbibe from very bright flame, and found that alabaſter itſelf, which is ſaturated more than any ſubſtance by the ſun's rays, imbibed exceedingly little. The next query is, how long theſe bodies ſhould remain in the light to be ſufficiently ſaturated ? Four or five ſeconds were found the utmoſt length of time required for that purpoſe. The other query is, how long the received light will continue in theſe phoſphori ? It does not laſt the ſame time in all ; but continues more or leſs, from two ſeconds to eight, in proportion to the ſtrength of the phoſphorus, and the quantity of light received.

But that which, of all natural phoſphori, has occaſioned the greateſt ſpeculation, is the

Phosphorus, *Barometrical*, or *Mercurial*. M. Picard firſt obſerved, that the mercury of his barometer, when ſhaken in a dark place, emitted light ; with this circumſtance, that in ſhaking the mercury with rapidity, ſometimes above, and ſometimes below its equilibrium with the air, the light was only ſeen when below it, where it appeared as if adhering to the upper ſurface.

But this light is not found in the mercury of all barometers ; which occaſions a great difficulty.

M. Bernouilli, upon examining the circumſtances of this phenomenon, invented a ſolution of the ſame ; he imagines, that upon the mercury's deſcending, the vacuum in the tube increaſing, there iſſues out of the mercury to fill up this exceſs of vacuity, a very fine ſubtile matter, before diſperſed throughout the pores of this mineral ; and that, at the ſame time, there enters through the pores of the tube another fine matter : thus, the firſt matter emitted from the mercury, and collected over its ſurface, ſtriking impetuouſly againſt that received from without, has the ſame effect with Deſcartes' firſt element againſt the ſecond ; that is, it produces the motion of light.

But why, then, is not the phenomenon common to all barometers ? To this he anſwers, that the motion of the ſubtile matter out of the mercury may be weakened, and prevented, by any heterogeneous matter collected on its upper ſurface, into a kind of pellicle, ſo that the light ſhould never appear, but when the mercury is perfectly pure. This reaſoning ſeemed confirmed from the experiments of ſeveral barometers, which he made according to this plan ; but the Royal Academy of Sciences, repeating experiments with barometers made after the ſame manner, did not meet with the ſame ſucceſs ; the light being found in ſome, but not in others.

M. Homberg, therefore, conjectured, that the difference conſiſted in the different qualities of the quickſilver : in ſome, he obſerved, they uſed quick-lime to purify it ; in others, ſteel-filings. The mercury, then, riſing in the diſtillation, and paſſing through the lime, might take away ſome parts thereof, capable, by their extreme ſmallneſs, of lodging in its interſtices.

Hence, as quick-lime always retains ſome fiery particles, it is poſſible, in a place void of air, where they ſwim at liberty they may produce this luſtre.

Mr. Hauksbee has ſeveral experiments on the mercurial phoſphorus. Paſſing air forcibly through the body of quickſilver, placed in an exhauſted receiver, the parts were violently driven againſt the ſide of the receiver, and gave all round the appearance of fire ; continuing thus till the receiver was half-full again of air.

From other experiments he found, that though the appearance of light was not producible by agitating the mercury in the ſame manner in the common air, yet that a very fine medium, nearly approaching to a vacuum, was not at all neceſſary.

And, laſtly, from other experiments he found, that mercury incloſed in water, which communicated with the open air, by a violent ſhaking of the veſſel wherein it was incloſed, emitted particles of light in great plenty, like little ſtars.

By including the veſſel of mercury, &c. in a receiver, and exhauſting the air, the phenomenon was changed ; and, upon ſhaking the veſſel, inſtead of ſparks of light, the whole maſs appeared one continued circle of light. Farther, if mercury be incloſed in a glaſs tube, cloſe ſtopped, that tube is found, on being rubbed, to give much more light, than when it had no mercury in it. When this tube has been rubbed, after raiſing ſucceſſively its extremities, that the mercury might flow from one end to the other, one ſees a light creeping in a ſerpentine manner all along the tube ; that is to ſay, the mercury is all luminous. The mercury, being made to run along the tube afterwards without rubbing it, was found to emit ſome light, though much leſs than before: this proves that the friction of the mercury againſt the glaſs, in running along, does in ſome meaſure electrify the glaſs, as the rubbing it with the hand does, only in a much leſs degree. This is more plainly proved by laying ſome very light down near the tube, for this will be attracted by the electricity raiſed by the running of the mercury, and will riſe to that part of the glaſs along which the mercury runs; and it is very plain from this, that what has been long known in the world under the name of the phoſphorus of the barometer is not a phoſphorus, but merely a light raiſed by electricity, the mercury electrifying the tube. Phil. Tranſ. N° 484. See ELECTRICITY and MERCURY.

PHOSPHORI, *Artificial*, are ſuch as owe their luminous quality to ſome art or preparation.

Phoſphori are, it is well known, often produced by art; ſome are made by the maceration of plants alone, and without any fire; ſuch as thread, linen cloth, but above all paper. The luminous appearance of this laſt, which is now known to be an electrical phenomenon, is greatly increaſed by heat. This is confirmed by two experiments; the firſt is, by expoſing the paper, ſpread upon an iron grate, to the naked fire, yet not near enough to reſcorch it, and then laying a warm brick thereon to retain the heat; by which means it was obſerved, that where the paper was not ſcreened by the iron grate, it was moſt luminous; ſo that by the lights and ſhades you might diſtinguiſh in the dark the image of the iron grate a conſiderable time. The other experiment is, the application of the paper to a plate of warm braſs; from which, when in the dark, you might very eaſily, by its being leſs luminous, diſtinguiſh the margin of the paper that had not been warmed by the braſs.

However Beccarius, though he acknowledges that paper, after having been made red-hot and cooled again, is an excellent phoſphorus, found, that it was much injured by being expoſed to the light of the ſun. He made experiments to the ſame purpoſe with a great variety of ſubſtances, mineral, vegetable, and animal; and obſerved, that the effects were the ſame, and that the ſtronger the light was, and the longer they were expoſed to it, the more injury they received: and he found alſo, that the injury they received was laſting.

The ſame author takes notice alſo of thoſe phoſphori which become ſo by the aſſiſtance of fire; but the fire here ſpoken of is not great enough to diſſolve their conſtituent parts, but only ſuch as may affect the external parts of their texture, and that but gently; ſo that the proceſs here mentioned is only drying or roaſting. For it is not the watery or the ſaline parts in bodies which are torrified, but the oleaginous, with which many vegetables, and moſt animals abound. The white fleſh of animals, ſuch as that of chickens, become a phoſphorus by roaſting, as well as the tendons; and whatever parts of animals become glutinous by boiling, ſuch as carpenters' glue, iſinglaſs, &c. to theſe may be added cheeſe. Bones, though they imbibe light without any preparation, have that property in a much greater degree when burnt, and their luminous appearance is much more lively. But roaſting has not this effect upon feathers, hoofs, horns, and only in a ſmall degree on whites of eggs, though the yolk when dry eaſily became a phoſphorus.

The ſame operation which produces ſeveral phoſphori from the animal kingdom, gives alſo ſeveral from the vegetable. Thus, by gently roaſting gums, as myrrh, gum tragacanth, and others, they appear luminous, though different in degrees; and this light is clear in proportion to the gentle evaporation of the aqueous parts. By this treatment nuts of every kind, pulſe, corn, coffee-berries, meal, bread, and wafers, alſo become phoſphori. Turpentine, amber, and ſome reſins, require more fire before they imbibe light; ſo that you muſt diveſt them of their acid, and their light etherial oil, to make them appear luminous. But here great care muſt be taken that they boil no longer than from being white they turn yellow; for, if you proceed longer, your labour is loſt. Thoſe phoſphori produced by torrefaction ſoon loſe their power, which, perhaps, neither time, nor a thorough diſſolution of their parts, can deprive the natural ones of. In general, as long as the phoſphori gained by torrefaction preſerve their power, their light is more ſharp and ſtriking, but the natural more weak. Thoſe that are gained by calcination, and Baldwin's phoſphorus, ſeem to poſſeſs both the ſtriking light of thoſe gained by torrefaction, and the weaker light of the natural phoſphori: the laſt they preſerve a long time, but the former is loſt, by degrees, much ſooner. The well calcined aſhes of plants, or rather their terreſtrial parts, remaining after the ſolution of their fixed ſalts by waſhing, and neutral ſalts, continue phoſphori after many years: ſo that, as far as we can judge, the luminary power which is gained by calcination, though not ſo intenſe, continues perpetual; whereas, that gained by torrefaction always decreaſes, and, in a very little while, is no longer viſible. Some, even by this method, continue to imbibe light much longer than others. Gum arabic, which continues longeſt, laſts ſix days; bread not one, and coffee only a few minutes. However, at any time, by a freſh torrefaction, you may recover theſe languid phoſphori; in which property they have great likeneſs to the Bolognian ſtone, and other phoſphori prepared by art.

Almoſt all bodies, by a proper treatment, have that power of ſhining in the dark, which, at firſt, was ſuppoſed to be the property of one, and afterward only of a few. How this is brought about is not eaſy to ſolve. If we ſuppoſe, with ſome, that the light from a luminous body enters and abides in the phoſphori; we ſhall find ſomewhat new to admire in light itſelf. It is no new opinion, that this fluid conſiſts of very fine particles, which are continually darted forth from a luminous body in all directions, with a very great velocity: but it has by nobody been laid down hitherto, that theſe particles are not diſſolved by the violence of their agitation, nor diſperſed, nor immediately ceaſe to exiſt; but ſubſiſt ſtill, and adhere to what bodies come in their way, as heat does. If, therefore, the particles of light are not diſſolved as ſoon as they are emitted from a radiant body, but continue ſome time, what elſe is required but that we allow its atmoſphere to every lucid appearance? If the phoſphori ſhine with a borrowed light, but not with their own, and that only when put in motion, and fired by the rays of a ſhining body, which ſome experiments ſeem to confirm, then other new doctrines will ariſe. There muſt be then a hidden, a ſecret principle in bodies, to be lighted up by this moſt ſubtle fire. There will be in the univerſe a certain perpetual fire from theſe phoſphori; the matter of which, though conſtantly diſſipated by burning, does not waſte enough to be obvious to our ſenſes. See Phil. Tranſ. N 478. in vol. xliv. art. 17. p. 83. and Beccarii Com. p. 52. 91, &c. See LIGHT, LIGHT *from Diamonds*, and *Bolognian* PHOSPHORUS, *infra*.

Of artificial phoſphori there are three principal kinds: the firſt *burning*, which conſumes every combuſtible it touches; the other two have no ſenſible heat; and are called the *Bononian* and *Hermetic* phoſphorus, to which claſs others of a ſimilar kind may be reduced.

Phosphorus, *Burning*, in *Chemiſtry*, is a ſimple inflammable ſubſtance.

The diſcovery of this phoſphorus was firſt made in 1677, by one Brandt, a citizen of Hamburgh, in his reſearches for the philoſopher's ſtone. Brandt communicated the ſecret to one Kraaſt, of Dreſden, but withheld it from Kunckel; upon which this chemiſt, knowing that urine was the ſubſtance employed, ſucceeded in his attempts of making phoſphorus; accordingly, this phoſphorus is commonly called *Kunckel's* phoſphorus, aſter his name. A ſimilar phoſphorus was alſo made by Mr. Boyle, after having ſeen a piece of it in the hands of Kraaſt, who brought it to London in 1679, in order to ſhew it to the king and queen of England; having been only informed that this phoſphorus was produced from ſome matter belonging to the human body. Kraaft, indeed, told Stahl, that he had communicated the proceſs for making it to Mr. Boyle; but this is ſuch an imputation on the integrity and honour of our Engliſh philoſopher, as can by no means be admitted on the teſtimony of a man, who had been treacherous to Kunckel, who traded in the ſecret of making phoſphorus, and after ſelling it to many perſons, publiſhed the proceſs for making it in the Mercure Galont, for June 1683. Kunckel, and a German chemiſt called Godfreid Hantkwitz, to whom Boyle communicated the method of preparing it, were the only perſons who made it in any conſiderable quantities.

M. Hellot, in his Memoir upon this ſubject, Ac. Paris, 1737, enumerates all the proceſſes for making it, that were in uſe ſoon after the diſcovery of it; *viz.* that publiſhed by Mr. Boyle in 1680, in the Phil. Tranſ. N° 196. (ſee Phil. Tranſ. Abridg. vol. iii. p. 346.); that of Kraaſt; that of Brandt, in a collection of experiments and obſervations of Dr. Hooke, publiſhed by Dr. Derham in 1726; that of M. Homberg, in the Ancient Memoirs of the Academy, in 1692; and thoſe found in the works of ſeveral chemiſts, particularly of Theickmeyer, Hoffmann, and Niewentyt. However, the operation continued in a great degree a ſecret till the year 1737, when a ſtranger came into France, and obtained a reward from the miniſtry for communicating his proceſs, which was executed by Meſſrs. Hellot, Du Fay, Geoffroy, and Duhamel. Since the publication of M. Hellot's Memoir, the operation has been no longer a ſecret; though ſeldom executed, becauſe it was rather curious than uſeful, and both troubleſome and expenſive.

The ſolid phoſphorus was formerly prepared from urine in the following manner. Evaporate a good quantity of urine of beer-drinkers to the conſiſtence of honey; cover it up in an earthen veſſel, and ſet it three or four months in a cellar to ferment and putrefy. Mix two parts of ſand, or powder of pot-ſherds, with one part of this urine, and put it into a retort, fitted to a long-necked receiver, with two or three quarts of water in it. Diſtil it in a naked fire, in a reverberatory furnace; at firſt gently; after two hours, augment the fire gradually, till all the black fetid oil be drawn off. Raiſe the fire to the higheſt degree; upon which white clouds will come into the receiver, and fix, by little and little, on one ſide, in form of a yellowiſh ſkin; and another part will precipitate to the bottom in powder. Keep the fire thus violent for three hours, till no more fumes ariſe. Let all cool, and unlooſe the veſſels; and, throwing more water into the receiver, ſhake all well about, to looſen what ſticks to the ſides. Pour the whole into a glaſs veſſel, to ſettle.

The volatile ſalt will now diſſolve in the water, and the phoſphorus and oil will ſink to the bottom; then pour off the water, and gathering the remaining part together, put it into a glaſs veſſel, with a little freſh water, and digeſt it in a ſand-heat, ſtirring it from time to time with a wooden ſpatula.

By this means, the phoſphorus will ſeparate from the oil, and ſink to the bottom: pour off the oil, and make up the phoſphorus, while hot, into ſticks for uſe.

Boerhaave gives us other ways of preparing phoſphorus. Recent urine, he obſerves, digeſted three or four days in a tall glaſs, with a heat no greater than that of a healthy man, grows ruddy, fetid, and cadaverous; this digeſted urine, being put to diſtil in a retort, yields a clear, fetid liquor, then a yellow volatile ſalt, which evaporated to the conſiſtence of a ſapo, and mixed with four times its weight of dry ſand, and the diſtillation continued in a covered retort, there ſucceſſively comes over, by greater and greater degrees of fire, a fetid brown oil, blueiſh fumes, and, finally, a groſs ſhining matter, which ſinks in water, and is the ſolid phoſphorus.

To make it more eaſily, and to the beſt advantage, it may be proper to take a ſufficient quantity of human urine, afforded by a perſon not much given to drink wine, and exhale it away in an open veſſel to a rob, or the conſiſtence of honey; then ſet it to putrefy for half a year, and, upon diſtillation, it will afford a large proportion of ſalt, after which, if ſix times its own quantity of ſand, or brick duſt, be added to the remainder, and the diſtillation be continued, as in the caſe laſt mentioned, the phoſphorus will fall into the water. Or it may commodiouſly be prepared, by ſuffering the rob of urine to digeſt for two years in an open veſſel in the open air; during which time, a ſlimy, feculent, unctuous, earthy matter, will fall to the bottom; which, being frequently waſhed with pure water, wherein it will not diſſolve, will leave a white matter behind it, neither of an alkaline, acid, ſaline, or terreſtrial, nor ſcarcely of an unctuous nature: and this is of itſelf a proper matter for the making of phoſphorus by diſtillation with ſand.

In order to preparing the phoſphorus, and indeed moſt of the other preparations of urine, the firſt ſtep is to reduce that liquor to the conſiſtence of a rob or thick extract; thoſe who have worked on this ſubject ſufficiently know how abominably nauſeous and diſagreeable a taſk this is. The operator alone is not the perſon who is almoſt poiſoned by it, but the whole neighbourhood is affected; and it is well known, that our Godfrey, who uſed to prepare large quantities of this ſubſtance, was always obliged to keep a houſe in the fields to perform this part of the proceſs in.

There is an eaſy and excellent method propoſed by Stahl for the performing of this troubleſome buſineſs, by means of condenſation by cold or freezing. There needs no more than to expoſe the proper quantity of urine to ſome froſty nights in winter; or at any time of the year to our ice-houſes, or other places where ice is preſerved all the year round. The froſt will, in this caſe, affect a large part of the urine, but not the whole; and the liquid part being ſeparated from the ſolid ice, it will be found that the watery parts alone have ſuffered the freezing, and that all the unctuous and ſaline ones are left behind in the unfrozen part, which is, by repeated freezings of its yet remaining aqueous parts, at length reduced to that ſort of rob which is required for all the purpoſes of diſtillation, and that without any trouble or offenſiveneſs, either to the operator or any body elſe. The power of condenſation by freezing in this manner, extends to wine, vinegar, and all fermented liquors; but it operates differently on the ſeveral different ones, and is to be regulated according to their natures. The natural cold of our climate is ſeldom too great for any of the liquors we deſire to condenſe; that is, it is never ſo great as to condenſe the whole into ice. It often is not ſufficiently great to condenſe the aqueous part, even after ever ſo many repetitions. In this caſe, it may be proper to bring in the uſe of the common freezing mixtures, made with ice, or ſnow and ſalt. To ſuit the artificial degree of cold, in theſe caſes, requires care and experience, and is almoſt as nice a point as the ſuiting of the degrees of heat in the operations of chemiſtry.

In 1743, Mr. Margraaf publiſhed, in the Memoirs of the Academy at Berlin, a new and excellent proceſs for obtaining more eaſily and expeditiouſly, and at leſs expence than had hitherto been done, a conſiderable quantity of phoſphorus. In his proceſs, a kind of plumbum corneum is previouſly prepared, by diſtilling a mixture of four pounds of minium with two pounds of powdered ſal ammoniac; the reſiduum after the diſtillation, or the plumbum corneum, is to be mixed with nine or ten pounds of extract of putrefied urine, boiled to the conſiſtence of honey. This mixture is to be made ſlowly in an iron cauldron ſet upon the fire, and by frequently ſtirring the contents. Half a pound of powdered charcoal is then to be added, and evaporation is to be continued till the whole is reduced into a black powder, which is to be put into a retort, in order to extract from it, by a moderate and gradual heat, all the volatile products of urine, that is, volatile alkali, fetid oil, and an ammoniacal matter which adheres to the neck of the retort. In this diſtillation the heat is only to be raiſed ſo as to make the matter red-hot. After the diſtillation a black and friable reſiduum is left, from which the phoſphorus is to be extracted by a ſecond diſtillation, and a ſtronger heat. Before it is expoſed to another diſtillation it may be tried by throwing ſome of it upon hot coals. If the matter has been well prepared, a ſmell of garlic exhales from it, and a blue phoſphorical flame is ſeen undulating along the ſurface of the hot coals. This matter is to be put into a good earthen retort, capable of ſuſtaining a violent fire, and which may be ſecured with a covering of clay and hair. Three quarters of the retort are to be filled with the matter which is to yield the phoſphorus. It is to be placed in the common furnace for diſtillation with a retort; excepting that inſtead of being terminated by an ordinary reverberatory or dome, this ought to be terminated by the upper piece of an air-furnace, to which a tube is to be applied, the diameter of which ought to be from four to ſix inches, according to the ſize of the furnace, and the height from eight to nine feet. This apparatus, which Mr. Beaumé uſes, is neceſſary for raiſing a ſufficient heat, and for the convenience of throwing in a ſufficient quantity of fuel through the door of the upper piece of the furnace. The retort ought to be well luted to a receiver of moderate ſize, pierced with a ſmall hole, and half full of water. For this purpoſe ordinary fat lute may be bound on with ſtrips of linen, dipped in a lute prepared with lime and whites of eggs. The hole in the furnace through which the neck of the retort paſſes ought to be well ſtopped with furnace-earth. Laſtly, a ſmall wall of bricks is raiſed betwixt the furnace and the receiver, to guard this veſſel againſt heat as much as poſſible.

All theſe preparations being made the evening before the diſtillation is to be performed, we are then capable of proceeding to this operation, which is very eaſy. The retort is to be heated by ſlow degrees during an hour and a half; and then the heat is to be increaſed till the retort be red-hot, and the phoſphorus begin to paſs in luminous vapours: when the retort is almoſt of a white-red heat, the phoſphorus paſſes in drops, which fall and congeal in the water at the bottom of the receiver. This degree of heat is continued till no more paſſes into the receiver. When a retort contains eight pints or more, this operation continues about five hours.

Mr. Margraaf's apparatus is ſomewhat different from that above deſcribed. He divides the whole quantity of matter from which the phoſphorus is to be obtained into ſix ſmall retorts, which he places in a furnace that he deſcribes. The advantage of this diviſion is, that if any accident happens to one retort, the whole matter is not loſt; and as the retorts are ſmaller, a leſs heat is required. If, indeed, much phoſphorus was to be made, this practice would be ſafe and excellent; but Macquer affirms, that the method above deſcribed of Mr. Beaumé is very convenient when a large quantity of phoſphorus is not wanted, and that he has never ſeen it fail.

Phoſphorus does not paſs pure in this diſtillation, but is blackened by ſoot or coal, which it carries along with it: it may be eaſily purified, and rendered white and fine by a ſecond diſtillation or rectification. This rectification is made in a ſmall glaſs retort, to which is adjuſted a ſmall receiver half full of water. A very gentle heat is ſufficient, becauſe phoſphorus once formed is very volatile: and as the fuliginous matters with which it is ſoiled were raiſed merely by the violence of the heat, they remain at the bottom of the retort in this diſtillation, and the phoſphorus paſſes very pure.

The phoſphorus is then uſually divided into ſmall cylindrical rolls, for the conveniency of uſing it. This is done by putting it in glaſs tubes immerſed in warm water. This very gentle heat is ſufficient to liquefy the phoſphorus, which is almoſt as fuſible as ſuet. It takes the form of the glaſs tubes, from which it may be taken out when it is cold and hardened. That it may be more eaſily taken out of the tubes, theſe muſt be ſomewhat of the form of fruſtums of cones. All theſe operations ought to be made under water, to prevent the inflammation of the phoſphorus.

Phoſphorus is now uſually procured by the following proceſs. Calcine a quantity of bones till the whole of their inflammable matter is conſumed, which will be indicated by their whiteneſs. After they are reduced to a fine powder, let 100 parts, by weight, be mixed with 500 parts of water, in a veſſel of ſtone ware, or any other which ſulphuric acid will not act upon. To the above mixture add, by degrees, 40 parts of ſulphuric acid, conſtantly ſtirring the mixture with a ſtick or a glaſs rod. After the efferveſcence has ſubſided, let the mixture ſtand for a day or two, then decant off the clear liquor, which is to be preſerved. Let the reſiduum be agitated with a quantity of freſh water, and thrown upon a filtre, adding the clear liquor which runs through to that decanted in the firſt inſtance. Let more water be poured upon the filtre till it comes through taſteleſs. This being added to the laſt, the whole will contain a ſuper-phoſphat of lime, with great exceſs of acid. In order to ſeparate the phoſphoric acid from the lime, the nitrat of lead is to be added. Phoſphat of lead precipitates in the ſtate of white powder, while the lime is diſſolved in the nitric acid. The phoſphat of lead being very ponderous, may be ſeparated by decantation and repeated waſhing. When the powder is dried, mix it with one-eighth its weight of charcoal powder, and put it into an earthen retort. The common earthen retorts are ſeldom fitted for this proceſs, being very liable to crack. The clay of which they are formed ſhould be mixed with coarſely powdered crucibles, to render the texture of the ſubſtance when baked more open. The outſide muſt be coated with white lead and flint, to form a glazing during the diſtillation of the phoſphorus. Without this precaution the vapour of the phoſphorus would eſcape through the pores of the veſſel. The retort, with its contents, muſt be placed in an air-furnace, with a ſlit in the ſide to admit the neck of the retort. The fuel ſhould be well burnt coaks, and the fire raiſed very gradually. The neck of the retort ſhould be luted to an adopter, which is fitted to a glaſs receiver, previouſly filled with azotic gas. A ſmall tube ſhould proceed from another opening in the receiver, terminating in a pneumatic trough. This ſerves to carry off the elaſtic fluids which are diſengaged in the proceſs. During the firſt ſtage of the proceſs carbonic acid is diſengaged, which is afforded by the carbon combining with the oxygen of the phoſphoric acid and the oxyd of lead. The charcoal always contains a portion of moiſture, which is decompoſed by the carbon. In the laſt ſtage of the proceſs, when the phoſphorus riſes in the elaſtic form, a portion of it combines with the hydrogen of the water, forming phoſphoretted hydrogen gas, which takes fire when it comes in contact with oxygen of the atmoſphere. This ſpontaneous inflammation of the eſcaping bubbles, is a certain ſign that the phoſphorus is coming over. It is ſeen running down the adopter into the receiver, which contains a ſmall portion of water for it to drop into. The maſs which drops into the water is generally of a browniſh, and ſometimes a darker colour, and conſiſts of phoſphorus, containing ſome carbon, and is otherwiſe impure. When the apparatus is quite cold, it may be taken out, and placed in a glaſs funnel provided with a long cylindrical neck, about one-fourth of an inch in diameter, cloſed at one end with a cork. It is firſt filled with cold water, ſo as to cover the phoſphorus. The whole is now immerſed into hot water, which melts the phoſphorus which is cauſed to occupy the interior of the tube, aſſuming a pale yellow colour, while that in the top part of the tube is of a darker colour, and contains the impurities. The pure part is broken into pieces, in which ſtate it is ſold. If the phoſphorus after diſtillation be very impure, it ſhould be diſtilled a ſecond time from a glaſs retort, obſerving the ſame precautions in the receiver as in the firſt proceſs. After this it may be ſtrained through chamois leather under hot water.

The phoſphat of lead may alſo be procured by adding nitrat of lead to urine. The latter ſubſtance contains a quantity of the phoſphats of ſoda and ammonia, each of which give up their acid to the lead, forming phoſphat of lead, which falls to the bottom of the veſſel in the ſtate of an inſoluble white powder. This is doubtleſs the cheapeſt way of getting phoſphorus.

Stahl ſuppoſed phoſphorus to be a compound of muriatic acid with phlogiſton; but it was afterwards proved by the reſearches of Margraaf, that muriatic acid could not be produced by burning phoſphorus, nor could he ſucceed in forming phoſphorus by treating muriatic acid with inflammable bodies. He found in the courſe of his experiments, what has ſince led to the overthrow of the phlogiſtic doctrine. The phoſphorus gained weight by burning, and he called the ſubſtance reſulting from the combuſtion phoſphoric acid. Lavoiſier, in a ſatisfactory manner, confirmed the facts of the above chemiſt, by burning phoſphorus in oxygen gas. The diminution of the oxygen he found juſt equal to the increaſe of weight in the phoſphorus after burning. Hence it was eſtabliſhed, that phoſphoric acid was a compound of phoſphorus and oxygen.

Phoſphorus, when perfectly pure, is of a pale yellow colour, having ſome reſemblance to white wax. Like the latter ſubſtance it ſoftens by heat, and is ſo ductile as to be cut with a knife.

It is called "phoſphorus fulgurans" from its corruſcations; and "phoſphorus ſmaragdinus," becauſe its light is frequently green or blue, eſpecially in places that are not very dark.

It is alſo called "ſolid phoſphorus," from its conſiſtence.

It diſſolves in all kinds of diſtilled oils; and, in that ſtate, is called the "liquid phoſphorus."

It may be ground in all kinds of fat pomatums; in which caſe it makes a luminous unguent.

So that the phoſphorus fulgurans, ſmaragdinus, ſolid and liquid phoſphorus, and luminous unguent, are all the ſame preparation, under different circumſtances. See FULGURATING *Phoſphorus*.

The ſpecific gravity of phoſphorus is about 1.77; the fuſing point is 90° Fahr.; and it aſſumes the form of vapour at a little ſhort of 600°.

When phoſphorus is heated to 148 in the open air, it takes fire and burns with great brilliancy, owing to the rapidity with which it combines with oxygen. Very denſe white fumes are produced, ſo as ultimately to nearly obſcure the flame. If the combuſtion be made in a veſſel, the fumes adhere to its ſides, and become liquid, by attracting moiſture from the atmoſphere. A portion of red matter is left after the burning has ceaſed, which is probably a compound of phoſphorus and carbon. The liquid which is formed upon the ſides of the veſſel has an acid taſte, and conſiſts of phoſphoric acid, water, and probably a ſmall quantity of phoſphorus which has eſcaped combuſtion. When phoſphorus is burnt in pure oxygen, the light produced is of ſuch dazzling ſplendour as to give pain to the eyes. The combuſtion is by this means complete, and if the oxygen is in ſufficient quantity, the whole is converted into phoſphoric acid.

Lavoiſier found that 100 grains of phoſphorus took up 154 grains of oxygen, ſuppoſing the atom of oxygen to be 7, hydrogen being 1, agreeably to the numbers of Dalton. And conſidering the phoſphoric acid as an atom of phoſphorus with two atoms of oxygen, we have $\frac{154}{100} = \frac{14}{9.1}$. Dalton has fixed the atom of phoſphorus at 9. From theſe data the atom of phoſphoric acid will be $9 + 2 \times 7 = 23$.

When phoſphorus is expoſed to the air in ſmall bits, it gives out a white ſmoke for ſome time, and is ultimately changed into a clear vivid oily liquid, which has an acid taſte. In this proceſs it combines ſlowly with oxygen, and conſiſts of one atom of phoſphorus with one of oxygen, or $9 + 7 = 16$. When phoſphorus is made to undergo ſlight combuſtion, by melting it over the interior of a phial, with the preſence of ſmall quantities of air, the phoſphorus aſſumes a reddiſh colour. By this change it is found to take fire with much greater facility, ſo much ſo that this proceſs is reſorted to in the conſtruction of the common fire bottles.

From this and other facts it is probable that an oxyd of phoſphorus exiſts with leſs oxygen than is contained in phoſphorous acid. It doubtleſs is conſtituted by 2 atoms of phoſphorus to 1 of oxygen, or $2 \times 9 + 7 = 25$. See PHOSPHOROUS and PHOSPHORIC *Acids*.

The action of the acids upon phoſphorus is treated under the reſpective acids, but what has been omitted under OXYMURIATIC *Acid*, we ſhall introduce here.

The muriatic acid does not act upon phoſphorus when the acid is in the gaſeous form, but when preſented in combination with ſome other bodies, it forms very curious combinations, which have been little noticed. We are indebted to ſir Humphry Davy for our knowledge of theſe facts.

When phoſphorus is immerſed in oxymuriatic acid gas, it burns with a pale flame, producing a white ſubſtance, which adheres to the ſides of the veſſel. The above chemiſt found that one grain abſorbed nine cubic inches of the gas, and hence concludes that 1 of phoſphorus combines with 6.8 of oxymuriatic acid, or, agreeably to the nomenclature of this philoſopher, who conſiders the latter a ſimple body, *chlorine*. The number he gives to repreſent one proportion of chlorine is 67, that of oxygen being 15 and phoſphorus 20; ſo that he concludes the compound formed by burning phoſphorus in chlorine gas to conſiſt of two proportions of chlorine equal 134, to one proportion of phoſphorus equal to 20, or $134 + 20 = 154$, the number repreſenting the compound. To this ſubſtance he has given the name of phoſphorana. The advocates of the old hypotheſis conſider this compound as conſtituted by two atoms of muriatic acid, free from water, united to one atom of phoſphoric acid, and agreeably to the common nomenclature it will be called a ſupermuriat of phoſphorus. Dalton's number for muriatic acid is 22, for oxygen 7, and for phoſphorus 9. Hence this ſubſtance will be conſtituted by $2 \times 22 + 2 \times 7 + 9$, or 58 oxymuriatic acid to 9 of phoſphorus, but in fact 44 muriatic acid to 23 phoſphoric acid.

The compound in queſtion is deſcribed by its diſcoverer as being a ſnowy white ſubſtance. It is volatile at a temperature leſs than that of boiling water. It is capable of being fuſed under preſſure, and then cryſtallizes in the ſhape of priſms which are tranſparent.

He ſtates that "it acts violently upon water, which it decompoſes." Its phoſphorus combines with the oxygen, producing phoſphoric acid, and its chlorine with the hydrogen, forming muriatic acid. The advocates for the old opinion equally well explained the action of water upon this ſubſtance, by ſuppoſing the ſame quantity of water to combine with the muriatic acid, which ſir Humphry would ſtate to be decompoſed.

Another compound of this kind has been diſcovered by the ſame chemiſt, by diſtilling phoſphorus through the powder of corroſive ſublimate in a glaſs tube. A limpid fluid is obtained, which he ſtates to be a compound of one proportion of chlorine with one proportion of phoſphorus, or $67 + 20 = 87$. The properties of this compound are ſtated by ſir Humphry as follows: it emits and fumes when expoſed to the air, decompoſing the aqueous vapour, and is converted into acid in the air without inflammation. In its pure ſtate it does not redden dry litmus paper. The vapour from it burns in the flame of a candle. When poured into water, it is converted into muriatic and phoſphorous acid, the hydrogen combining with the chlorine to form muriatic acid, and the oxygen with phoſphorus forming phoſphorous acid. This ſolution, being evaporated to the conſiſtence of ſyrup, affords a very pure phoſphorous acid combined with water, the muriatic acid having eſcaped. It becomes ſolid on cooling.

Sir H. Davy has called the above compound phoſphorana.

By thoſe of the common opinion, this ſubſtance is conſidered as a compound of pure muriatic acid and phoſphorous acid. The phoſphorus, on paſſing through the ſuperoxymuriat of mercury, took an atom of phoſphorus from the mercury forming phoſphorous acid, which, combining with an atom of muriatic acid, formed the compound in queſtion, leaving behind an atom of muriat of mercury (calomel), which conſiſts of an atom of muriatic acid, with an atom of the firſt oxyd of mercury. By Dalton's numbers this ſubſtance is conſtituted by one atom of muriatic acid, 22 added to one of phoſphorous acid, equal to $9 + 7$ or 16, the whole being equal to $22 + 16 = 38$. All the phenomena ſtated above, which have been explained by ſir Humphry's hypotheſis, will be equally well explained by the old theory. The above ingenious chemiſt has pointed out a third compound of chlorine with phoſphorus, which he ſuppoſes to conſiſt of one proportion of chlorine with two of phoſphorus, or $67 + 2 \times 20 = 107$. This, by the old doctrine, would be conſidered as compoſed of 1 of muriatic acid, 22 to 2 of phoſphoric oxyd, equal 32, the whole being 52.

This ſubſtance was firſt obtained by Guy Luſſac and Thenard, by diſtilling phoſphorus and calomel. If its conſtitution be as above ſtated, 9 of phoſphorus ſhould be diſtilled with 196 of calomel.

Phoſphorus combines with hydrogen, forming a gaſeous compound called by ſome phoſphoretted hydrogen, and by others more properly phoſphoret of hydrogen. Several circumſtances ſhew the affinity between phoſphorus and hydrogen to be very ſlight, particularly its liability to be decompoſed even by agitation with water. The following is the proceſs recommended by Dalton for procuring it. To two ounces of dry hydrat of lime, or lime which has juſt taken as much water as is required to ſlack it, add 50 grains of phoſphorus in ſmall bits. Let theſe be put into a glaſs retort, which has been previouſly filled with nitrogen gas. Without the latter precaution the preſence of oxygen would decompoſe the gas intended to be obtained. Let the neck of the retort be connected with an hydromuriatic trough, and apply the heat of a lamp, which brings over the gas. The lime is here more than is neceſſary, which is no inconvenience. The abſolute quantities which are engaged in the proceſs are, 1 atom of hydrat of lime $= 8 + 24$, and 2 atoms of phoſphorus $= 2 \times 9 = 18$. The water of the hydrat of lime is decompoſed. The oxygen combines with one atom of phoſphorus, forming phoſphorous acid, which afterwards combines with the lime. The hydrogen combines with the other atom of phoſphorus, forming phoſphoret of hydrogen, which comes over in the form of gas. In this ſtate it takes fire ſpontaneouſly in the open air, or in contact with oxygen. The phoſphorus is eaſily ſeparated by the electric ſpark, and even by ſtanding over water, leaving the hydrogen pure, and occupying the original volume of the gas. This latter effect taking place partially, has given riſe to the opinion of phoſphorus combining with hydrogen in different proportions. We can hence explain the aſſertion made by ſir H. Davy, in which he ſays he has obtained phoſphoretted hydrogen gaſes of different ſpecific gravities, from 4 to 7; hydrogen being 1.

The compoſition of this gas is eaſily inferred from its ſpecific gravity, which Dalton ſtates to be 10.5, hydrogen being 1. Hence if 1 of hydrogen takes up 9.5 of phoſphorus without any change of volume, it will make the ſpecific gravity as above. By theory, 9 of phoſphorus ſhould combine with 1 of hydrogen, when 1 atom of the former combines with 1 of the latter. We may hence conclude that an atom of this gas in a ſtate of purity is $1 + 9 = 10$.

To confirm this, Mr. Dalton found that 1 meaſure of this gas to 1.5 oxygen produced phoſphoric acid; and 1 meaſure to 1 produces phoſphorous acid. We are indebted to ſir Humphry Davy for the diſcovery of a new compound of phoſphorus and hydrogen, which he obtained by expoſing the ſolid hydrat of phoſphorous acid to heat in a retort. An elaſtic fluid is produced, having a leſs diſagreeable ſmell than the phoſphoret of hydrogen, already deſcribed. It does not, like the latter, explode ſpontaneouſly. When heated to 300° Fahrenheit with oxygen, it detonates with violence. It alſo explodes in oxymuriatic gas with a white flame. This chemiſt ſuppoſes its ſpecific gravity to be about 12, hydrogen being 1.

When heated in potaſſium, its volume is doubled, and the gas produced is pure hydrogen. When ſulphur is ſublimed in it, the volume is doubled, and ſulphuretted hydrogen gas produced.

He found that 3 in volume of this gas took up more than 5 of oxygen. He concludes its compoſition to be nearly 2 of hydrogen to 10 of phoſphorus, by weight. According to Dalton's numbers it will conſiſt of an atom of phoſphorus to 2 of hydrogen, or $9 + 2 = 11$. If its volume be doubled by taking away its phoſphorus, which is the caſe in the experiment with potaſſium, its ſpecific gravity will be increaſed by 1 compreſſed into $\frac{1}{2}$, which will give a ſpecific gravity equal to 2: this added to 9, the weight of the phoſphorus, will give $9 + 2 = 11$, which is very near to ſir Humphry's experiment. In the experiment where it combines with the ſublimed ſulphur, the volume is doubled, and two atoms of ſulphuretted hydrogen are formed, one of which being equal to the original volume, will make the ſpecific gravity of this gas equal to that of ſulphuretted hydrogen, which is about 14, hydrogen being 1. The mean of theſe will be $\frac{11 + 14}{2} = 12.5$, which comes very near to ſir Humphry's ſtatement of the ſpecific gravity, and ſtrongly confirms the reſt of the facts relative to it.

The oxygen required for its total abſorption will be 28 to 11 by weight, and $\frac{28}{11} \times \frac{12}{14} = \frac{24}{11}$, or 2 to 1 by meaſure nearly. This is obtained by multiplying their ratios of weight by the inverted ratio of their ſpecific gravities.

Phoſphorus combines with ſulphur by melting them together in a glaſs tube, from which oxygen is excluded. The compound is more fuſible than either of the elements. Sir Humphry Davy found that a compound of theſe bodies in the proportion of 3 of ſulphur to 4 of phoſphorus, is fuſible at 40° Fahrenheit. When ſolid, its colour was of a yellowiſh-white. Theſe bodies, like all others, muſt produce moſt complete compounds in certain definite proportions dependent on the ratio of the weight of their ultimate atoms. Atom to atom, their proportions will be 9 to 13. The compound above alluded to will be 2 atoms of phoſphorus to 1 of ſulphur, or $18 + 13 = 31$. The moſt remarkable properties poſſeſſed by theſe compounds are their increaſed fuſibility, and their taking fire at a lower temperature than phoſphorus. This latter property has been taken advantage of in making the common fire-bottles. Their proportions for this purpoſe are generally about 2 phoſphorus and 1 ſulphur. This is nearly 3 atoms of phoſphorus to 1 of ſulphur, which would be 3×9 to $13 = 27$ to 13.

Dr. Prieſtley has made many experiments with phoſphorus, in different kinds of air; and has found, that it ſmoked and gave light in the acid air, juſt as it would have done in common air confined, without being ſenſibly waſted for twelve hours, and with a very inconſiderable diminution of the bulk of the air; in alkaline air it gave no light and made no laſting change in its dimenſions; in nitrous air, it gave no light, nor did it leſſen its power by diminiſhing common air, and the phoſphorus remained unchanged; and after having remained a day and two nights in vitriolic acid air, it produced no ſenſible effect, and gave no light.

Dr. Fordyce has ſuggeſted the following eaſy method of reducing phoſphorus to powder: take phoſphorus of urine two drachms; put it into a four-ounce phial; pour upon it three ounces of water; heat it gently by immerſion in warm water, till the phoſphorus melts; ſhut the phial with a cork; take it out of the water, and ſhake it briſkly till it be cold; and the phoſphorus will be found in powder. A receiver may be lined with this powder by adding a very ſmall quantity of water to it, and then making the powder to adhere to its internal ſurface, by gently inclining and turning the receiver round. Macquer's Chem. Dict. art. *Phoſphorus*, and Prieſtley's Experiments and Obſervations on Air, &c. Phil. Tranſ. vol. lxi. part ii. p. 504, &c.

Phosphorus, *Properties of Solid.* 1. With this phoſphorus one may write on paper as with a pencil, and the letters will appear like flame in the dark; yet, in the light, nothing will appear but a dim ſmoke. This is occaſioned by the oxygen of the atmoſphere combining ſlowly with the phoſphorus.

If the letters written with this phoſphorus are warmed by the fire, they preſently become dark lines, which continue upon the paper like ink.

2. A little piece, rubbed between two papers, takes fire inſtantaneouſly, and if care be not taken in the management of it, there is danger of burning the fingers, the phoſphorus being exceedingly inflammable.

3. Its burning is very vehement, and penetrates deeper into the fleſh than common fire; and it is very difficult to be extinguiſhed.

Dr. Slare, in order to determine whether air contains the pabulum of flame, as ſome have ſuppoſed, placed a large piece of phoſphorus in a receiver; but upon exhauſting it, he found that it became more luminous, and that upon admitting the air it returned to its former ſtate. This property was alſo aſcertained by ſeveral experiments of Mr. Haukſbee.

M. Caſſini happening to preſs a piece in a cloth between his fingers, the cloth immediately took fire; he endeavoured to put it out with his foot; but his ſhoe caught the flame, and he was obliged to extinguiſh it with a braſs ruler, which caſt forth rays in the dark for two months after.

The ſolid phoſphorus ceaſes to ſhine and never ſpoils, provided it be kept in a phial full of water; but if any part of it emerge, it will ſhine, though the glaſs be hermetically ſealed; and will continue ſhining in a large glaſs without water for ſeveral days, with very little diminution of its light or weight; and even when immerſed in water, it will ſometimes make very bright and vigorous corruſcations in the air; that in form of an unguent, does not keep ſo well; and the liquid phoſphorus worſt of all.

The liquid phoſphorus is beſt made by digeſting in horſe-dung, a little bit, or ſome ſcrapings of the ſolid kind, for two days, in oil or eſſence of cloves, oil of turpentine, or the like. After the diſſolution, the oil will be ſo impregnated with it, that, upon opening the bottle, the matter will appear on a flame.

Phosphorus, *Experiments with Liquid.* By waſhing the face, hands, or the like, with liquid phoſphorus, Dr. Slare tells us they will be made to ſhine very conſiderably in the dark, and the luſtre thereof will be communicated to adjacent objects, yet without any offence to the ſkin.

As ſoon as the candle is brought in, the ſhining diſappears, and no change is perceiveable.

This phoſphorus emits frequent flaſhes like lightning, even when cloſe ſtopped, eſpecially in warm water. Hence Mr. Boyle takes occaſion to draw a parallel between lightning and phoſphorus. Phil. Tranſ. Abr. vol. iii. p. 348, &c. Haukſbee's Phyſico Mech. Exper. p. 122. In ſome caſes animal ſweat, which is ſimilar to urine, has been obſerved to be phoſphoraceous, without any preparation. An inſtance of this kind is related of a perſon who uſed to eat great quantities of ſalt, and who was a little ſubject to the gout, after ſweating with violent exerciſe. Stripping himſelf in the dark, his ſhirt ſeemed to be on fire, and a urinous ſmell was perceived, ſimilar to that which iſſues from cabbage much ſalted and ſtrongly fermenting. Act. Cæſarienſia, vol. v. p. 334.

Phosphorus, *Bolognian*, or *Bononian*. The ſecond kind of artificial phoſphorus, is a preparation of ſtone called the Bononian ſtone, from Bologna, a city in Italy, near which it is found.

The firſt who undertook to make this ſtone luminous, was a chemiſt of that city, called Vicenzo Caſciarolo. Poterus, Licetus, &c. have deſcribed the proceſs; but miſtakenly. M. Homberg, who made a journey to Italy, expreſsly to learn the preparation, firſt communicated the ſame to M. Lemery, who publiſhed it in the ſeventh edition of his chemiſtry. (See Bononian *Stone*.) Under that article, the reader will find ſome account of the diſcovery of this ſtone, and of the method of preparing it. We ſhall here ſubjoin ſome farther particulars on this ſubject, chiefly extracted from the diſſertations of M. Margraaf. The Bolognian ſtone, he ſays, is ſoft, friable, heavy, cryſtallized, and incapable of efferveſcing with acids, before it has been calcined in contact with fuel, and with a free acceſs of air. Theſe qualities have induced him to claſs it among the heavy fuſible ſpars, which, by a preparation ſimilar to that for the Bolognian ſtone, are rendered phoſphoric. After analyſing theſe ſubſtances, he concludes that all contain a vitriolic acid, united to an alkaline or calcareous earth. In order to render theſe ſtones phoſphoric, ſuch of them ought to be choſen as are the cleareſt, but cryſtallized, moſt friable, moſt heavy, which exfoliate when broken, and which contain no heterogeneous parts. They are to be made red-hot in a crucible, and reduced to a very fine powder in a glaſs mortar, or upon a porphyry, and not in a copper mortar, which will obſtruct the ſucceſs of the operation. The powder thus obtained, is to be formed into a paſte with gum tragacanth, and divided into cakes as thin as a knife. Theſe are to be dried by a gradual heat. An ordinary reverberatory furnace is to be filled to three quarters of its height with charcoal, and the fire to be kindled; upon this charcoal the flat ſurfaces of the cakes are to reſt; and more charcoal is to be placed above them, ſo as to fill the furnace, which is then to be covered with its dome, the tube remaining open: all the coal is to be conſumed, and the furnace left to cool. The cakes are then calcined, and are to be cleanſed from the aſhes by blowing upon them with bellows. He farther obſerves, that after this calcination through the coals, if the ſtones be expoſed to a ſtronger calcination during a full half hour under a muffle, their phoſphoric quality will be rendered ſtronger. Ac. Berlin, 1749, and 1750.

This phoſphorus has not any ſenſible heat, and only becomes luminous after being expoſed to the ſun, or the daylight; in which ſtate it reſembles a burning coal, and preſerves its light five or ſix minutes in the dark, eſpecially if the perſon obſerving it has been ſome time in the dark, or has ſhut his eyes, that the pupils may be ſufficiently expanded; during which time the light gradually dwindles; and, to recover the ſhining, it muſt be expoſed afreſh to the light.

Phosphorus, *the Hermetic*, or *Phoſphorus Balduini*, which makes the third kind, and properly belonging to the ſame claſs with the former, is a preparation of Engliſh chalk, with aquafortis, or ſpirit of nitre, by the fire. See Baldwin's *Phoſphorus*.

This makes a body conſiderably ſofter than the Bolognian ſtone; but it has all the qualities of it. It has its name from its inventor Baldwin, a German chemiſt, called *Hermes*, in the ſociety of the Naturæ Curioſorum; whence its other name *Hermetic*. It was diſcovered a little before the year 1677.

This phoſphorus of Baldwin is exactly ſimilar to thoſe made with Bolognian ſtone and phoſphoric ſpars, differing only in the kind of acid which it contains. It is evidently a nitre with a calcareous baſis, and in calcination acquires its phlogiſton from the nitrous acid, the chalk alſo containing ſome of this inflammable principle. It is obſerved, however, that this is not ſo good a phoſphorus as the Bolognian; it is not ſo luminous, it does not retain the light ſo long, it ſoon loſes its virtue, and never recovers it again. Acad. Par. 1693, p. 271.

The proceſs for making this phoſphorus, though Baldwin gave no direction for it, nor ſo much as mentioned the materials, was communicated to the Royal Society, in 1679, by Dr. Slare, and publiſhed by Grew, in his Muſ. Reg. Soc. p. 353; and is as follows: Take good firm chalk, ignite it in a crucible, and then powder it; put into a pint, or half a pint of ſtrong ſpirit of nitre, *cochleatim*, as much of the powdered chalk as will ſerve well to ſatiate it, *i. e.* till it becomes ſweetiſh, and makes no efferveſcence upon the injection of the chalk. Then dilute this liquor with fair water, filtre it through a paper, and ſo evaporate it in a large glaſs, or glazed veſſel, or good Heſſian crucible, to a dry ſalt. The preparation may be performed in four hours.

To this claſs we may alſo refer ſome other phoſphori, enumerated in the ſequel of this article. As the

Phosphorus, *Ammoniacal*, compoſed of ſal ammoniac and lime, which Mr. Homberg firſt diſcovered.

The method of preparing it is this: Take one part of ſal ammoniac in powder, and two parts of lime extinguiſhed by lying in the air: mix them exactly together and fill a crucible with the mixture; ſet it in a ſmall melting heat. As ſoon as the crucible grows red-hot, the matter in it will melt, and it muſt be ſtirred with an iron rod, leſt it ſwell over the edges of the crucible: as ſoon as the whole is melted, pour it into a copper baſon; it will appear of a greyiſh colour and vitrified, and if it be ſtruck upon with any hard body, there will be ſeen a fire all over the place where the blow was given. As this matter is brittle, however, and the ſame maſs will not ſerve often for the experiment, the beſt method is to dip iron rods in it while melting, and theſe will be covered with the matter, and will anſwer the purpoſe eaſily and often. Mem. Acad. Par. 1693.

This is a combination of quick-lime with the acid of ſal ammoniac.

Phosphorus, *Antimonial*, is the name of a ſubſtance having the qualities of the phoſphorus diſcovered by Mr. Geoffroy, in his experiments on antimony. This gentleman had prepared a ſoap from pot-aſhes, quick-lime, and oil, with which he made ſeveral experiments on antimony; among others, he was deſirous, by means of this, to reduce ſome diaphoretic antimony, which he had before made from two parts of the regulus of antimony, and three parts of nitre; but, inſtead of the reduction which he was labouring after, his operation afforded him a much more ſingular phenomenon: the reſult of them being a phoſphorus, which he had never thought of; a matter which, after having remained perfectly quiet while cloſe ſtopt down, took fire as ſoon as ever it was expoſed to the air; and that with a violent detonation, and darting every where a ſhower of fire.

It is eaſy to ſee, that there are in the preparation all the requiſites for ſuch an effect; nitre, charcoal furniſhed by the burnt ſoap, and ſulphur both from the ſoap and from the regulus of antimony; and to all theſe a ſort of calx, either from the ſoap, or from ſome earthy parts of the antimony. It is eaſy to conceive, that all theſe ſubſtances, coming into a mixture together, ſhould be ready to catch fire and blaze, upon a proper application; but it is not leſs difficult to account for the effects being produced merely by the air, after the whole had been for a long time in a ſtate of reſt.

The method of preparing this new ſpecies of phoſphorus is this: Mr. Geoffroy mixed two ounces of his ſoap with one ounce of this diaphoretic antimony; this mixture, being put by little and little into a red-hot crucible, took fire, and ſwelled very much; after it had done flaming, the maſs ſubſided, and became a red or fire-coloured ſubſtance, of an even ſurface, but ſtill throwing up a vaſt quantity of blueiſh-green luminous vapours; and all this regularly happened on every freſh throwing in of the matter, without the leaſt variety. When the whole quantity was thrown in, and had ceaſed to give any flame or luminous vapour, it remained in the crucible in the form of an inverted muſhroom, being hollow, very porous, and of a black colour. When the crucible was taken out of the fire, the edges of this ſubſtance were beaten down into the middle, and the whole covered with an ounce of freſh ſoap; when this laſt ſoap was burnt, and a ſmall blueiſh flame appeared upon the ſurface of the maſs, the crucible was covered with a lid, and a large quantity of charcoal laid upon it, and the fire blowed up very briſkly by an hundred blaſts of the bellows, or thereabouts; but, notwithſtanding the fierceneſs of the fire, there was no fluid ſcoria formed, but the whole maſs remained ſpungy and porous; the fire was then ſuffered to go out, and the crucible placed in the corner of the elaboratory at reſt for five hours. In the evening, when the crucible was perfectly cold, Mr. Geoffroy went to examine the matter, and a ſervant went to uncover the maſs, by removing its ſurface with an iron inſtrument; but the moment the air was admitted, the whole maſs took fire, burning with a very conſiderable noiſe, and darting its flames every way to a great diſtance.

Mr. Geoffroy repeated the proceſs ſeveral times, and always with the ſame ſucceſs, whether he uſed his own diaphoretic antimony, or that made in the common manner. The great caution to inſure the ſucceſs, ſeems to be taking care of not carrying the fire too far before the addition of the laſt quantity of ſoap. Mem. Acad. Scien. Par. 1736.

Phosphorus *of the Bern-ſtone*, is a name given to ſtone (which, when heated, becomes a ſort of phoſphorus) from Bern, in Switzerland, the place where it is found.

This ſubſtance was ſent to the members of the Royal Academy at Paris, by M. Bourguet, and referred by them to the examination of M. du Fay, whoſe account of it is publiſhed in Mem. Acad. Paris, 1724.

The Bern-ſtone is of a moderate hardneſs, conſiderably pellucid, and uſually colourleſs, or whitiſh, though ſometimes with a tinge of green, yellow, or ſome other colours: it is compoſed of a number of plates or flakes, laid over one another in the manner of the iſland cryſtal; and, therefore, like that body is plainly a ſpar. It breaks into ſeveral faces, and has different angles; but of a ſomewhat determinate meaſure, the acute ones being of ſixty degrees, and the obtuſe ones of one hundred and twenty.

This ſtone, when heated at one of its angles with the flame of a lamp or candle, ſplits by means of the flame's inſinuating itſelf into the interſtices of the plates that are leſs firmly united; and theſe ſeparate, and ſome fragments uſually fly off with conſiderable violence. One of theſe pieces, carried into an obſcure place, appears ſurrounded with a blue flame, which laſts about a minute. And it is to be obſerved, that theſe pieces which fly off have all the ſhape of an irregular pyramid, with an uneven baſe. If this ſtone be put into a crucible and ſurrounded with coals, it becomes a very beautiful phoſphorus. The whole bottom of the crucible is ſeen, even though it be in broad daylight, ſhining with a bright and beautiful blueiſh white; and if it be carried into a dark place, the light is ſeen much more beautifully. If, after it is cold, it be again heated in a crucible, in the ſame manner, it ſhews the ſame bright appearance. After this, if it be tried a third time, it does not ſhine at all. According to all theſe phenomena, the effects of fire upon this ſtone ſeem to depend on a ſulphur contained in it, probably of the ſame nature with that which enters the compoſition of the metals. This may, by means of a heat, ſuch as that given by the candle or in the crucible, diſengage itſelf ſo far from the body of the ſtone as to take fire; and when it has burnt ſo long as to conſume itſelf, the luminous property of the ſtone ſeems to ceaſe.

The coloured gems are cryſtals of a peculiar kind, tinged with what has been called the ſulphur or phlogiſton of metals: this ſulphur gives them their colour, and conſequently it ought to give them the properties of the Bern-ſtone, if it were not too fixed to be diſſipated in the ſame eaſy manner, and to take fire in the diſſipation. And it appears, on trial, that the baſtard emeralds of Auvergne and other places, the matrix of the amethyſt, the fragments of ſome of the accidental jaſpers, the hyacinths, and ſome ſort of rubies, are all phoſphoruſes of the nature of the Bern-ſtone, but with different degrees of brightneſs. The mother of the emerald, the yellow jaſper, the water ſapphire, the malachite, the opal, and the garnet, have none of them any of this property.

Since the ſame ſulphurs, which take fire in the Bern-ſtone, are what give colour to theſe other ſtones, it ſhould ſeem, that thoſe, which are not of this phoſphorus kind, nor give a light after being heated, ſhould not loſe their colours in the fire; and this is found to be true in the garnet, which does not loſe any part of its colour, nor is it at all luminous; whereas the hyacinth, and ſome of the jaſpers and other ſtones, which loſe a part of their colour, not the whole, in the fire, become alſo in part luminous, or more ſo, in degree, according to the quantity of colour which they loſe. This, however, is no certain rule, ſince the mother of the emerald, the topaz, and ſome other ſtones, loſe all their colour, and yet are not at all luminous. The reaſon of this ſeems to be, that the ſulphurs are driven out of theſe ſtones ſo ſlowly, and in ſuch minute quantities, that they are not at any time collected into body enough to be capable of flame. There is nothing to be objected as to the Bern-ſtone ſhining; though they are uſually white, they may poſſeſs no ſmaller portion of ſulphurs than the coloured ſtones; only in thoſe the ſulphurs may be colourleſs, or white in themſelves. It may be poſſible alſo, that the ſulphurs in a ſtone of this kind may be diſperſed in ſuch ſmall molecules, as not to form a body ſufficient to give any colour; but when collected, in order to be driven off in the fire, they may then be ſufficient in quantity to give a blue tinge to the flame.

The iſland cryſtal, which is alſo a ſpecies of ſpar, and which greatly reſembles this Bern-ſtone in many particulars, flies to pieces alſo in the ſame manner, on being heated; and when carried into the dark, this alſo gives ſome ſparks of light, but they are few in number, and looſely ſcattered over the ſurface: when this ſtone is burnt a little in the crucible, there is ſome ſmall appearance of flame, with a ſmell of ſulphur, and the matter in the bottom of the crucible is found ſhattered to pieces; but all the pieces are regular parallelopipeds, as was the original maſs.

It is to be obſerved, that the Bern-ſtone, and others of the ſame kind, which only ſhine in the dark, and that only for a few minutes, when firſt taken out of the fire, are, properly ſpeaking, endued with no other luminous quality than that of a burning coal; but their light, having been generally unobſerved, and requiring darkneſs to ſhew it, has obtained for them the ſpecious title of *phoſphori.*

Phosphorus, *Canton's*, is an artificial phoſphorus, the method of preparing which was diſcovered by the late ingenious Mr. Canton, and publiſhed in the Phil. Tranſ. for 1768, vol. lviii. p. 337, &c.

This is much ſuperior to any ſingle natural ſubſtance, and has the advantage of being very eaſily and cheaply prepared. The proceſs is as follows: calcine ſome common oyſter-ſhells, by keeping them in a good coal fire for half an hour; let the pureſt part of the calx be pulverized, and ſifted; mix with three parts of this powder one part of the flowers of ſulphur; let this mixture be rammed into a crucible of about an inch and a half in depth, till it be almoſt full; and let it be placed in the middle of the fire, where it muſt be kept red-hot for one hour at leaſt, and then ſet by to cool: when cold, turn it out of the crucible, and cutting, or breaking it to pieces, ſcrape off, upon trial, the brighteſt parts; which, if good phoſphorus, will be a white powder, and may be preſerved by keeping it in a dry phial with a ground ſtopple. The quantity of light which a little of this phoſphorus gives, when firſt brought into a dark room, after it has been expoſed for a few ſeconds, on the outſide of a window to the common light of the day, is ſufficient to diſcover the time by a watch, if the eyes have been ſhut, or in the dark, for two or three minutes before. By this phoſphorus celeſtial objects may be very well repreſented; as Saturn and his ring, the phaſes of the moon, &c. if the figures of them, made of wood, be wetted with the white of an egg, and then covered with the phoſphorus. And theſe figures appear to be as ſtrongly illuminated in the night, by the flaſh from a near diſcharge of an electrified bottle, as by the light of the day. This phoſphorus receives no injury from being expoſed to the direct rays of the ſun, which is the caſe of ſome of the more delicate kinds, as Beccarius has remarked, and Lemery ſuppoſed with all. However, it cannot be expoſed to moiſture without loſing its property of imbibing and emitting light, and alſo its whiteneſs. Mr. Canton found, that it was more affected by mixture with ſpirit of wine than with ether. It had been long known, that heat promotes the expulſion of the light, which has been formerly imbibed by theſe phoſphori. Mentzel, who wrote ſoon after the diſcovery of Baldwin's phoſphorus, aſſerted, that it had the property of becoming luminous by heat only; the ſame fact was obſerved by M. du Fay; but the principle on which it depended was diſcovered by Beccarius, M. Margraaf, and Mr. Canton, independently of one another. Beccarius was firſt of opinion with Mentzel, that the light was produced by heat; but finding by repeated trials, that, without previous expoſing to the light, heat had no effect, he relinquiſhed that opinion. M. Margraaf fell at firſt into the ſame miſtake with Beccarius; but he afterwards obſerved, that the phoſphorus would not ſhine by being placed upon a hot furnace, unleſs it had been expoſed to the light two or three days before. Upon the whole, he concludes, that the light is held in this ſubſtance by attraction, and afterwards expelled by heat. Mr. Canton alſo, without any knowledge of the obſervations of Beccarius and Margraaf, found by a variety of experiments, that, when his phoſphorus had imbibed light, and had emitted all that it could in the common ſtate of the atmoſphere, it would emit more upon the application of heat, but that a continuance of the ſame degree of heat would only make it luminous for a certain time. Whence he infers, that there is a ſtrong attraction between light and the particles of natural bodies: and that the ſtrong vibrations into which heat throws them, compels them, as it were, to quit their hold of each other; and the light, which this phoſphorus gives, by being heated to a certain degree, appears to be cauſed by its throwing off adventitious particles, and not by any of its own; ſince its light will decreaſe, and be entirely gone, before the phoſphorus be hot enough to ſhine of itſelf, or to emit particles of light from its own body. Lemery and Muſchenbroeck have obſerved, that the Bolognian phoſphorus imbibes leſs light when hot than cold; becauſe it appears leſs bright when carried into a dark room; but this circumſtance is accounted for by Mr. Canton, by its parting with its light faſter when hot than when cold, and, therefore, parting with more in the time of the conveyance from one place to another: and this, he alſo ſays, ſeems to be the cauſe why the Bolognian phoſphorus never appears ſo bright after it has been illuminated, and, conſequently, in ſome meaſure heated, by the direct rays of the ſun, as after it has been only expoſed in the ſhaded open air to the common light of the day. However, there is reaſon to imagine, that the ſame degree of heat, which diſpoſes the phoſphorus to throw off the light after it has been imbibed, muſt likewiſe render it indiſpoſed to receive it. For an account of the reſult of Mr. Canton's experiments on this ſubſtance in favour of the materiality of light, ſee Light.

Phosphorus, *Wilſon's*, a ſubſtance belonging to the claſs of ſolar phoſphori, which Mr. B. Wilſon diſcovered, and which is one of the ſimpleſt and moſt powerful of all the phoſphori belonging to this claſs. The method of preparing it is as follows: Select twenty oyſter-ſhells, the thicker the better; then take from a fire that is briſkly burning, moſt of the flaming coals, but not all of them; ſtrew the ſhells over the ſurface, and replace the coals that have been taken off. In about an hour's time take out the calcined ſhells, breaking them as little as poſſible; and after expoſing them for a few minutes to the light, they will be found to have acquired a high degree of phoſphoreſcence, glowing in the dark, in a very beautiful manner, with moſt of the priſmatic colours. If the ſhells are ſufficiently heated in a cloſe crucible, they will exhibit priſmatic colours, chiefly blue and green, though not ſo bright as by the former method. If the calcination is effected in an iron crucible, all thoſe parts of the ſhells that are in contact with the ſides of the crucible will glow with a red light. The contact of inflammable matter, and particularly charcoal, with the ſhells during calcination, appears very much to contribute to the brilliancy of the phoſphorus: hence it is, that if the ſhells are calcined in a crucible in contact with thin plates of ſteel, the phoſphorus thus produced will be much more bright, and of more various colours, than where plates of iron are employed; and, on the other hand, if flat pieces of charcoal are made uſe of, the intenſity of the colours, eſpecially the blue, green, and red, is far greater than in thoſe produced by ſteel.

The colour of the light, in moſt phoſphori that have been preſented to the light, and that are then carried into the dark, is white or reddiſh-white; but in Wilſon's phoſphorus, not only white colours, but all thoſe of the priſm make their appearance, ſometimes being all united in a ſingle ſpecimen, at other times each piece exhibiting only one or two colours. In every ſpecies of ſolar phoſphorus, the light, after having been extinguiſhed, may be increaſed for any number of times, without the ſmalleſt apparent diminution of brilliancy, by ſimple expoſure for a few ſeconds to the light. If the phoſphorus be moderately heated, when it is preſented to the light, its luminouſneſs will be very ſenſibly augmented. If a common box ſmoothing-iron, heated as uſual, be placed for half a minute on a ſheet of dry white paper, and the paper be then expoſed to the light, and afterwards examined in a very dark cloſet, the whole paper will be luminous, and the part on which the iron box had ſtood will be much more ſhining than the reſt. It is obſerved that the variation of the temperature produces remarkable effects on phoſphori, *after* having been expoſed to the light. If a thin glaſs tube be filled with Canton's or Wilſon's phoſphorus, and as ſoon as it is brought into a cloſet made very dark, be plunged half way into a freezing mixture for a few minutes, it will be found, on again withdrawing the tube, that the cold portion is much leſs luminous than the other; and if the freezing mixture has been ſufficiently powerful, it will be entirely extinguiſhed. The luminous property in this caſe is ſuſpended, and not exhauſted: for as the dark part of the tube begins to acquire the temperature of the ſurrounding air, its light will revive, and it will remain longer than that of the other part of the tube, in proportion to the time of its being kept in the freezing mixture. From hence it would ſeem to follow, that at a very low temperature the preſent claſs of ſolar phoſphori would ceaſe to exiſt. As cold retards, heat quickens the emiſſion of light from phoſphoric ſubſtances. If the tube juſt mentioned be dipped half way into boiling water, the immerſed part will exhibit a great increaſe of luſtre, which in a minute or leſs time will be ſucceeded by total darkneſs; while the unheated part will ſhine for a much longer time, though with leſs ſplendour. If any one of theſe phoſphori, kept in the dark till it is totally extinguiſhed, be placed, without being again expoſed to the light, in the warm hand, its luminouſneſs will for a ſhort time be renewed; and if, when the hand fails to produce the effect, it be placed in boiling water, a further emiſſion of light will take place; and, finally, it may be entirely exhauſted of its light, by being placed on a metallic plate, heated nearly to redneſs. Hence it appears, that there are two cauſes of the extraordinary brightneſs exhibited by ſolar phoſphorus, when ſtrongly heated immediately on being introduced into the dark room: in the firſt place, there is a greater quantity of light actually given out; and, ſecondly, the whole is diſcharged in perhaps a twentieth of the time in which even a part would be exhauſted at the common temperature.

Two theories have been propoſed, in order to account for the origin of light in theſe ſubſtances. One theory aſcribes it ſimply to the ſolar light, which they had previouſly imbibed; and the other attributes it to the inherent light of the phoſphoreſcent ſubſtance itſelf. The advocates of the firſt theory allege, that previous expoſure to the light is neceſſary to the phoſphoreſcence of theſe ſubſtances, and that the period of its greateſt brilliance is the moment of its being placed in the dark, where it regularly and rapidly diminiſhes till it becomes extinct. Beccaria's experiment is alſo urged in favour of this theory: he found that thoſe phoſphori, which in the uſual circumſtances emit a white light, give out coloured rays in the dark, correſponding to thoſe which they receive from the ſun, with the interpoſition of a plate of coloured glaſs. The accuracy of this fact has been doubted. Du Fay's experiments, made before thoſe of Beccaria, tend to a directly oppoſite reſult; the light emitted by the phoſphorus being of the ſame tint, whatever was the colour of the glaſs through which the rays paſſed to the phoſphorus. Others have failed in repeating Beccaria's experiments. Mr. Wilſon, in particular, had made many experiments in reference to this point, which, with their reſults, he has detailed in his Treatiſe on Phoſphorus. His facts would lead us to conclude, that the phoſphoreſcent light is not merely that which was previouſly imbibed from the ſun; and yet they do not prove that it is properly inherent in the phoſphoric ſubſtance itſelf.

The ſolar phoſphori may be excited not only by the rays of the ſun, but by any other light that is ſufficiently powerful; and thoſe phoſphoreſcent ſubſtances which are moſt brilliant, in conſequence of expoſure to the light of day, are moſt eaſily excited, as we might naturally expect, by other luminous bodies. However, the rays of the moon, even when concentrated in a lens, appear to be incapable of illuminating even the moſt ſenſible kinds of phoſphori. The light of a ſingle candle, or the momentary flaſh from the exploſion of a little gunpowder, or from an electrical diſcharge, are ſufficient to render Wilſon's phoſphorus, when well prepared, very viſibly luminous. It is not very certainly known what is the effect of the different gaſes on the luminous property of theſe bodies. Aikin's Dict. of Chem. and Min., art. PHOSPHORUS. See LIGHT.

PHOSPHORUS, *Fæcalis*, a very fine kind of phoſphorus, exhibiting many wonderful phenomena, and prepared from human dung mixed with alum.

Mr. Homberg, who was the inventor of it, gives the method of preparing it in the following manner: take four ounces of human dung newly made, mix it with the ſame quantity of roach alum groſsly powdered; put the mixture into a ſmall iron ladle, capable of holding about a pint; ſet it over the fire in a chimney, and it will melt together, and become as fluid as water; let it boil gently over a ſmall fire, continually ſtirring it with an iron ſpatula till it is dry; it will then be difficult to ſtir, but it muſt be kept ſtirring about, and all the lumps it runs into muſt be broken, and what adheres to the ſides of the ladle ſtirred in and blended with the reſt; this muſt be continued till it is perfectly dry, and the ladle muſt be now and then taken from the fire, and the matter ſtirred about in it, that it may now grow red-hot. When the whole is thus perfectly dried, it will ſtill be in little lumps, and when cold it muſt be rubbed to powder in a metal mortar; it muſt then be put into the ladle, and ſet over the fire again; it will then become a little moiſt again, and run into clods and grumes, but it muſt be again ſtirred till dry; when cold it is to be powdered again, and a third time put into the ladle; and when perfectly dried this time, it is to be laid by in a paper in a dry place: thus is the firſt or preparatory operation finiſhed.

Take two or three drams of this powder, put it into a ſmall matraſs, capable of holding an ounce and a half of water, and which has a neck ſix or ſeven inches long; put a paper ſtopper lightly into the neck of the matraſs; then take a ſmall crucible of three or four fingers breadth high, put two or three ſpoonfuls of ſand into it, then ſet the bottom of the matraſs on the ſand, and take care that no part of it touches the ſides of the crucible; fill up the reſt of the crucible with ſand, and let the whole body of the matraſs be covered with it; then ſet the crucible in one of the common little earthen furnaces, and make a charcoal fire about it; for the firſt half hour let the coals only reach up to the middle of the crucible, but afterwards lay them up to the rim in it; continue this fire about half an hour, or till the powder within the matraſs is red-hot; then pile up more charcoal above the rim of the crucible, and continue this fire an hour, after which let the whole cool. There will ariſe a large quantity of fumes during the operation, and they will often throw out the ſtopper of the matraſs; but this muſt be replaced, and the fire a little abated in that caſe; when theſe fumes ceaſe, the fire may be raiſed without hurting the proceſs, when the crucible is ſo cool that it may be taken out of the furnace without burning the hands. This is to be done, and the matraſs is to be half raiſed out of the ſand, to make it bear the cold by degrees, and its mouth muſt then be ſtopped cloſely with a cork, inſtead of its paper ſtopper. If, on ſhaking the matraſs about, the matter falls into powder, it is a proof that the operation has been well performed; but if it hang together in form of a cake, it is a ſign that the matter was not well roaſted in the ladle before the putting it into the matraſs.

When the operation has been well performed, and the matter is in powder in the matraſs, pour out a ſmall quantity of it on a piece of paper, and immediately ſtop the matraſs again; the powder upon the paper will immediately fume and take fire, burning the paper, and any other combuſtible matter that is in the way. If there has been too much of the powder poured out of the matraſs, it muſt not be returned in again; for though that ſhould be done before it begin to ſmoke, yet it will certainly ſet fire to all that is in the matraſs: from this it may be eaſily ſeen alſo, that the matter cannot be emptied out of the matraſs into a phial, but muſt always be in the veſſel in which the calcination was made.

If too much alum be uſed, the powder will not take fire at all: it will be of different colours, according to the veſſel the firſt calcination was made in, and according to the degree of fire that was uſed; hence it is ſometimes black, ſometimes brown, ſometimes red, green, yellow, or white.

It takes fire equally well in the day-time and in the night, and that without the mixture of any other ſubſtance, or without the leaſt rubbing, or any other circumſtance beſide the mere expoſure to the air. In this it differs from all the other known artificial phoſphori; for that of urine requires a ſmall degree of heat, in order to its burning; the ſmaragdine phoſphorus requires a conſiderable degree; the Bononian ſtone does not ſhine, except after having been expoſed to the day-light; and all the others require violent rubbing, or a ſmart blow, to produce their light.

If it be deſired to keep this powder good for any time, it muſt be put in a dry place where there is not too much heat; the mouth of the matraſs muſt be kept cloſe ſtopped, and its body covered with paper; and the place where it ſtands muſt not be in too ſtrong a light; for the open day-light has been often known to weaken its power, and, in fine, wholly to ſpoil it through the glaſs. Mem. Acad. Par. 1711. See Pyrophorus.

Phosphorus, *Fulgurating*. See Fulgurating.

Phosphorus *Metallorum*, a name given by ſome chemiſts to a preparation of a certain mineral ſpar, which is found in the mines of Saxony, and other places, where there is copper. The ſpar to be uſed on this occaſion is that kind which is tinged green, and from its, in ſome degree, reſembling the colour of the emerald, is called by ſome *pſeudoſmaragdus*, and by others *lapis ſmaragdi mineralis*. This is to be powdered very fine, and this powder is to be laid on a flat plate of copper, iron, or any other metal: this plate is then to be ſet over ſome lighted charcoal, and the whole placed in a dark place. The ſpar will receive its neceſſary degree of heat for ſhining long before the metal will, and, conſequently, as ſoon as it begins to ſhine, the fire is not to be made any briſker. While the plate of metal is held in this degree of heat, and does not appear at all red, the powder upon it will ſhine like a lighted coal, and will continue ſo for ſome time. If it be removed away, and ſuffered to cool, it will be fit to repeat the experiment a ſecond time with, but its light will not be ſo ſtrong as before. Phil. Tranſ. N 244. p. 365.

Phosphorus *of Sulphur*, the name given by the French academicians to a new-diſcovered ſpecies of phoſphorus, which readily takes fire on being expoſed to the open air. See Pyrophorus.

The invention was M. Le Fevre's, and the proceſs is this: the ingredients are two drams of common ſulphur, half an ounce of ſteel filings, ten grains of colophony, and ſix drams of common water. Theſe things being all weighed and ſet apart, powder about half a dram of the ſulphur in a ſmall mortar, then add the colophony, and afterwards the remainder of the ſulphur. When this is all reduced to a fine powder, put in the filings of ſteel, and rub the whole together till it is ſo thoroughly mixed, that the ſteel does not appear, but the colour of the whole looks every where uniform and regular; then add about twenty drops of the water; and after beating the whole together add as much more, and continue to do ſo till the maſs is of the ſubſtance of a paſte, but not too moiſt. Put this paſte into a ſmall matraſs that will contain about three ounces, and pour on it more of the water till it ſwim above the ſurface of the paſte near a quarter of an inch. The matter of the paſte will then break, and appear in form of a granulated powder under the water; put the matraſs on a ſand-furnace, but give it no greater heat than that the hand can bear to lie upon the matraſs. When it begins to heat, the mixture will ferment and ſwell, and become black; it is then to be ſtirred with an iron rod, and a little more water muſt be added every quarter of an hour, till the whole is uſed. The matter will then be very black and liquid; and it is to be then taken from the fire, and ſet by for the whole night. This is the firſt and moſt eſſential part of the operation, and in this great care is to be taken that the fire be not too violent; for if the ſulphur be burnt the operation will be ſpoiled; and the matter would ferment ſo high as to run over at the mouth of the veſſel.

To finiſh the operation, a little water muſt be added to the matter, ſo as to ſwim over it, and the veſſel muſt be again ſet in the ſand, and a ſtronger fire given than before; this is known to be ſtrong enough when there is any humid vapour obſerved to ariſe out of the mouth of the veſſel. This fire is to be continued about two hours, that the greater part of the humidity may be evaporated; which is known by the iron rod finding ſome reſiſtance when put into the veſſel, and the matter it brings up being granulated and ſolid, or no longer moiſt, it muſt then be immediately taken from the fire, and the whole is then finiſhed. It is neceſſary to be very exact in this laſt and critical minute; for a very little longer ſtanding on the fire will burn the ſulphur, and render all the former care of no effect. The black matter remaining in the matraſs is to be taken out, and the ſides ſcraped clean with an iron rod; any piece of this that happens to fall upon a paper takes fire in a very little time, and burns away like the other phoſphorus. The proceſs is a very nice one, but, by obſerving all the rules here laid down, ſeveral perſons have ſucceeded in making the phoſphorus to perfection: the whole intent of the operation ſeems to be to join together the minute particles of ſteel and ſulphur, which when thus joined cannot fail to be very inflammable, and to take ſire on receiving the ſmalleſt humidity from the air to make them ferment.

It cannot but be obſerved, that this phoſphorus is founded on Lemery's experiments of ſteel and ſulphur taking fire together; but this is a much more nice and accurate operation, and a fine improvement on the original plan, which was only by mixing large quantities of ſteel filings and ſulphur together into a paſte with water, and burying this in the earth to make it take fire of itſelf, and thus repreſent the natural phenomena of volcanos, thunder, lightning, &c. Mem. Acad. Par. 1728.

John Baptiſt Beccaria has ſhewn, Phil. Tranſ. vol. lxi. part i. art. 25. that the phoſphorus compoſed of ſulphur and calcareous earth, imbibed the peculiar coloured rays to which it had been expoſed. Thus, having expoſed different phoſphoric pieces to rays of the ſun tranſmitted through green, yellow, and red cryſtals, he obſerved, that each of them, when afterwards viewed in the dark, exhibited that colour to which it had been expoſed. This obſervation is deciſive in favour of the opinion, that phoſphorus of this kind emits the ſame light that it receives, and no other; and that the light is not produced, but expelled by heat.

This experiment, which has often failed, for want of employing good glaſſes, or on account of the weakneſs of the ſolar rays, has been repeated by profeſſor Allamand of Leyden; who ſays, that having expoſed a prepared (probably by calcining it with ſome ſulphureous ſubſtance) piece of the Bononian calcareous phoſphorus to the coloured rays of the ſun, after their being ſeparated by one of his priſms, and looking to it in the dark, he found the phoſphorus gave the colour of the ſeparated rays to which it had been expoſed.

Phosphorus, *Aquatic*, a name given by Dr. Leigh, in his Hiſtory of Lancaſhire, to a water found near Wigan in that county, which takes fire on holding a lighted candle to it. It is not properly the water, however, that takes fire in this caſe, but a ſteam which burſts out of the ground with it. The author alſo calls it a ſulphurated water; but that very improperly, for it contains no ſulphur, but only iſſues out with this bituminous vapour.

Phosphorus, in *Aſtronomy*, is the morning ſtar, or the planet Venus, when ſhe goes before the ſun.

The Latins call it *Lucifer;* the French *etoile de berger;* the Greeks *phoſphorus*, from φως, *light*, and φερω, *I bear*, or *bring*.

PHOSSA, in *Ornithology*, a name underſtood by ſome to expreſs the whole genus of pigeons, but more properly it is the name of one ſpecies only, the *palumbus torquatus*, or ring-dove. See Columba *Palumbus*.

PHOTIÆ, in *Ancient Geography*, an epiſcopal town of Aſia, in Phrygia Salutaris.

PHOTINIANS, in *Eccleſiaſtical Hiſtory*, a ſect of ancient heretics, in the fourth century, who denied the divinity of Jeſus Chriſt.

They took their name from Photinus their chief, who was biſhop of Sirmium, and a diſciple of Marcellus. This prelate publiſhed, in 343, his opinions concerning the Deity, which were equally repugnant to the orthodox and Arian ſyſtems. He maintained, that Jeſus Chriſt was born of the Holy Ghoſt and the Virgin Mary; that a certain divine emanation (which he called the Word) deſcended upon this extraordinary man; that on account of the union of the divine word with his human nature, Jeſus was called the ſon of God, and even God himſelf; and that the Holy Ghoſt was not a diſtinct perſon, but a celeſtial virtue proceeding from the Deity. He was condemned by both parties in the councils of Antioch and Milan, held in the years 345 and 347, and by the council of Sirmium in 351. He was afterwards degraded from the epiſcopal dignity, and died in exile, in the year 372 or 375. His opinion was afterwards revived by Socinus.

PHOTINUS, in *Biography*. See the preceding article.

PHOTINX, or crooked flute: an Egyptian inſtrument. Its ſhape was that of a bull's horn, as may be ſeen in many gems, medals, and remains of ancient ſculpture. Not only the form of this inſtrument, but the manner of holding it, is deſcribed by Apuleius, in ſpeaking of the myſteries of Iſis: "Afterwards," ſays this author, "came the flute players, conſecrated to the great Serapis, often repeating upon the crooked flute turned towards the right ear, the airs commonly uſed in the temple." All the repreſentations in ſculpture which we have ſeen of this inſtrument, have ſo much the appearance of real horns, that they encourage a belief of its great antiquity; and that the firſt inſtruments in uſe of this kind, were not only ſuggeſted by the horns of dead animals, but that the horns themſelves were long uſed as muſical inſtruments, at leaſt thoſe founded by the Hebrew prieſts at the ſiege of Jericho, we are repeatedly told, were trumpets made of ram's horns.

PHOTIUS, in *Biography*, a patriarch of Conſtantinople in the ninth century, was of a noble Conſtantinopolitan family. His wealth and intereſt raiſed him to the higheſt offices of the ſtate, while he enjoyed the reputation of being the moſt learned and accompliſhed man of his age. When he was a captain of the guards he was ſent on an embaſſy to the caliph of Bagdad, and he employed his leiſure in reading and literary compoſition. He afterwards became ſecretary of ſtate under the emperor Michael III. In this ſituation he contracted an intimacy with the emperor's uncle, who, after he had procured the exile of the patriarch Ignatius, perſuaded the emperor to raiſe Photius to that dignity. At this time he was a layman, but in the ſpace of ſix days he went through the gradations requiſite for prieſt's orders, and on Chriſtmas day, 858, he was conſecrated patriarch of Syracuſe. Photius was recognized by the metropolitans of his patriarchate, and proceeded to the ſolemn depoſition of Ignatius. The elevation of Photius cauſed a great ſchiſm, and he exerciſed ſeverities on thoſe who adhered to his rival. The emperor Baſil expelled him in 869, an act that was confirmed by a council ſummoned for the purpoſe, who pronounced an anathema, as well as depoſition, againſt the fallen patriarch. Afterwards he obtained the emperor's favour, and on the death of Ignatius he reſumed his dignity with a ſtrong hand. Baſil obtained from pope John VIII. his conſent to the meaſure, which was ratified at a council holden in preſence of the pope's legates in 879. In 886 Leo cauſed him again to be deprived, and confined in a monaſtery, where he died in 891. His principal works are; 1. "Myriobiblon or Bibliotheca," compoſed on his embaſſy to Bagdad, conſiſting of an abſtract and critical judgment of 280 different writers in the departments of hiſtory, oratory, grammar, philoſophy, theology, &c. of many of whom no other relic remains: this was printed by Heſchelius in 1601, but the beſt edition is that of Rouen, Gr. and Lat. 1653. The book which at preſent bears that name, is not the real production of Photius; and it has been ſuppoſed that not more than half of it can be ſafely attributed to this learned and turbulent biſhop. 2. "Nomocanon," or a collection of the canons of the church, printed with the commentaries of Balſamon at Paris in 1615. 3. "Epiſtolæ," or a collection or Letters, printed by R. Mountagu in 1651. 4. His celebrated Lexicon, which, imperfect and mutilated as it is, is more valuable to the critical ſcholar than ten myrobibla. The various MSS. of this Lexicon, in different libraries on the continent, are mere tranſcripts from each other, and originally from one, venerable for its antiquity, which was formerly in the poſſeſſion of the celebrated Thomas Gale, and which is now depoſited in the library of Trinity college, Cambridge. This MS., which is on parchment, bears ſuch evident marks of antiquity, that it may not unreaſonably be ſuppoſed to have been a tranſcript from the author's copy. It is written in various hands. The compendia, which are uſed in ſome parts of it, are extremely difficult to decipher, though, on the whole, they are leſs ſo than the contractions which occur in many MSS., and particularly thoſe in the library of St. Germain. A copy of this Lexicon, at Florence, was tranſcribed about the end of the 16th century, by Richard Thomſon, of Oxford, who probably intended to publiſh it. (See Scaliger Epiſt. p. 503. printed 1715.) Profeſſor Porſon had tranſcribed and corrected this valuable Lexicon for the preſs, and after it had been conſumed by fire, he began the taſk afreſh, and ſuch were his incredible induſtry and patience, that he completed another tranſcript in his own exquiſite hand-writing. Mr. Porſon's copy of the Codex Galeanus is ſaid to be among the papers of that incomparable ſcholar, which are preſerved by the learned ſociety of which he was long a diſtinguiſhed ornament. But whilſt the publication of it was anxiouſly expected and delayed, an edition appeared at Leipſic in 1808, by Godfrey Hermann, from two MSS., both of them extremely inaccurate.

PHOTOMETER, or *Meaſurer of Light*, as the name, derived from φως, *light*, and μετρεω, *I meaſure*, imports, in *Optics*, an inſtrument contrived for meaſuring the different intenſities of light. That ſome luminous bodies give a ſtronger and others a weaker light, and that ſome reflect more light than others, are facts that have been always known, and that are ſufficiently obvious. But it is not eaſy to eſtimate with accuracy the comparative intenſity of light afforded by any two, or more, luminous objects. For this purpoſe, it is neceſſary to aſſume as a principle, that the ſame quantity of light, diverging in all directions from a luminous body, remains undiminiſhed at all diſtances from the centre of divergence. Thus, we muſt ſuppoſe, that the quantity of light falling on every body is the ſame as would have fallen on the place occupied by its ſhadow; and if there were any doubt of the truth of the ſuppoſition, it might be confirmed by ſome ſimple experiment. It follows that, ſince the ſhadow of a ſquare inch of any ſurface occupies, at twice the diſtance of the ſurface from the luminous point, the ſpace of four ſquare inches, the intenſity of the light diminiſhes as the ſquare of the diſtance increaſes. We can judge with tolerable accuracy of the equality of two lights by the eſtimation of the eye; but we cannot form any idea of the proportions of light of different intenſities. If, however, we remove two ſources of light to ſuch diſtances from an object, that they may illuminate it in equal degrees, we may conclude that their original intenſities are inverſely as the ſquares of their diſtances. To this ſubject Mr. Bouguer ſeems to have firſt directed his attention. The methods which he uſed for meaſuring the proportion of different lights, are deſcribed by Dr. Prieſtley in his "Hiſtory of Light, &c." as follow. He took two pieces of wood or paſteboard, in which he made two equal holes, over which he drew pieces of oiled or white paper. Upon theſe holes he contrived that the light of the different bodies he was comparing ſhould fall, while he placed a third piece of paſteboard, to prevent the two lights from mixing with one another. Then placing himſelf ſometimes on one ſide and ſometimes on the other, but generally on the oppoſite ſide of this inſtrument, with reſpect to the light, he altered their poſition, till the papers in the two holes appeared to be equally enlightened. This being done, he computed the proportion of their light by the ſquares of the diſtances at which the luminous bodies were placed from the objects. If, for inſtance, the diſtances were as 3 and 9, he concluded the light they gave were as 9 and 81.

When any light was very faint, he ſometimes made uſe of lenſes, in order to condenſe it, and he encloſed them in tubes or not, as his particular application of them required. To meaſure the intenſity of light proceeding from the heavenly bodies, or reflected from any part of the ſky, he contrived an inſtrument reſembling a kind of portable camera obſcura. He had two tubes, of which the inner was black, faſtened at their lower extremities by a hinge. At the bottom of theſe tubes were two holes, three or four lines in diameter, covered with two pieces of fine white paper. The two other extremities had each of them a circular aperture, an inch in diameter; and one of the tubes conſiſted of two, one of them ſliding into the other, which produced the ſame effect as varying the aperture at the end. When this inſtrument is uſed, the obſerver has his head, and one end of the inſtrument ſo covered, that no light can fall upon his eye, beſides that which comes through the two holes above mentioned, while an aſſiſtant manages the inſtrument, and draws out or ſtraightens one tube, as the obſerver directs. When the two holes appear equally illuminated, the intenſity of the lights is judged to be inverſely as the ſquares of the lengths of the tubes. In uſing this inſtrument, it is neceſſary that the object ſhould ſubtend an angle larger than the aperture of the tube from its other end; for, otherwiſe, the lengthening of the tube has no effect. To avoid, in this caſe, making the inſtrument of an inconvenient length, or making the aperture too narrow, he has recourſe to another expedient. He conſtructs an inſtrument, conſiſting of two object-glaſſes, fixed in the ends of two tubes, ſix or ſeven feet, or, in ſome caſes, ten or twelve feet long, and having their foci at the other ends. At the bottom of theſe tubes are two holes, three or four lines in diameter, covered with a piece of white paper; and this inſtrument is uſed exactly like the former. If the two objects to be obſerved by this inſtrument be not equally luminous, the light that iſſues from them muſt be reduced to an equality, by diminiſhing the aperture of one of the object-glaſſes; and then the remaining ſurface of the two glaſſes will give the proportion of their lights. But, for this purpoſe, the central parts of the glaſs muſt be covered, in the ſame proportion with the parts near the circumference; becauſe the middle part of the glaſs is thicker, and leſs tranſparent than the reſt. If all the objects to be obſerved lie nearly in the ſame direction, our author obſerves, that the two long tubes may be reduced into one, the two object-glaſſes being placed cloſe together, and one eye-glaſs ſufficing for them both. The inſtrument will then be the ſame with that of which he publiſhed an account in 1748, and which he called a heliometer, or aſtrometer. (See Heliometer.) For ſome reſults of the application of theſe methods for determining the comparative intenſities of the light proceeding from different luminous bodies in different circumſtances, ſee Light. Count Rumford has uſed the firſt of Bouguer's methods, and contrived an inſtrument for this purpoſe, called the "Photometer," of which he has given a deſcription and drawing in the Philoſophical Tranſactions for 1794, vol. lxxxiv. art. 9. The principle upon which it is grounded is, that if two lights ſhine upon the ſame ſurface, at equal obliquities, and an opaque body be interpoſed, the two ſhadows it will produce muſt differ in blackneſs or intenſity in the ſame degree. For the ſhadow formed by intercepting the greater light will be illuminated by the ſmaller light only, and reverſely, the other ſhadow will be illuminated by the greater light: that is, the ſtronger light will be attended with the deeper ſhadow. But it is eaſy, by removing the greater light to a greater diſtance, to render the illumination it produces at the common ſurface equal to that afforded by the leſs. Experiments of this kind may be conveniently made by faſtening a ſheet of white paper againſt the wall of a room; and placing the two candles or lights intended to be compared, ſo that the ray of light from each ſhall fall with nearly the ſame angle of incidence upon the middle of the paper. In this ſituation, if a book or other object be held to intercept part of the light which would have fallen on the paper, the two ſhadows may be made to appear, on ſeparate ſurfaces, and alſo a third or perfect ſhadow, from which both lights are excluded, may be exhibited. If one or both of the lights be removed directly towards or from the paper, as the appearances may require, until the two ſhadows near the upper angular point of the perfect ſhadow have the ſame intenſity, the quantities of light emitted by each will be as the ſquares of the diſtances from the paper. By ſome experiments made in this way, in the year 1785, Mr. Nicholſon (ſee his Journal, vol. i.) was ſatisfied that the degree of illumination could be thus aſcertained, to an 80th or 90th part of the whole.

Count Rumford, in his "Account of a Method of meaſuring the comparative Intenſities of Light," directs two burning candles, lamps, or other lights that are to be compared, to be placed at equal heights upon two light tables, or moveable ſtands in a darkened room; let a ſheet of clean white paper be equally ſpread out, and faſtened upon the wainſcot or ſide of the room, at the ſame height from the floor with the lights, and let the lights be placed over-againſt this ſheet of paper, at the diſtance of ſix or eight feet from it, and ſix or eight feet from each other, in ſuch a manner, that a line drawn from the centre of the paper, perpendicular to its ſurface, ſhall biſect the angle formed by lines drawn from the lights to that centre; in which caſe, conſidering the ſheet of paper as a plane ſpeculum, the one light will be preciſely in the line of reflection of the other.

This may be eaſily performed, by actually placing a piece of a looking-glaſs, ſix or eight inches ſquare, flat upon the paper, in the middle of it, and obſerving by means of it the real lines of reflection of the lights from that plane, removing it afterwards as ſoon as the lights are properly arranged.

When this is done, a ſmall cylinder of wood, about a quarter of an inch in diameter, and ſix inches long, muſt be held in a vertical poſition, about two or three inches before the centre of the ſheet of paper, and in ſuch a manner, that the two ſhadows of the cylinder correſponding to the two lights may be diſtinctly ſeen upon the paper.

If theſe ſhadows ſhould be found to be of unequal denſities, which will almoſt always be the caſe, then that light whoſe correſponding ſhadow is the denſeſt, muſt be removed farther off, or the other muſt be brought nearer to the paper, till the denſities of the ſhadows appear to be exactly equal; or in other words, till the denſities of the rays from the two lights are equal *at the ſurface of the paper;* when, the diſtances of the lights from the centre of the paper being meaſured, the ſquares of thoſe diſtances will be to each other as the real intenſities of the lights in queſtion at their ſources.

If, for example, the weaker light being placed at the diſtance of four feet from the centre of the paper, it ſhould be found neceſſary, in order that the ſhadows may be of the ſame denſity, to remove the ſtronger light to the diſtance of eight feet from that centre, in that caſe, the real intenſity of the ſtronger light will be to that of the weaker as 8 to 4; or as 64 to 16; or 4 to 1; and ſo for any other diſtances.

It is well known, that the intenſity of any quality proceeding from a centre in ſtraight lines in all directions, like the light emitted by a luminous body, at any given diſtance from that centre will be as the ſquare of that diſtance inverſely; and hence it is clear, that the intenſities of the lights in queſtion at their ſources, muſt be to each other as the ſquares of their diſtances from that given point *where their rays uniting, are found to be of equal denſity.* For putting $x =$ the intenſity of B; if P repreſents the point where the rays from A and from B meeting, are found to be of equal denſity or ſtrength, and if the diſtance of A from P be $= m$, and the diſtance of B from the ſame point $P = n$; then, as the intenſity of the light of A at P is $= \frac{x}{m^2}$, and the intenſity of the light of B at the ſame place $= \frac{y}{n^2}$, and as it is $\frac{x}{m^2} = \frac{y}{n^2}$ by the ſuppoſition, it will be $x : y :: m^2 : n^2$.

That the ſhadows being of equal denſity at any given point, the intenſities of the illuminating rays muſt of neceſſity be equal at that point alſo, is evident from hence, that the total abſence of light being perfect blackneſs, and the ſhadow correſponding to one of the lights in queſtion being deeper or fainter, according as it is more or leſs enlightened by the other, when the ſhadows are equal, the intenſities of the illuminating rays muſt be equal likewiſe.

In removing the lights, in order to bring the ſhadows to be of the ſame denſity, care muſt be taken to recede from, or advance towards the centre of the paper in a ſtraight line, ſo that the one light may always be found exactly in the line of reflection of the other; otherwiſe the rays from the different lights falling upon the paper, and conſequently upon the ſhadows, at different angles, will render the experiment fallacious.

When the intenſity of one ſtrong light is compared with the intenſities of ſeveral ſmaller lights taken together, the ſmaller lights ſhould be placed in a line perpendicular to a line drawn to the centre of the paper, and as near to each other as poſſible; and it is likewiſe neceſſary to place them at a greater diſtance from the paper than when only ſingle lights are compared.

In all caſes, it is abſolutely neceſſary to take the greateſt care that the lights compared be properly trimmed, and that they burn clear and equally, otherwiſe the reſults of the experiments will be extremely irregular and inconcluſive.

To aſcertain by this method the comparative denſities, or intenſities of the light of the moon, and of that of a candle, the moon's direct rays muſt be received upon a plane white ſurface, at an angle of incidence of about 60°, and the candle placed in the line of the reflection of the moon's rays from this ſurface; when the ſhadows of the cylinder correſponding to the moon's light, and to that of the candle, being brought to be of equal denſity, by removing the candle farther off, or bringing it nearer to the centre of the white plane, as the occaſion may require, the intenſity of the moon's light will be equal to that of the candle *at the given diſtance of the candle from the plane.*

To aſcertain the intenſity of the light of the heavens by day or by night, this light muſt be let into a darkened room through a long tube, blackened on the inſide, when its intenſity

tenſity may be compared with that of a candle or lamp, by the method above deſcribed.

To determine the intenſity of the direct rays of the ſun, compared to the light emitted by any of our artificial illuminators, it may perhaps be neceſſary, conſidering the almoſt inconceivable intenſity of the ſun's light, to make uſe of ſome further contrivances and precautions, but I am convinced, however, (ſays the author,) that it may be done, and that even with a very conſiderable degree of preciſion. And when the relative intenſity of the ſun's light at the ſurface of the earth, compared with the intenſity of the light of a given lamp, placed at a given diſtance, and burning with a flame of given dimenſions, ſhall be known; it will then be eaſy, from the known ſize and diſtance of the ſun, to compute the relative denſity of his light at *his* ſurface, compared to the denſity of the light of the flame of the lamp at the ſurface of that flame.

The intenſity of the light emitted in the combuſtion of iron or of phoſphorus in dephlogiſticated air, as alſo that of all other burning, or red-hot bodies, may be compared and determined by this method with the greateſt facility and exactneſs.

Count Rumford afterwards found it expedient to make ſome alterations in the inſtruments with which he conducted his experiments: and he thus deſcribes them in their finiſhed ſtate, when he denominated the whole apparatus combined a "photometer." For an account of the conſtruction of this inſtrument, of the purpoſes to which it is capable of being applied, and of the author's experiments with it, we refer to the Phil. Tranſ. *ubi ſupra.*

Profeſſor Leſley has invented an inſtrument for the ſame purpoſe, and under the ſame name, which he deſcribes as being conſtructed in the ſame manner with his *hygrometer*, only that the upper ball is blown of black glaſs, or is blackened, and the lower one is quite diaphanous, and free of ſpecks. The former detains the incident light, while the latter tranſmits it freely. But light, in proportion to its abſorption, cauſes heat, whether uniting with bodies it really conſtitutes the matter of heat, or only excites heat in the act of combination. But though the black ball acquires conſtant additions of heat, its temperature will not uniformly and perpetually increaſe; for the accumulated heat will at laſt be conducted off by the ſurrounding air exactly as it is received. The depreſſion of the liquor, therefore, will meaſure the momentary afflux of light. To prevent the irregular effects of winds, which might accelerate that diſperſion, the inſtrument is incloſed within a glaſs caſe. But this caſe ſerves alſo an important purpoſe, for, by confining the circulation of the ambient air, which alone transfers the continual augmentation of heat, it doubles the performance of the inſtrument. The cylindrical caſe ſhould be made of clear glaſs neatly rounded over, and hermetically ſealed at the end. Its width is not of much importance, only it ſhould leave a free ſpace not leſs than $\frac{1}{10}$th of an inch round the balls, and at leaſt half an inch at the top. Indeed both the ſize and form may be regulated by convenience, for I found (ſays the profeſſor) a receiver of 2200 inches to afford quantities ſcarcely one-tenth leſs than thoſe given by a caſe of the ordinary dimenſions.

Since this inſtrument was firſt conſtructed, in the autumn of 1797, Mr. Leſley has been delighted with the nicety of its performance. It not only meaſures the direct rays of the ſun, but the reflected light of the ſky, for which it is principally deſigned. It is ſenſible to every fluctuation of the atmoſphere, marks the progreſs and decline of the light of day, and the periodic increaſe and diminution of the brightneſs of the year. It enables us likewiſe to eſtimate other lights, ſuch as the flame of a candle. By comparing two photometers, it is eaſy to determine the relative properties of different coloured ſubſtances, in reflecting, abſorbing, and tranſmitting light. In the ſame manner, they will determine the queſtion, whether the particles of light are ſpread over the priſmatic ſpectrum with equal intenſity. By help of this inſtrument, too, we can meaſure the quantity of light tranſmitted through various diaphanous bodies, and that reflected or abſorbed at different angles of incidence from poliſhed or rough ſurfaces; in ſhort, perform with the utmoſt facility all thoſe ingenious experiments which have exerciſed the ſagacity of Bouguer and Lambert. Another ſet of inquiries, for which the photometer is nicely calculated, is to diſcover the conducting powers of different fluids for heat. If the glaſs caſe, for inſtance, be filled with a gas of higher conducting power than common air, the inſtrument will be proportionally leſs affected by the ſame afflux of light, ſince thoſe are the two balancing conditions. With air, too, of different denſities, the effects are materially different. In that way the author has examined various liquids and gaſes, nay jellies and ice. His experiments on theſe and other points are completed, and afford reſults which are ſatisfactory and important. For a farther account of this inſtrument, and of a curious and vabluable collection of facts eſtabliſhed by means of it, we refer to Leſlie's "Short Account of Experiments and Inſtruments on the Relation of Heat to Air and Moiſture," 8vo. See *Differential* THERMOMETER.

PHOTOSCIATERICA, a term which ſome authors uſe for the art of dialling.

The name is derived hence, that the art not only ſhews the hours by the ſhadow of a gnomon, whence it is called *ſciaterica*, from σκια, *ſhadow*; but ſometimes alſo by means of the ſun's light, as in ſpot dials, reflecting dials, &c. from φως, *lux*, *light*.

PHOVIBAGINA, in *Ancient Geography*, a town of Aſia, in Galatia, belonging to the Trocmi. It is called by Ptolemy Cariſſa and Duduſa.

PHOXINUS, in *Ichthyology*, a ſpecies of *Cyprinus;* which ſee.

PHOXOS, Φοξος, one with an acuminated or faſtigiated head, that is, ſharpened toward the top; the eminences of the forehead or occiput, or both, being depreſſed, or one or both of thoſe parts beyond meaſure prominent. But phoxoi are properly thoſe who have the top of their head very much faſtigiated and turbinated, and conſequently deformed. Therſites is deſcribed in Homer with ſuch a head.

PHRAATA, in *Ancient Geography*, a town of Aſia, which belonged to the Medes, according to Appian.

PHRAATIS GAZA, an iſland of Aſia, in the courſe of the Euphrates, which was of great extent, and fortified by a wall; ſituated W.N.W. of Anatho.

PHRADRA, a town of Drangiana, called alſo Prophthaſia. Steph. Byz.

PHRÆNIAN, in the *Botanical Writings of the Ancients*, a name given to a kind of anemone, uſed in making garlands and other ornaments.

PHRAGANDÆ, in *Ancient Geography*, a people of Thrace, on the confines of Macedonia.

PHRAGONIS, an epiſcopal town of Egypt, according to the acts of the council held at Alexandria in the year 562.

PHRANGI, a people of Italy, in the vicinity of the Alps. Steph. Byz.

PHRANZA, PHRANZES, GEORGE, in *Biography*, a modern Greek hiſtorian, was from his youth employed in the ſervice of the Byzantine court, and was the favourite chamberlain of the emperor Manuel Palæologus, who died A.D. 1427, when Phranza was 24 years of age. He was maſter of the wardrobe to his ſucceſſor John, and alſo to Conſtantine, the laſt emperor of the Eaſt, by whom he was ſent ambaſſador to the courts of Georgia and Trebiſond, for the purpoſe of negociating a marriage for the young ſovereign. When the Turks took Conſtantinople, Phranza with his family were made ſlaves. In a few months, he and his wife were ranſomed; but his two children, a ſon and a daughter, were ſeized for the ſeraglio, and loſt to their unhappy parents. After this, Phranza became domeſtic to prince Thomas, brother of the deceaſed Conſtantine, who employed him in various embaſſies. He aſſumed the monaſtic habit before his death, which took place at an advanced age. At the requeſt of ſome noble Corcyreans, he drew up a chronicle of the affairs relating to Conſtantinople and the Morea, to moſt of which he had been an eye-witneſs. This work is brought down to 1461; but though there are many MSS. of the Greek original extant in libraries, it has been publiſhed only in the Latin verſion, or abſtract of Pontanus, which, according to Gibbon, is very deficient in accuracy and elegance.

PHRASE, Phrasis, Φρασις, of Φραζω, *I ſpeak*, in *Grammar*, an elegant turn or manner of ſpeech, peculiarly belonging to this or that occaſion, this or that art, or this or that language.

Thus we ſay, an Italian phraſe, an eaſtern phraſe, a poetical phraſe, or a rhetorical phraſe.

A few elegant phraſes, pertinently applied, are an ornament of diſcourſe; but, if they come too thick, they have an ill effect, and make the ſtyle ſavour of affectation.

Phrase is ſometimes alſo uſed for a ſhort ſentence, or ſmall ſet or circuit of words, conſtructed together.

In this ſenſe, father Buffier divides phraſes into *complete* and *incomplete*.

Phraſes are *complete*, where there are a noun and verb, each in its proper function; *i. e.* where the noun expreſſes a ſubject, and the verb the thing affirmed of it. They are *incomplete*, where the noun and the verb, together, only do the office of a noun, as conſiſting of ſeveral words, without aſſuming any thing, and which might be expreſſed in a ſingle word.

Thus, *that which is true* is an incomplete phraſe, which might be expreſſed in one word, *truth:* as, that which is true ſatisfies the mind, *i. e.* truth ſatisfies the mind.

Phrase, *Phraſe*, Fr., in *Muſic*, denotes the continuance of an air or harmony, which forms, without interruption, a ſenſe more or leſs complete, and which is terminated by a cadence more or leſs perfect. In melody the phraſe is conſtituted by the air; but in harmony, it is a regular ſeries of concords, united together by diſſonances expreſſed or underſtood.

Phraſe is frequently uſed as ſynonimous with *paſſage*, in muſic. It is in the invention of muſical phraſes, in their proportion and texture, that the true beauties of muſic conſiſt. A compoſer who accents and phraſes his paſſages well, is, according to Rouſſeau, a man of wit. Upon this principle, Haydn's muſic is full of *bons mots*. A ſinger who feels, who marks and accents his phraſes well, is a man of taſte; but he who only ſees crotchets and quavers, keys, meaſure, and intervals in muſic,—in ſhort, who only ſings in time and tune, however ready and certain he may be, if he feels not the accents and phraſeology of what he executes, is nothing more than a vulgar ballad-ſinger.

PHRASEOLOGY, Phraseologia, Φρασεολογια, a collection of the phraſes, or elegant expreſſions, in any language.

PHRAT, the name anciently given to the river *Euphrates;* which ſee. Phrat is mentioned in ſcripture, and is ſaid to have two derivations from the Hebrew, *phar* or *pharatz*, to ſpread, and *pharah*, to produce fruit or flowers. Vincent.

PHRATRIARCHUS, Φρατριαρχος, among the Athenians, a magiſtrate that preſided over the *phratria*, or third part of a tribe. He had the ſame power over the phratria, that the phylarchus had over the tribe.

PHREATA, in *Ancient Geography*, a town of Cappadocia, in Garſauria. Ptolemy.

PHREATIS, or Phreattium, in *Greek Antiquity*, a court pertaining to the civil government of Athens, which was ſituated upon the ſea-ſhore in the Piræus, and derived its name απο τȣ Φρεατος, becauſe it ſtood in a *pit*, or, as others ſuppoſe, from the hero Phreatus. The cauſes heard in this court were ſuch as concerned perſons that had fled out of their own country for murder, or thoſe that fled for involuntary murder, and had afterwards committed a deliberate and wilful murder. The firſt perſon that was tried in this place was Teucer, upon a groundleſs ſuſpicion, that he had been acceſſory to the death of Ajax. The criminal was not permitted to come to land, or ſo much as to caſt anchor, but pleaded his cauſe in his bark; and, if found guilty, was committed to the mercy of the winds and waves, or, as ſome ſay, ſuffered there condign puniſhment; if innocent, he was only cleared of the ſecond fact, and, according to cuſtom, underwent a twelvemonth's baniſhment for the former. Potter's Gr. Antiq. vol. i. p. 111.

PHRENES, Φρενες, in *Anatomy*, the diaphragm.

It was thus called by the ancients, from Φρην, *mind;* becauſe they imagined this to be the ſeat of the rational ſoul. Hence,

PHRENESIS, Phrensy, or *Diſtraction*. See Phrenitis and Paraphrenitis.

PHRENETIC Nerves, called alſo *diaphragmmatic* and *ſtomachic nerves*, in *Anatomy*, are nervous branches derived from the cervical nerves, which, joining in a trunk, run through the mediaſtinum undivided, till, arriving near the diaphragm, they again divide, and ſend off divers branches, ſome into the muſcular, others into the tendinous part thereof.

PHRENIC, an epithet applied to parts belonging to the diaphragm, as the nerve, artery, &c. See Nerve and Artery.

PHRENITIS, in *Medicine*, from Φρην, *the mind*, ſometimes written *phreneſis*, *a phrenſy*, or a diſorder of the underſtanding, (*ſapientiæ ægritudo*, as Pliny denominates it, Hiſt. Nat. lib. vii. cap. 51.) has been underſtood, however, in a limited ſenſe from the time of Hippocrates; namely, as a continued ferocious delirium, accompanied by an acute fever, and ariſing from inflammation of the brain, or its membranes. In the language of modern noſologiſts, *phrenitis* ſignifies literally *inflammation of the brain;* the termination *itis* implying inflammation of the organ alluded to, as in *hepatitis*, *enteritis*, &c.

Some writers derive the word from Φρενες, *the diaphragm*, in which organ the mind was anciently ſuppoſed to be ſeated. See Paraphrenitis.

The ſymptoms which characteriſe acute inflammation of the brain are a vehement fever, a violent deep-ſeated pain in the head, a redneſs and turgeſcence of the face and eyes, intolerance of light and noiſe, continued watchfulneſs, and an impetuous and fierce delirium. (Cullen, Firſt Lines, § 293.) Some writers, indeed, have attempted to eſtabliſh a diſtinction, as in the inflammations of other viſcera, between the affections of the inveſting membranes, and of the ſubſtance of the brain; and have maintained that the ſymptoms juſt enumerated were peculiar to inflammation of the membranes, whilſt ſome degree of coma, inſtead of wakefulneſs,

fulneſs, characteriſed the inflammation of the cerebrum itſelf. The fact is, in this, as in other viſceral inflammations, that both parts of the organ are commonly involved in the diſeaſe; but it is probable that the ſymptoms are more violent, in proportion to the predominant affection of the membranes; and more obtuſe and chronic, as the malady prevails more extenſively in the parenchyma or ſubſtance.

But, in truth, the ſymptoms of inflammation of the common ſenſorium, the centre of ſenſation and voluntary motion, are not always ſo ſimple and uniform as the ſigns of a ſimilar affection of other organs. The other parts of the body, which are ſo intimately connected with the ſource of the nervous power, and ſome of which are linked to it by direct and particular ſympathies, are neceſſarily more or leſs involved in the derangements of the brain. Inſtead of a mere local diſeaſe, therefore, this inflammation becomes more peculiarly a general affection of the ſyſtem. Hence it is juſtly remarked by moſt writers on the ſubject, that pure idiopathic phrenitis is a very rare diſeaſe, at leaſt in this climate; in other words, that the congeries of ſymptoms, conſtituting the noſological character of the local inflammation above laid down, very ſeldom occur without great modifications. It ſometimes puts on merely the ordinary character of common continued fever, when diſſection has demonſtrated not only the exiſtence of inflammation, but of ſuppuration in the brain. Indeed ſo common is its occurrence in this form, though to a leſs degree than is followed by the ſuppurative proceſs, that an ingenious writer has attempted to prove, that all idiopathic fevers are, in fact, caſes of inflammation of the brain (ſee Clutterbuck on Fever); an opinion which we have diſcuſſed at length under its proper head. (See FEVER.) It is univerſally admitted, however, that, except where external mechanical violence has been ſuffered, a pure idiopathic phrenitis is rarely obſerved; but that a ſecondary or ſymptomatic inflammation of the brain, of a leſs determined character, is frequently the reſult of other diſeaſes, and then partakes more of an atonic or paſſive form; ariſing, for inſtance, during the progreſs of general fever from any cauſe, or from metaſtaſis in gout, rheumatiſm, eryſipelas, and other acute diſorders. It is juſtly remarked, indeed, by an intelligent writer, that whenever the velocity of the circulation is much increaſed, there muſt always be, from the nature of the circulation in the head, a tendency to this complaint, or to congeſtion in the larger veſſels: hence headache, ſuffuſion of face, inflammation of the eyes, bleeding from the noſe, and other ſymptoms denoting preternatural diſtenſion of the veſſels of the head, are among the moſt frequent ſymptoms of continued fever of the more acute kind. Wilſon on Febrile Diſeaſes, vol. iii. chap. 6.

Hiſtory of the Symptoms.—Phrenitis often makes its attack with a ſenſe of fullneſs in the head, fluſhing of the countenance, and redneſs of the eyes, the pulſe being full, but in other reſpects natural. As theſe ſymptoms increaſe, the patient becomes reſtleſs, his ſleep is diſturbed, or wholly forſakes him. Sometimes it comes on with tremors of the limbs, and intolerable pains of the hands, feet, and legs; ſometimes with ſtupor and rigidity of the whole body; and ſometimes with anxiety, and a ſenſe of tenſion in the breaſt, which is often accompanied with palpitation of the heart. Sometimes, again, the ſtomach is early affected, (by its cloſe ſympathy with the brain,) and nauſea, and a painful ſenſe of weight in that viſcus, ſometimes heart-burn and vomiting, are among the earlieſt ſymptoms.

The pain in the head ſoon becomes conſiderable, and ſometimes very acute. The ſeat of it is various: ſometimes it ſeems to occupy the whole head; ſometimes, although more circumſcribed, it is deep-ſeated and ill defined; and, in other caſes, it is felt principally in the forehead or occiput. The redneſs of the face and eyes generally increaſes with the pain, and there is often a ſenſe of heat and throbbing in the head, the countenance acquiring a peculiar fierceneſs.

Theſe ſymptoms, for the moſt part, do not laſt long, before the patient begins to talk incoherently, and to ſhew other marks of delirium: ſometimes, however, delirium does not come on till the fifth, ſixth, or ſeventh day. It gradually increaſes till it often arrives at a ſtate of phrenſy. The face becomes turgid, the eyes ſtare, and ſeem as if ſtarting from their ſockets, tears, and ſometimes even blood, flowing from them; and the patient ſometimes reſembles a furious maniac, from whom he is principally to be diſtinguiſhed by the ſhorter duration of his complaint.

We ſhould, *à priori*, expect in phrenitis conſiderable derangement in the different organs of ſenſe, which ſo immediately depend upon the ſtate of the brain; and ſuch is the fact. The eyes are incapable of bearing the light, and falſe viſion, particularly that termed *muſcæ volitantes*, or floating motes and flaſhes of light ſeeming to dart before the eyes, are frequent ſymptoms. The hearing is often ſo acute, that the leaſt noiſe is intolerable: ſometimes, on the other hand, the patient becomes deaf; and it has been even obſerved, that the deafneſs and morbid acuteneſs of hearing ſometimes alternate. Affections of the ſmell, taſte, and touch, are leſs obſervable.

The pulſe is not always ſo much diſturbed at an early period, as might be expected from the violence of the other ſymptoms, compared with what is obſerved in idiopathic fevers. In many caſes, however, the fever runs as high as the delirium, and the pulſe is harder than in common fever; indeed the hard and ſmall pulſe is often one of the beſt diagnoſtics of the complaint: it is ſometimes, though rarely, intermitting. The reſpiration is generally deep and ſlow, ſometimes difficult, now and then interrupted with hiccup, ſeldom humid and frequent, which laſt is a very unfavourable ſymptom. The deglutition is often difficult, ſometimes convulſive. The ſtomach is frequently oppreſſed with bile, which is an unfavourable ſymptom; and complete jaundice, the urine and ſkin being tinged yellow, ſometimes ſupervenes. Inſtead of a ſuperabundance of bile, however, there is ſometimes a deficiency of it, which ſeems to afford even a worſe prognoſis. The fæces being of a white colour, and a black cloud in the urine, have been regarded as fatal ſymptoms. The black cloud in the urine is owing to an admixture of blood; when unmixed with blood, the urine is generally pale.

Among the moſt unfavourable ſymptoms of phrenitis the following may be enumerated; namely, tremors of the joints, convulſions of the muſcles of the face, grinding of the teeth, ſudden changes of the colour of the face from florid to pale, involuntary tears, a mucous diſcharge from the noſe, the urine being of a dark red colour, or yellow, or black, or covered with a pellicle, the fæces being either bilious or white and very fetid, profuſe ſweat of the head, neck, and ſhoulders, paralyſis of the tongue, general convulſions, much derangement of the internal functions, and the ſupervention of the ſymptoms of other viſceral inflammations, particularly of peripneumony. If the delirium changes to coma, and the pulſe at the ſame time becomes weak and the deglutition difficult, the approach of death may be generally expected.

With reſpect to the *cauſes of phrenitis*, we have already obſerved that it is a rare diſeaſe in our temperate climate, but is more frequently obſerved in warm latitudes. The prediſpoſition ſeems to conſiſt in the irritability of youth, and of the ſanguine temperament, as well as in a paſſionate temper of mind. The exciting cauſes are ſuch circumſtances, internal and external, as tend to produce an accumulation of blood in the head; among which are the direct influence of a vertical ſun in tropical climates, or long expoſure to it in hot weather in more moderate heats, eſpecially under great bodily exertions; violent fits of anger; intoxication; concuſſion, fracture of the ſkull, or other mechanical violence; long and intenſe exertion of the mind; certain narcotic poiſons, miaſmata, and perhaps contagion.

The appearances which are obſerved on diſſection after death vary conſiderably in different inſtances, according to the actual ſeat of the inflammation, and to the duration and violence of the diſeaſe. Sometimes the *dura mater* is found reddened by a number of extremely fine veſſels, filled with florid blood, which paſs between it and the cranium; but this membrane, when inflamed, exhibits leſs of this crowded ſtate of veſſels than many other membranous parts, which are naturally more vaſcular. Sometimes a layer of coagulable lymph is found adhering upon its under ſurface, like an adventitious membrane; and ſometimes adheſions are formed to a conſiderable extent between it and the other membranes of the brain. It is not unuſual, when the dura mater has been inflamed, eſpecially in conſequence of ſome external violence, for ſuppuration to take place, and pus to be found covering a portion of the membrane. Inflammation of the *pia mater* is more difficult to diſtinguiſh for a contrary reaſon; namely, that in its natural ſtate it is crowded with a great number of minute veſſels: when inflamed, however, theſe ſmall veſſels are much more numerous, are filled with a florid blood, and form by their anaſtomoſis a beautiful network: at the ſame time, there is a ſtronger adheſion between the under ſurface of the membrane and the brain than uſual. It very rarely happens, that any layer of coagulable lymph is formed in the inflammation of the *pia mater*, which is ſo very common in that of the *pleura* and the *peritonæum*. When the *pia mater* is inflamed to a high degree, pus is formed, and is ſometimes found diffuſed over the whole ſurface of the brain. When inflammation has exiſted in the ſubſtance of the brain, it is rarely found extended over any large portion of it, but is rather confined to one or more diſtinct ſpots. In this ſtate of diſeaſe the inflamed portion becomes of a red colour, although this is ſeldom very intenſe. When cut into, the colour is found to ariſe from a great many ſmall veſſels, which are filled with blood; and the part inflamed has no peculiar hardineſs, but yields nearly the ſame ſenſation to the touch, as it would do in a healthy ſtate. If the inflamed portion be upon the ſurface of the brain, the membranes in the neighbourhood are alſo commonly inflamed. Inflammation of the brain frequently advances to ſuppuration, and abſceſſes are formed in it. When theſe are of a large ſize, the weight of the pus breaks down the ſtructure of the neighbouring parts, and they look ſimply as if they had been deſtroyed, or very much injured by the preſſure. When the abſceſſes are ſmall, there is an ulcerated appearance of the cavities in which the pus is contained. Portions of the brain become gangrenous occaſionally, eſpecially after violent injuries of the head; but this appearance is extremely rare, where inflammation of the brain has originated from any other cauſe. See Baillie's Morbid Anatomy, chap. xxiv.

The cure of phrenitis muſt be conducted upon the ſame general principles as that of other acute viſceral inflammations; and from the particular importance of the organ inflamed, the antiphlogiſtic and evacuant plan muſt be purſued with the utmoſt vigour and expedition.

Blood-letting is to be conſidered as the principal dependence of the practitioner, and the more early it is employed, the more efficacious in general it will prove. It fortunately happens, that, in this complaint, the advantages of general and local blood-letting may be combined; inaſmuch as a large quantity of blood can uſually be procured from the veſſels immediately connected with the inflamed organ. When this advantage can be obtained, it ſhould never be overlooked. It is adviſable, therefore, to open the temporal artery, or the jugular vein, and to take a large quantity of blood, according to the violence of the ſymptoms, and to the age and ſtrength of the patient. Some authors recommend the opening of the artery, and ſome (eſpecially Dr. Cullen and Hoffmann) prefer the ſection of the jugular vein. The frantic ſtate of the patient ſometimes renders either of theſe operations difficult, otherwiſe perhaps the choice is of little importance. We have ſeen a few inſtances, in which a free bleeding from the temporal artery was followed by the moſt ſpeedy and permanent relief, where the phrenitis had followed intoxication and a metallic poiſon. Dr. MᶜBride recommends that the blood-letting be carried to the extent of producing ſyncope or fainting; and when that effect follows, the relief is perhaps more generally complete; it is, however, rather a precarious rule of practice, and moſt practitioners prefer the ſafer mode of repeating the blood-letting at a ſhort interval, than puſhing it ſo far.

The effects of the blood-letting, in diminiſhing the morbid determination of blood to the head, ſhould be ſeconded by all other means in our power. The application of *cold* to the ſcalp, ſuch as waſhing it, after ſhaving, with cold water, vinegar and water, or with æther and ſpirits, (which laſt produce a great degree of cold by their rapid evaporation), is often exceedingly beneficial. To aſſiſt in leſſening the flow of blood to the head, the patient ſhould be kept as near the erect poſture as can be borne. At the ſame time, every irritation, eſpecially thoſe of light and noiſe, of which the inflamed ſenſorium becomes peculiarly ſuſceptible, ſhould be carefully withdrawn. Some writers, eſpecially of the old ſchool, have recommended warm bathing to the lower extremities, and the application of bliſters and rubefacients to them, for the purpoſes of revulſion. But Dr. Cullen juſtly regards them as very ambiguous remedies, which are likely to be productive of injury by increaſing the general excitement of the circulation. It has been propoſed to immerſe the trunk and limbs in the warm bath, while cold applications are made to the head; a practice of which the theory is ambiguous, and a ſufficient experience has ſcarcely been obtained to warrant the recommendation. *Bliſters* have been generally applied over the ſhaven ſcalp, after the excitement has been ſomewhat reduced by blood-letting; but, on the whole, the active abſtraction of heat, by means of the cold and evaporating fluids, above-mentioned, ſeems to afford a more decided relief.

In addition to theſe direct means of diminiſhing the inflammatory action in the head, the indirect effect, which is produced by copious evacuations from the bowels, obtained by the uſe of *purgatives*, is of great importance, and ſhould be carefully attended to. Even ſyncope itſelf has been produced by profuſe evacuations from the inteſtines, which implies the complete influence over the circulation in the brain, which ſuch operations produce. The free uſe of cathartic medicines, therefore, ſhould be reſorted to in all caſes of phrenitis; and if a ſpontaneous diarrhœa ſhould ſupervene, the practitioner will be careful not to check it.

As in all other caſes of inflammatory fever, every external ſource of excitement ſhould be carefully excluded; the apartment ſhould be cool and well ventilated; the bed-clothes light; the food liquid and chiefly of milk and farinaceous matters; the drink aqueous, cold, and acidulated. Antimonial and neutral diaphoretics may be exhibited as medicine, with the view of keeping a ſoft and moiſt ſtate of ſkin, and diminiſhing febrile action.

When phrenitis occurs as a ſecondary affection in common fever, or by metaſtaſis, it ſeldom aſſumes that violent character which idiopathic phrenſy puts on; and conſequently it demands a leſs vigorous treatment. Nevertheleſs the principles of the treatment muſt be the ſame. The removal of the determination of blood to the head muſt be attempted by the ſame meaſures, uſed in a more moderate degree. Thus the more local evacuants, ſuch as bleeding by leeches applied to the temples, by cupping and ſcarifying the neck, and the application of cold, and of bliſters to the ſhaven ſcalp, muſt be reſorted to, and repeated according to the violence of the ſymptoms. The bowels ſhould be evacuated by moderate cathartics, and ſimilar diet and regimen ſhould be adhered to as in the more acute ſpecies. And it ſhould be cautiouſly obſerved, that, even ſhould ſymptoms of typhoid fever ſupervene, yet while there is evident congeſtion in the brain, with fluſhed face, ferrety eyes, delirium, or coma, wine and all other ſtimulants muſt be withheld, as having a direct tendency to aggravate the ſymptoms, and to accelerate the fatal termination of the diſeaſe. See Fever. See Wilſon on Febrile Diſeaſes, vol. iii. chap. 6. Cullen's Firſt Lines.

PHRENSY, a violent delirium, originating from inflammation of the brain. See Phrenitis.

PHRETOMANORUM Urbs, in *Ancient Geography*, a town of Italy, in Samnium, of which Q. Fabius took poſſeſſion, according to Diodorus Siculus.

PHRICODES, from *φρικη*, *horror*, *ſhivering*, in *Medicine*, a fever deſcribed by the ancients, of a remittent, ſemitertian form, in which the paroxyſms are not only uſhered in by ſhiverings, but accompanied by them through the greater part of their duration. See Galen, Comment i. in lib. i. Epidem.

PHRIDIESGAM, in *Geography*, a town of Ruſſia, in the government of Viborg, on the N. coaſt of the gulf of Finland; 60 miles W. of Viborg. N. lat. 60° 35′. E. long. 26° 34′.

PHRIXIUM, in *Ancient Geography*, a town of Aſia, on the confines of the Colchide and Iberia, according to Strabo; who ſays that, in his time, it was called Ideeſſa, and that it was well fortified.

PHRIXUS, a town of Aſia Minor, in Lycia. Steph. Byz.—Alſo, a port of Aſia, in the Thracian Boſphorus, near its mouth in the Euxine ſea. Steph. Byz.—Alſo, a river of the Peloponneſus, in Arcadia, which received the waters of the Eraſinus, and ran into the ſea between Temenium and Lerna, according to Pauſanias.

PHROLICHINO, in *Geography*, a lake of Ruſſia, in the government of Irkutſk; 60 miles N. of Bargazinſk.

PHRONTIS, a word uſed by Hippocrates as the name of a peculiar diſorder of the general nature of the melancholy affections. In this caſe the patient, he ſays, feels, as it were, a thorn pricking the abdominal viſcera; he is extremely reſtleſs and uneaſy, and always avoids light and company. He dreads being touched, and becomes timorous and afraid of every thing; he is moleſted with troubleſome dreams, and imagines that he frequently ſees ſpectres and frightful objects.

PHRUGUNDIONES, in *Ancient Geography*, a people of European Sarmatia, near the ſource of the Viſtula, between the Sulones and the Avarini. Ptolemy.

PHRURÆSUM, mountains of Africa, in the interior of Mauritania Cæſarienſis, S.E. of the mountains Malæthubolus. Ptolemy.

PHRURI, a people of Scythia, in the vicinity of the Caſpian ſea.

PHRURIUM, a promontory on the S. coaſt of the iſle of Cyprus, near Curtum, and N.E. of the promontory Curias. The term denotes a fortreſs.—Alſo, a town of India, on this ſide of the Ganges, placed by Ptolemy in the interior of the territory belonging to the Arvarni.

PHRYGANEA, in *Entomology*, a genus of inſects of the order Neuroptera. The generic character is, mouth with a horny ſhort curved mandible; four feelers; three ſtemmata; the antennæ are ſetaceous, longer than the thorax; wings equal, incumbent, the lower ones folded. There are fifty-five ſpecies, divided into two ſections. The genus Phryganea conſiſts of inſects, which, in point of habit or general appearance, bear a conſiderable reſemblance to ſome of the Phalænæ, (which ſee,) and particularly to thoſe belonging to the diviſion entitled Tineæ. They may be diſtinguiſhed from moths by their feelers, as well as by the ſtemmata ſituated at the top of the head. The Phryganeæ proceed from ſix-footed aquatic larvæ of a lengthened ſhape, reſiding in tubular caſes, which they form by agglutinating various fragments of vegetable ſubſtances, particles of gravel, &c. Theſe caſes are lined within by a tiſſue of ſilken fibres, and are open at each extremity. The included larvæ, when feeding, protrude the head and fore-part of the body, creeping along the bottom of the waters which they inhabit by means of ſix ſhort and ſlender legs; on the upper part of the back, in moſt ſpecies, is ſituated an upright papilla or proceſs, ſerving as a kind of prop or ſtay, preventing the caſe from ſlipping too forward during the time the animal is feeding. The perfect inſects are ſeen in a ſummer's evening floating in the air in large maſſes, and are eagerly devoured by ſwallows. The Phryganeæ are eaſily diſtinguiſhed from the ſmaller moths by their wanting the ſpiral tongue.

A. *Tail with two truncate Briſtles.*

Species.

Marginata. Wings immaculate; body brown, with yellowiſh ſpots on the head, ſides of the abdomen yellowiſh. It is a large inſect, and found in Germany. The thorax is grooved on the back; briſtles of the tail yellowiſh, annulate with brown, and as long as the abdomen.

* Bicaudata. Wings reticulate; body brown, with a yellowiſh line on the head and thorax. It inhabits this country and other parts of Europe.

* Nebulosa. Wings pale cinereous; body brown. It inhabits alſo this and other countries in Europe.

Viridis. Wings greeniſh-hyaline, immaculate; body greeniſh. This is a ſmall inſect, and inhabits Germany. The antennæ are green tipt with black; the head and thorax are green, the latter faintly margined with black; the abdomen and legs are greeniſh.

B. *Tail without Briſtles.*

Species.

* Reticulosa. Wings ſub-ferruginous, reticulate with black; body black. An inhabitant of Europe, as is alſo the next.

* Striata. Wings teſtaceous, with darker nerves.

Analis. Wings brown, with a white ſpot near the tail; the nape is covered with golden hair. Found in Sweden.

* Fusca. Upper wings brown, immaculate; legs yellow. An inhabitant of this and other countries in Europe.

Discoides. Wings brown, with a pale margin, and ſpots on the diſk; the body is grey. It is found in Germany.

Pilosa. Wings teſtaceous, immaculate; the head and thorax hairy. This is a Swediſh inſect.

Pallipes. All the wings black, immaculate; the legs are pale. A native of Italy, and is very ſmall.

Signata. Wings grey, ſpotted with yellow, the hind margin is ſtriate with yellow.

* Grandis. Wings brown-teſtaceous, with cinereous ſpots. This is one of the largeſt of the European phryganeæ, uſually meaſuring an inch or more in length, and having very much the general aſpect of a phalæna; the upper wings are grey, marked by various darker and lighter ſtreaks and ſpecks, and the under wings are yellowiſh-brown and ſemi-tranſparent. The larva, which meaſures nearly an inch and three-quarters in length, is of a fleſh-coloured grey, with brown head and legs, and inhabits a tube compoſed of pieces of bark, ſmall fragments of graſs-ſtalks, or other ſubſtances. Like other larvæ of this genus, it is known by the name of *Cadew-worm*, and is frequently uſed by anglers as a bait. When arrived at its full growth it faſtens the caſe or tube to the ſtem of ſome water-plant, or other convenient ſubſtance, in ſuch a manner as to project a little above the ſurface of the water, and caſting its ſkin, changes to a chryſalis of a lengthened ſhape, and diſplaying the immature limbs of the future phryganea, which in the ſpace of a fortnight emerges from its confinement.

* Varia. Wings varied with dark-grey and black, and ſpotted with white in the middle. This has been deſcribed and figured by Mr. Donovan. The legs are teſtaceous, and annulate with black.

Irrorata. Wings grey-brown, with numerous whitiſh ſpots and ſpecks. It is found in South America. A ſpecimen of it is in ſir Joſeph Banks's muſeum.

* Phalænoides. Wings white, with ſcattered black ſpots; the body is black. It inhabits the northern parts of Europe.

Flavicornis. Wings grey; abdomen greeniſh; antennæ and legs yellowiſh. It inhabits Kiel.

* Rhombica. Wings grey-brown, with rhombic whitiſh ſpots. This is a much ſmaller ſpecies than the *grandis*, and is of a yellowiſh-brown colour, with two obliquely tranſverſe rhomboidic ſemi-tranſparent white ſpots on each upper wing; the lower wings being whitiſh, with a tinge of yellow-brown towards the upper edge. The larva is of a greeniſh-brown colour, and like that of the *grandis* is found in rivulets and ſtagnant waters. The larvæ of the phryganeæ in general feed not only on the ſmaller water inſects, but on the ſpawn of fiſhes, and even on the young fry itſelf.

* Grisea. Upper wings clouded, with a black marginal ſpot. This is found in England and other European countries.

Atomaria. Wings pale-grey, with numerous black dots. This is a native of Kiel; is rather a large inſect; the antennæ are yellowiſh; the head and thorax hairy; the body cinereous.

Fennica. Wings ſtriate, cinereous, with a teſtaceous dot near the tail; the body is black; the antennæ are white at the baſe. It inhabits Denmark. The antennæ of this ſpecies are black at the tip.

Atrata. Black; wings immaculate; antennæ ſhort. It inhabits France. The body is villous.

Notata. Upper wings yellowiſh-grey, with a brown marginal ſpot. It inhabits North America. A ſpecimen is in the muſeum of ſir Joſeph Banks.

* Bimaculata. Wings brown, with a double yellow lateral ſpot. It inhabits Europe. The larva is found in a tapering cylinder, compoſed of ſand and mud.

* Nigra. Wings black; antennæ twice as long as the body. It is found in the northern parts of Europe, as is the next.

* Azurea. Wings black; the hinder part violet. The lower wings are likewiſe obliquely violet.

Variegata. Wings brown, ſpeckled with teſtaceous. It is found in divers parts of Germany.

* Bilineata. Wings brown, with two tranſverſe white lines on each margin. It inhabits northern Europe.

* Interrupta. Wings black, with four white bands, the anterior ones are interrupted, the hind one is marginal and compoſed of dots. This is a native of our own country, as is the next. The body is black.

* Hirta. Brown; upper wings hairy; antennæ as long as the body. The antennæ are white, annulate with brown.

* Longicornis. Wings brown, with two darker waved ſtreaks; antennæ are very long. It is found, as well as the next, in this country and other parts of Europe.

* Quatuor-fasciata. Black; wings teſtaceous, with four black bands; antennæ very long.

Punctata. Wings fringed, pale-yellowiſh, dotted with white; the abdomen is green. It is a native of Paris, and very much reſembles a moth.

* Filosa. Wings rounded, brown, immaculate; antennæ thrice as long as the body. This is a native of England.

Tri-punctata. Wings fringed, cinereous, with three brown dots. It inhabits Saxony. The antennæ are longer than the body.

* Minuta. Variegated with brown and cinereous; feelers villous. It inhabits Europe.

Pusilla. Wings fringed, brown-teſtaceous; antennæ moderately long, annulate with white and black. It is a native of Italy.

Atrata. Black; wings whitiſh, with numerous black ſpots, and two bands. It inhabits Siberia.

Ciliaris. Black; abdomen with a white line on each ſide; the hind ſhanks paler; antennæ moderate. It is found in various parts of Europe, but not in England.

Wæneri. Cinereous; lower wings paler, the inner margin whitiſh and hairy. It inhabits Sweden, as does the next.

Albifrons. Black; wings with four white linear ſtreaks on the outer part.

Flava. Wings reticulate with yellow; antennæ moderately long. This and all the following are found in ſome or other of the countries of Europe.

Umbrosa. Black; upper wings with yellowiſh clouds.

Saltatrix. Wings hyaline, with a green and white ſpot; the antennæ are longer than the body.

Virescens. Wings white, with ferruginous ſpots at the ſuture, and inflected margin; abdomen greeniſh; legs yellowiſh.

Argentata. Wings varied with brown and ſilvery, with a brown dot behind the middle at the anterior margin, and three at the poſterior; the lower ones tipt with brown.

Fasciata. Wings pale-yellow, with four white bands, one entire, the others compoſed of ſpots.

Strigosa. Teſtaceous; lower wings with a long white ſtreak towards the tip.

Maculosa. Wings brown, hairy, ſpotted with white, two of the ſpots ſolitary towards the tip at the outer margin.

Laciniosa. Teſtaceous; wings with three white bands united at the baſe, and each divided at the tip, with an oblique ſpot in the middle.

Atomaria. Teſtaceous; wings grey, with numerous whitiſh ſolitary and confluent dots.

Testacea. Wings and body brown-teſtaceous; lower ones whitiſh.

Inconspicua. Brown; antennæ and fore-feelers long; wings grey, glabrous at the tip; legs yellowiſh.

Ciliata. Black; wings ſubteſtaceous, fringed, the veins at the margin very much branched, the four fore-legs teſtaceous.

Annulata. Brown; antennæ long, annulate with white; wings fringed at the inner and hind margins.

PHRYGANICUS, in *Botany*, a term uſed by Dioſcorides, and many other of the ancient Greeks, to expreſs ſuch herbaceous plants as have hard and woody ſtalks; ſuch are the garden-thyme, and ſeveral others of that kind. They alſo call theſe plants *xylodes*, ξυλωδες, and ξυλωιδεα ϖοα.

PHRYGES, or Phryx, in *Ancient Geography*, a river of Aſia Minor. It diſcharged itſelf into the Hermus, gave its name to Phrygia, and ſeparated this province from Caria, according to Pliny.

PHRYGI, a people of Illyria, in the vicinity of the Ceraunian mountains. Strabo.

PHRYGIA, a country of Proconſular Aſia, concerning the name of which there are two different opinions: the one aſcribing it to the country, whence it paſſed to the people; and the other attributing it to the people, who gave it to the country. According to the former opinion ſome have derived it from the river Phryges or Phryx (now Sarabat;) others from Phrygia, the daughter of Aſopus and Europa, an etymology which is founded in mere fable. Bochart ſuppoſes, that this tract was called Phrygia from the Greek verb Φρυγειν, to burn or parch, which, according to him, is a tranſlation of its Hebrew name, derived from a verb of the ſame ſignification. This etymology bears relation to the nature of its ſoil, which was dry in many parts of it, and which, in its mountains, exhibited traces of volcanos. Another opinion aſcribes the name of Phrygia to Phryges, the people who inhabited it; and it is ſaid that they had at a former period borne the name of Bryges or Breges; and theſe, according to Strabo, were the ſame people: Herodotus ſays, that whilſt they remained in Europe they were called Breges, but after their paſſage to Aſia, their name was changed into Phryges.

With regard to the boundaries of Phrygia, Strabo informs us, that thoſe of the Phrygians and Myſians were diſtinct; but that it was ſcarcely poſſible to aſcertain them. He adds, that the Trojans, Myſians, and Lydians, are all, by the poets, blended under the common name of Phrygians, which Claudian extends to the Piſidians, Bithynians, and Ionians.

Phrygia Proper, according to Ptolemy, was bounded on the north by Pontus and Bithynia; on the weſt by Myſia, Troas, the Ægean ſea, Lydia, Mæonia, and Caria; on the ſouth by Lycia; and on the eaſt by Pamphylia and Galatia. It lies between the 37th and 41ſt degrees of N. lat., extending in longitude from 56 to 62 degrees. Phrygia is commonly divided into the *Greater* and *Leſſer*, called alſo Troas; but this diviſion did not take place till Troas was ſubdued by the Phrygians; and hence it is more conſidered by ſome Roman writers as a part of Phrygia, than Bithynia, Cappadocia, or any other of the adjacent provinces. In ſubſequent ages, the Greater Phrygia was divided into two diſtricts or governments, one called Phrygia Pacatiana, from Pacatianus, who, under Conſtantine, bore the great office of the præfectus prætorio of the eaſt: the other Phrygia Salutaris, from ſome miraculous cures ſaid to have been performed there by the archangel Michael.

This country, as well as the whole of Aſia Minor lying in the 5th and 6th northern climates, was, in ancient times, highly celebrated for its fertility. It abounded in all ſorts of grain, being, for the moſt part, a plain country covered with a deep rich ſoil, and plentifully watered by ſmall rivers. In ſome parts it furniſhed bitumen and other combuſtible ſubſtances. Having large plains and paſture grounds, it was well ſtocked with cattle. The air was anciently deemed very pure and ſalubrious, though it is now, in ſome parts, thought to be extremely groſs, as a great part of the country lies in an uncultivated ſtate. The moſt remarkable cities in Phrygia Major were the following, *viz.* Apamea or Apamia, the metropolis of all Phrygia, till the above-mentioned diviſion of Conſtantine took place: this is commonly called Apamea Cibotos.—Laodicea, now Eſkihiſſar, ſeated on the banks of the river Lycus, not far from Apamea; the inhabitants of which carried on a very conſiderable trade in wool, which was much admired for its ſoftneſs, and who were reckoned the moſt wealthy people in Aſia Minor. Laodicea was one of the ſeven churches mentioned in the Apocalypſe; but at preſent only its ruins are to be ſeen. At Eſkihiſſar, as it is now called, there are ſtill to be ſeen four theatres of white marble, as entire as if they had been lately built; near one of them is an inſcription in honour of the emperor Titus.—Hierapolis, famous for its mineral waters, which, according to Strabo, when expoſed to the air, petrified in the ſpace of a year, and yet poſſeſs ſuch a virtue as to render the fields watered by them to be exceeding fruitful, and to afford a preſent remedy againſt innumerable diſtempers. Near this city was a deep cavern, which was always overſpread with a thick fog, and which exhaled ſuch a peſtilential ſtream, that it ſtifled any living creature who approached it. Strabo and Pliny except the Galli or eunuchs of Cybele; Ammianus and Dio Nicæus except all eunuchs. Hierapolis is now called Bambuk-kalaſi, and ſome veſtiges of its ancient magnificence may be ſtill ſeen in heaps of ruins and fine pillars.—Gordium, ſituated on the borders of Phrygia towards Cappadocia.—Coloſſe, now Chonos, on the S. ſide of the Meander.—Sipylus, the reſidence of king Tantalus, and hence called Tantalis.—Synnada, noted for its marble quarries; built by Conſtantine the Great, and declared the metropolis of Phrygia Salutaris, after his diviſion took place. Beſides theſe, and other cities of leſs note, there were ſome in later times of no ſmall account; ſuch as Saqua, Chara-Chiſar, Cillexuga, Einegiol, &c. taken by the Ottomans from the Chriſtian princes, at the firſt riſe of the Ottoman empire.

The rivers of this country are the Mæander, now Madre or Mendre, which riſes in the hill Celænæ, paſſes through Phrygia, divides Caria from Lydia, and after, as it is ſaid, 600 windings, by which it ſeems to flow back to its fountain-head, empties itſelf into the Archipelago between Priene and Miletus.—Marſyas, riſing near or at the ſpring of the Mæander, and ruſhing down from a conſiderable height between rugged rocks, and after flowing through the town of Celænæ, in the ſame channel with the Mæander, ſeparating into two branches, which form theſe two rivers; Marſyas purſuing a direct courſe with an incredible rapidity, and near Apamea being again received into the Mæander. Sangarius or Sangaris, ſpringing from the hill Dindymus, waſhing Phrygia and Bithynia, and diſcharging itſelf into the Black ſea.—Phryx or Phryges, (which ſee.)—Hermus, celebrated by the poets for its gold ſands, which riſes near Dorylæum, and falls into the Archipelago near Smyrna.—Myſias, Orga, Olrima, &c.

The Phrygians claim high antiquity; but their origin is uncertain. Joſephus and St. Jerom ſuppoſe that they are deſcended from Togarmah, one of the ſons of Gomer. Herodotus, Strabo, Pliny, and Euſtathius deduce their origin from the Brygians, a people of Macedonia, who, paſſing into Aſia Minor, were called Phrygians. Bochart agrees with thoſe who trace their origin to Gomer, the eldeſt ſon of Japhet. Whatever was their origin, they were ſuperſtitious, voluptuous, and effeminate, without prudence, and ſo ſervile in their temper, that they could be induced to comply with their duty only by ſtripes and ill uſage. This character, under which they are deſcribed, gave riſe to ſeveral trite and well-known proverbs: "Phryges ſeró ſapiunt;" "Phryx verberatus melior;" &c. Their muſic was ſuited to their effeminate temper, and tended, as ſome have ſaid, to enervate the mind. The Phrygians are ſaid to have been the firſt inventors of divination by the ſinging, flying, and feeding of birds. Their government was monarchical, and they were for ſome time under one ſovereign. But ſome time before the Trojan war, this country was divided into ſeveral petty kingdoms, and ſeveral princes reigned at the ſame period. Apollodorus mentions a king of Phrygia, who was contemporary with Ilus, king of Troy. Cedrenus and others ſpeak of Teuthrans, king of a ſmall part of Phrygia, whoſe territories were ravaged by Ajax, and his daughter Tecmaſſa carried away captive by the conqueror. Homer mentions Phorcys and Aſcaneus, both princes and leaders of the Phrygian auxiliaries, that came to the relief of Troy. Tantalus was king of Sipylus, and he is ſaid to have been no leſs famous for his great wealth, than infamous for his avarice, and other deteſtable vices. It is alſo reported, that with a view of appeaſing internal diſcords, the Phrygians conſulted an oracle, which directed them to commit the government to a king; upon which they placed Gordius on the throne.

As to their commerce, we merely know, that Apamea was the chief emporium of all Aſia Minor, which was the place of reſort for merchants and traders from all parts of Greece, Italy, and the neighbouring iſlands. From Syncellus we alſo learn that the Phrygians were for ſome time maſters of the ſea, and none but trading nations ever prevailed in that element. The country produced many rare and uſeful commodities, which afforded conſiderable exports. They had a ſafe coaſt, convenient harbours, and other advantages which warrant our concluding that they carried on a conſiderable trade. Of their laws we have no knowledge; and in favour of their learning it may be alleged, that, as they enjoyed the ſovereignty of the ſea, they muſt have had a competent ſkill in geography, geometry, and aſtronomy; to which we may add that they had a more than ordinary knowledge of muſic.

It has been the opinion of ſome writers, that the Phrygian language bore a great reſemblance to the Greek, but others have alleged to the contrary. The few Phrygian words which have been tranſmitted to us, are carefully collected by Bochart and Rudbeckius. Strabo alſo ſays, that it is difficult to diſcover any ſimilitude between the barbarous words of the Phrygian language and the Greek. The Egyptians looked upon the Phrygian tongue as the moſt ancient language of the world: but other nations, and particularly the Scythians, will not admit this fact.

The ancient Phrygians were much addicted to ſuperſtition. They had many idols: but their principal deity ſeems to have been Cybele. (See CYBELE.) They alſo worſhipped ſeveral other idols, *viz.* Bacchus, Adagyus, and the Cabiri. In ſolemnizing the feſtivals of their gods, and on other occaſions, they had dances and ſongs, which they called "lityerſes," from Lityerſes, ſon of Midas, king of Phrygia. Heſychius mentions certain Phrygian dances, called by him "bricigmata," derived without doubt from the word Bryges, the ancient name of the Phrygians.

The kings of Phrygia whoſe names are recorded were, Nannacus, Annacus, or Cannacas, who is the firſt king mentioned in hiſtory, Midas, Marcis, Gordius, Gordius II., Otreus, Lityerſes, Midas II., Gordius III., Midas III., and Midas IV., with whom ended the royal family of Phrygia, which became a province of the Lydian monarchy, and continued in that ſtate till Crœſus was conquered, and all Lydia was reduced by Cyrus.

PHRYGIA *Minor*, or *Leſſer Phrygia*, was divided into two parts, the maritime, called "Helleſpontiaca," and the Mediterranean, termed "Epictetus." The former borrowed its name from the Helleſpont, and extended along the coaſt from the town of Percote to the promontory Lectum or Lecton, oppoſite to the N. ſide of the iſland of Leſbos. This part was properly called Troas, or Troia, though the Trojan kingdom extended from the river Aſopus, to the banks of the Caicus, including not only Troas, but alſo the greater and leſſer Myſia. Epictetus, or the inland part of Phrygia Minor, extended to the neighbourhood of mount Olympus, in the greater Myſia. This part at firſt belonged to Pruſias, king of Bithynia, who yielded it, by agreement, to Eumenes, king of Pergamus, whence it was called Epictetus, that is, acquired. However, theſe appellations are frequently confounded, and both attributed to Phrygia Minor.

Phrygia Minor lay between the 40th and 42d degrees of N. lat., and in longitude was of ſmall extent. In general it may be ſaid, that Phrygia Minor, as comprehending both the Helleſpontiaca and Epictetus, was bounded by the Propontis on the N., by the Ægean ſea on the S., by Myſia Minor on the E., and the Helleſpont on the W. On the ſea-coaſt were the cities of Percote, Abydus, Ariſba, Dardanum, Rhetum, Sigeum, Troy or Ilium, Lariſſa, Colonæ, Alexandria, and Troas.

Of the rivers that watered Troas, or Phrygia Minor, we need only mention the Scamander and Simois, which ſee reſpectively. The only mountain of this country that deſerves notice was mount Ida, being a ridge of hills extending from the city of Zeleia, near the borders of Myſia Minor, to the promontory Lectum.

The ſoil of this diſtrict was anciently reckoned extremely fertile; and it has even now ſigns of fertility, though in a great meaſure neglected and uncultivated. Modern travellers deſcribe the Aſiatic coaſt of the Helleſpont, as a moſt beautiful and fertile tract of land; the hills being covered with vineyards and olive plantations, and the vales productive of all ſorts of grain.

The inhabitants of Leſſer Phrygia, or Trojans, ſo called from Troy, the metropolis of that country, were undoubtedly a very ancient people; but authors are not agreed about their origin. Some repreſent them as by deſcent Samothracians; others ſay they were Greeks; ſome again derive them from the iſland of Crete, whence they ſuppoſe Phrygia

Minor to have been peopled; others ſay, that they were deſcended from the Arcadians, and there are writers who maintain that they originally came from Italy, in which opinion Virgil concurs.

Bochart thinks that Leſſer Phrygia was planted by Aſhkenaz, Gomer's eldeſt ſon, becauſe ſome appellatives of lakes, rivers, iſlands, cities, and men of that country, bear a reſemblance to this name. But the blood of the firſt inhabitants of this country, whoever they were, was mixed in proceſs of time with that of foreigners, namely, of Myſians, Samothracians, Greeks, and Cretans, who ſettled among them, and were reckoned of the ſame deſcent with the ancient proprietors.

As to their government, it was unqueſtionably monarchical and hereditary; for from Dardanus to Priam, the father was conſtantly ſucceeded by the ſon, or the elder brother by the younger. Their country was at firſt parcelled out into ſeveral ſmall kingdoms: but the ſovereigns of all theſe were, in length of time, either expelled or made tributary by the Trojan kings; inſomuch that Strabo enumerates nine ſmall kingdoms, or principalities, ſubject to Troy, beſides the iſland of Leſbos. On this account the Trojan war was ſo protracted; becauſe all theſe countries were to be ſubdued before Troy could be inveſted. Of their laws no particular ſyſtem remains. Their religion was ſubſtantially the ſame with that of the inhabitants of Greater Phrygia. Their principal deities were Cybele, "the grand-mother of the gods," as they ſtyled her, Apollo, Minerva, and Pallas, (ſee PALLADIUM,) Venus, and Apollo Sminthius. The Trojans are celebrated as one of the moſt polite and civilized nations of thoſe days; and in the reigns of their later kings they roſe to a very conſiderable pitch of ſplendour and magnificence. Their language was probably the ſame that was ſpoken by the inhabitants of Greater Phrygia. Their trade can only be gueſſed at from their ſituation, which probably drew merchants from all the neighbouring parts to traffic in their country, as well for their own growth as for foreign productions. Their country abounded with the neceſſaries of life, as we may conclude from their having ſupported two very conſiderable armies for many years. Their ſettlements in Thrace, Peloponneſus, Sicily, Italy, Egypt, and Africa, afford ſufficient proof, that they applied themſelves at an early period to trade and navigation, which, moſt probably, were the ſources of the riches, ſplendour, and power, in which they far excelled all the neighbouring ſtates.

Troas, or Phrygia Minor, was, in all probability, governed by kings before the reigns of Teucer and Dardanus; but the Trojan hiſtory of that period is either fabulous or uncertain. Teucer, as ſome ſay, was the firſt ſovereign; he was the ſon of Scamander and Ida, that is, born in Phrygia, near the river Scamander and mount Ida, and ruled over all Troas, or Phrygia Minor. From him the country was called Teucria; and the inhabitants were denominated Teucri. He was ſucceeded by Dardanus, who extended the boundaries of his kingdom by conſiderable acquiſitions, and built two cities, one called Dardana, or Dardania, from his own name, and the other Thymbra, from Thymbræus, one of his intimates. Having reigned in Phrygia 64 or 65 years, he was ſucceeded by his ſon Erichthonius, who after a long, honourable, and proſperous reign of 46, as ſome ſay, or according to others, 75 years, left the kingdom of Phrygia in a flouriſhing condition. Tros, the founder of Troy, was his ſucceſſor, from whom Phrygia Minor borrowed the name of Troas, as its metropolis did that of Troy. He was ſucceeded by his ſon Ilus, who drove Tantalus out of Aſia, and annexed his kingdom to the crown of Phrygia; and having enacted many uſeful laws for the regulation of public affairs, he died in the 40th year of his reign. On the death of Ilus, his ſon Laomedon was placed on the throne; he built the citadel of Troy, but having treated Jaſon and the Argonauts, who had landed on the coaſts of Troy, in an inhoſpitable manner, Hercules, who was one of them, avenged their cauſe by taking Troy, and afterwards killing Laomedon. Podazers, his only ſurviving ſon, was his ſucceſſor. In his reign happened the war which terminated in the capture of *Troy*, which ſee; the city of Troy being utterly ruined, and moſt of the inhabitants of Troas put to the ſword. Some writers ſay, that the neighbouring Phrygians and Lydians poſſeſſing themſelves of that country, ſettled there; and that Troas from that time began to be called Phrygia; others are of opinion, that Æneas, having gathered together the ſcattered remains of the Trojans, rebuilt the city; and that his deſcendants, and the deſcendants of Hector, reigned there till the country was ſubdued by the Lydians, who became ſo powerful as to over-run all Aſia Minor. If the Trojans had any kings of their own, after their city was deſtroyed by the Greeks, they probably made but an indifferent figure, ſince they are not even named in hiſtory. Anc. Un. Hiſt. vol. iii.

PHRYGIAN MODE, in *Muſic*. See *Grecian* MODE. This mode and its effects are ſo frequently mentioned in ancient authors, that we muſt collect into a point its pretended properties. The Phrygian mode is one of the principal and moſt ancient modes of the Greek muſic. Its character was ardent, fierce, impetuous, vehement, and terrible. So that, according to Athenæus, trumpets and other military inſtruments, ſounded in the Phrygian mode. All this, however, might be ſaid of our trumpets in ſounding the charge, ſignals of battle, and even in playing marches; and that our kettle-drums and ſide-drums are beaten in the Phrygian mode; in which all muſic ſeems at preſent tranſpoſed by the eternal din of double drums and trumbone.

PHRYGIAN *Stone*, *Phrygius Lapis*, in *Natural Hiſtory*, the name of a ſtone deſcribed by the ancients, and uſed in their time in dyeing; probably from ſome vitriolic or aluminous ſalt contained in it, which ſerved to enliven or fix the colours uſed by the dyers.

It was a light ſpungy maſs, reſembling a pumice, and the whiteſt and lighteſt were eſteemed the beſt. Pliny gives us an account of their preparing it for uſe for dyeing, which was by moiſtening it with urine, and then heating it red-hot, and ſuffering it to cool again: this calcination was repeated three times, and the ſtone was then fit for uſe; and Dioſcorides recommends it in medicine after burning; he ſays it was drying and aſtringent.

PHRYGIANS, PHRYGES, or PHRYGASTES, as St. Epiphanius calls them, in *Church Hiſtory*, were a branch of the Montaniſts; ſo called from Phrygia, a country where they abounded.

They eſteemed Montanus their prophet; and looked on Maximilla and Priſcilla as great propheteſſes.

This ſpirit of prophecy, or rather enthuſiaſm, was their diſtinguiſhing character. See CATAPHRYGIANS.

PHRYMA, in *Botany*, a Linnæan name, whoſe meaning or derivation nobody has ventured to gueſs, nor can we throw any light upon the ſubject. Linn. Gen. 303. Schreb. 399. Willd. Sp. Pl. v. 3. 179. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 3. 431. Juſſ. 117. Lamarck Illuſtr. t. 516. Gærtn. t. 75. (Leptoſtachia; Mitchell Eph. Nat. Cur. v. 8. 212.)—Claſs and order, *Didynamia Gymnoſpermia*. Nat. Ord. *Perſonatæ*, Linn. *Labiatæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, cylindrical,

drical, ſtriated, gibbous at the baſe on the upper ſide, two-lipped; its upper lip narrow, and longeſt, with three awl-ſhaped converging teeth; the lower obtuſe, cloven. *Cor.* of one petal, ringent: tube the length of the calyx; upper lip ſhorteſt, nearly ovate, emarginate, ſtraight; lower larger and more ſpreading, three-cleft, the middle ſegment moſt prominent. *Stam.* Filaments four, two at each ſide, the upper ones ſhorteſt; anthers roundiſh, approximated, in the throat of the corolla. *Piſt.* Germen oblong; ſtyle thread-ſhaped, the length of the ſtamens; ſtigma obtuſe. *Peric.* none, except the permanent, furrowed, cloſed calyx. *Seed* ſolitary, oblong, nearly cylindrical, with a furrow at one ſide.

Eſſ. Ch. Calyx two-lipped, five-toothed. Seed ſolitary.

1. Ph. *leptoſtachya.* Slender-ſpiked Phryma. Linn. Sp. Pl. 838. Suppl. 277. Amoen. Acad. v. 3. 19. (Circææ foliis, amaranthi ſiculi Boccone ſpicâ, floribus parvis purpureis propendentibus, herba Floridana; Pluk. Amalth. 59. t. 380. f. 5.)—Leaves ovate, ſerrated. Calyx of the fruit deflexed.—Native of cloſe woods in North America; "from Canada to Carolina." *Michaux.* It is ſaid to have been ſent to Kew in 1802, by the late Mr. Maſſon, and is marked as a hardy perennial, flowering in July and Auguſt. The herbage reſembles a *Verbena* or *Veronica*, and the *flowers*, diſpoſed in long ſlender terminal ſpikes, are too ſmall and unattractive to obtain much favour. It is to be wiſhed however that a good figure of ſo little known a plant and genus might be given to the public.

2. Ph. *dehiſcens.* Splitting Phryma. Linn. Suppl. 277. Willd. n. 2. (Buchnera cuneifolia; Linn. Suppl. 288. Willd. Sp. Pl. v. 3. 335. Thunb. Prodr. 100.)—Leaves wedge-ſhaped, ſharply toothed at the ſummit. Calyx of the fruit erect, ſplitting lengthwiſe. – Gathered by Thunberg at the Cape of Good Hope. (See Buchnera.) The younger Linnæus was not aware of having mentioned this plant under two different names, in his *Supplementum*, nor did Willdenow detect the miſtake, though he juſtly objected to its being a *Phryma*. We muſt rely on Thunberg's authority in ſuppoſing it a *Buchnera*. The *ſtem* is ſhrubby, much branched, of humble growth. *Leaves* oppoſite, ſtalked, wedge or fan-ſhaped, fleſhy, rough with minute points or briſtles; terminating in about ſeven ſtrong ſharp teeth. *Cluſters* terminal, ſolitary, ſimple, three or four inches long, of numerous *flowers*, which Linnæus the elder has very carefully deſcribed on his ſpecimen before us, as follows. "*Calyx* of one leaf, cylindrical, with five angles; abrupt, with five teeth; finally ſplitting along one ſide. *Corolla* of one petal; tube cylindrical; limb in five, nearly equal, ſmall, rounded ſegments. *Stamens* two long and two ſhort. *Germen* ſuperior, oblong; ſtyle ſhort; ſtigma ſimple. *Seed* (rather *capſule*) almoſt as long as the calyx, obſcurely quadrangular, compreſſed, ſmooth, rugged in the upper part; abrupt at the baſe; of two cells. *Seeds* ſolitary, ſomewhat club-ſhaped." The fewneſs of the *ſeeds* is the chief objection to our conſidering this plant as an indubitable *Buchnera*. Perhaps it ought to conſtitute a new genus, but its habit cloſely agrees with the Linnæan *Buchnera cernua*, an imperfect ſpecimen of which is actually laid into the Linnæan herbarium as a nondeſcript *Phryma*. We are unacquainted with the number of its *ſeeds*.

PHRYNICUS, ſurnamed *Arrhaſius*, in *Biography*, a Greek ſophiſt or orator, was a native of Bithynia, and flouriſhed in the reigns of Marcus Antoninus and Commodus. Two works are attributed to him, *viz.* "Apparatus Sophiſticus," and "Dictiones Atticæ." There is extant an abridgment of the latter, which was printed at Rome, with the title of "Eclogæ Nominum et Verborum Atticorum," Gr. et Lat. 1517. The beſt edition of this work is that of Pauw in 1739. Of the ſame name were a compoſer of a tragedy, the diſciple of Theſpis, and a comic poet, who flouriſhed about a century later.

PHRYNIUM, in *Botany*, a name borrowed by Willdenow from the ancient Greeks, whoſe φρυνιον was ſo called from φρυνη, *a red kind of land toad*, reputed venomous, to which the plant in queſtion, being armed with ſpines, was thought to be hoſtile. Our *Phrynium* is a ſmooth herb, growing in damp ſhady places, and rather affording ſhelter to various reptiles, than dangerous to any. Willd. Sp. Pl. v. 1. 17. Roſcoe Tr. of Linn. Soc. v. 8. 341. (Phyllodes; Loureir. Cochinch. 13.)—Claſs and order, *Monandria Monogynia.* Nat. Ord. *Scitamineæ*, Linn. *Cannæ*, Brown Prodr. Nov. Holl. v. 1. 307.

Gen. Ch. *Cal.* Perianth ſuperior, of three awl-ſhaped, erect, equal leaves. *Cor.* of one petal, tubular; its limb in ſeven ſegments; the three outermoſt acute, nearly equal, reflexed; the four innermoſt obtuſe, erect, unequal. Nectary a long, channelled, upright lip. *Stam.* Filament ſolitary, awl-ſhaped, ſhort, united to the baſe of the nectary at one ſide; anther oblong, irregular, ſimple. *Piſt.* Germen inferior, ovate, triangular; ſtyle thick, ſhort, ſcarcely exceeding the ſtamen; ſtigma concave, bent towards the anther. *Peric.* Capſule bluntly triangular, of three cells. *Seed* ſolitary, ovate, ſmooth.

Eſſ. Ch. Calyx of three leaves. Inner ſegments of the corolla four, obtuſe, unequal. Stamen awl-ſhaped. Anther ſimple. Style thick, ſhort, inclined towards the anther. Capſule with one ſeed.

Obſ. It appears by the deſcriptions of authors, for we have not ſeen the fruit or germen, that the latter is of three cells, with the rudiments of three ſeeds, only one of which comes to maturity. Yet Willdenow mentions "three *nuts.*"

1. Ph. *capitatum.* Willd. as above. (Phyllodes placentaria; Loureir. Cochinch. 13. Naru kila; Rheede Malab. v. 11. 67. t. 34.)—Native of moiſt ſhady places in Cochinchina China, and the coaſt of Malabar. *Root* perennial, knotty, creeping horizontally. *Stem* none. *Leaves* radical, on long, ſimple, upright ſmooth *ſtalks* four feet high, ovate-oblong, acute, entire, flat, ſmooth, coriaceous, a foot long, obliquely furrowed. *Flowers* white, in a large ſeſſile hemiſpherical *cyme*, from a lateral cleft below the middle of the *leaf-ſtalk*, accompanied by two large *bracteas*, embracing ſeveral ſmaller ones, each common to many *flowers*. Loureiro obſerves that the *germen* is generally abortive, and that the *leaves* are uſed for wrapping up cakes, in the oven, to give them an agreeable taſte as well as colour. The young unfolded *leaves* are infuſed in rum or arrac, with thrice as much water, to make vinegar.

This may perhaps not be the only ſpecies of its genus. We have two nondeſcript plants gathered at Sierra Leone, by Dr. Afzelius, which that excellent botaniſt judged to belong to *Phrynium*. Their *infloreſcence* however ſeems to be terminal, and we are rather more inclined to refer them to *Thalia*, or perhaps *Maranta*.

PHRYNUM, in *Zoology*. See Rana *Bufo*.

PHTHALEON, in *Ancient Geography*, a town of Greece, upon the Pegaſean gulf.

PHTHAS, in *Mythology*, a name given among the Egyptians to the Greek Vulcan, whom they conſidered as the Supreme Divinity, or at leaſt as an attribute of that active principle, or intelligent power, eternally united, in their opinion, with the chaotic maſs, by whoſe energy the elements were ſeparated, and bodies were formed, and who continually preſides over the univerſe, and is the efficient cauſe of all effects. For this we have not only the authority of Plutarch (Iſis et Oſiris), who may be ſuſpected of having exhibited the Egyptian philoſophy in a Grecian dreſs, but the united teſtimony of many writers, who give ſuch accounts of the Egyptian gods, Phthas or Vulcan, and Cneph or Agathodæmus, as render it probable that theſe were only different names expreſſing different attributes of the Supreme Divinity. The Egyptians, ſays Euſebius, call the maker of the univerſe by the name of Cneph, and relate, that he ſent forth an egg from his mouth; which in their ſymbolical language denotes that he produced the univerſe. (See CNEPH.) Diodorus Siculus (l. i.) ſpeaks of the Egyptian Vulcan as the firſt king among the gods, and Manetho aſcribes to him unlimited duration, and perpetual ſplendour. The name itſelf, Phthas, ſignifies, according to Jablonſki, in the Coptic language, one by whom events are ordained, or the diſpoſer of things. When the Egyptians mean to repreſent the ruler of the world as good, they called him by the appellation Cneph, denoting a good genius; and they repreſented him under the ſymbol of a ſerpent. Upon a temple dedicated to Neithas at Sais, the chief town in Lower Egypt, was this inſcription; "I am whatever is, or has been, or will be, and no mortal has hitherto drawn aſide my veil; my offspring is the ſun." Plutarch and Proclus mention this inſcription, though with ſome difference of language; and it is ſo conſonant to the mythological ſpirit of the Egyptians, that notwithſtanding the ſilence of more ancient writers, who treat of this theology, its authenticity may be eaſily admitted. If this be allowed, and if, at the ſame time, it be granted, as the learned Jablonſki maintains (Pantheon Egypt.), that Neithas and Phthas were only different names for the ſame divinity, this inſcription will be a ſtrong confirmation of the opinion, that the Egyptians acknowledged the exiſtence of an active intelligence, the cauſe of all things, whoſe nature is incomprehenſible. On the obeliſk of granite, tranſported from Egypt to Rome, amongſt the hieroglyphics of which Hermaphion has given the interpretation, is the following remarkable paſſage, on the ſubject of Rameſtas, king of Heliopolis: "This is he, whom Phtha, the father of the gods, has elected." Theſe words, the father of the gods, point out the ſtars, which the Egyptian ſages regarded as the moſt ſtriking emblems of the divinity, and which the people really adored.

Upon the whole we may conclude, that Phtha was regarded, in remote antiquity, as the ordaining ſpirit, and the great architect of the univerſe. The inhabitants of Memphis raiſed a temple to him where he was principally worſhipped. Herodotus and Diodorus Siculus have deſcribed this temple; and Suidas adds, the inhabitants of Memphis adore Vulcan under the name of Phtha. From Phtha we ought not to ſeparate the god whom the Egyptians adopted under the name of Neith, ſince he alſo is the creating ſpirit. Neith, in fact, ſignifies, according to Jablonſki, him who diſpoſeth all things. By the firſt of theſe attributes, God was underſtood to be taken in a general ſenſe, and by the ſecond, his wiſdom was particularly characteriſed. He had a temple at Sais; and Plato, who frequented it ſays, Neith, to whom the Greeks have given the name of Minerva, is its tributary deity. Neith and Phtha are therefore the ſame divinity. The Phœnicians, who received their religion and their knowledge from their brethren the Egyptians, likewiſe acknowledged Minerva, or Neith, for the artiſt of nature. Cadmus, the Phœnician, who carried this worſhip into Greece, gave the name of Neith to one of the ſeven gates of Thebes, in Bœotia; and there the Egyptian theology was taught. The Egyptians adoring the power of the creator under the name of Phtha, and his wiſdom under that of Neith, honoured his beneficence, by calling him Cneph, or good, by way of excellence.

In fine we may conclude, notwithſtanding what has been advanced to the contrary by Porphyry, and others, that it appears highly probable, that the ancient Egyptians acknowledged an active as well as a paſſive principle in nature, and as Plutarch aſſerts, worſhipped τω πρωτω Θεω, the ſupreme deity. Brucker's Phil. by Enfield, vol. i. Savary's Travels in Egypt, vol. i.

PHTHEMBUTI, in *Ancient Geography*, a nome of Egypt, the capital of which was called "Tava" by Ptolemy.

PHTHENOTES, a nome of Egypt, the capital of which was Butcs. Ptolemy.

PHTHIA, a port of Africa, in Marmarica, between the great Cherſoneſus and Paliurus.—Alſo, a town of Aſia, in the vicinity of the Euxine ſea.

PHTHINTHIA, a town ſituated in the interior of Sicily. Ptolemy.

PHTHIOTIS, a country of Greece, in Theſſaly; it lay to the S.E. near Magneſia.

PHTHIRA, or PHTHIRO, a mountain of Aſia Minor, in Caria. Steph. Byz. and Suidas.

PHTHIRIASIS, φθειρίασις, in *Medicine*, from φθειρ, *a louſe*, ſignifies the louſy diſeaſe, *morbus pedicularis*, and *pediculatio*, of authors.

Of theſe well-known inſects, which infeſt the human body, there are two ſpecies; the one more commonly affecting the hairy ſcalp, and the other the pubes. Of the former ſpecies, however, (the pediculus humanus,) there is a variety uſually termed body-lice, concerning which Linnæus remarks, "Varietas capitis durior, coloratior, veſtimentorum laxior, magis cinerea." Theſe pediculi are bred abundantly among the inhabitants of ſordid dwellings, of gaols, and work-houſes, &c. and in ſuch ſituations prey upon perſons of all ages indiſcriminately. There is, however, alſo a peculiar ſtate of ſkin in people advanced in years, and connected with the diſeaſe, which has been denominated Prurigo ſenilis by Dr. Willan, in which they are generated, notwithſtanding every attention to cleanlineſs or regimen, and multiply ſo rapidly, that the patient endures extreme diſtreſs from their perpetual irritation. The nits or eggs are depoſited on the ſmall hairs of the ſkin; and the pediculi are only found on the ſkin or on the linen, and not under the cuticle, as ſome of the old authors have repreſented. Many marvellous ſtories, indeed, are related by Foreſtus, Schenckius, and others, reſpecting lice bred under the ſkin, and diſcharged in ſwarms from abſceſſes, ſtrumous ulcers, and veſications: and many individuals of great note are ſtated to have died, in ancient times, from the multitude of theſe devouring pediculi. Thus Plutarch relates of Sylla: "It was long before he perceived that he had an ulcer within his body; but at laſt the fleſh putrefied, and produced ſuch a quantity of lice, that though many perſons were employed day and night in deſtroying them, yet they increaſed much faſter than they could be removed; and to ſuch a degree did the diſtemper prevail, that his clothes, baths, baſins, and food, were polluted with that perpetual flux of corruption and vermin. He went many times in the day into the water, to ſcower and cleanſe his body, but all in vain; the vermin multiplied ſo faſt as to baffle every attempt to deſtroy them." The biographer adds, "it is ſaid, that among the ancients, there died of this diſeaſe Acaſtus the ſon of Pelias, and nearer our own times Alcmæon the poet, Pherecydes the philoſopher, Calliſthenes the Olynthian, during the time of his impriſonment, and

Mutius

Mutius the lawyer: and if it be proper to add to theſe a perſon not diſtinguiſhed by any merit or virtue, Eunus, a fugitive ſlave, who was author of the war in Sicily, called the "ſervile war," and who was taken and carried priſoner to Rome, died likewiſe of this ſickneſs." (See Plutarch's Life of Sylla; alſo, Plin. Hiſt. Nat. lib. xxvi. cap. 13, who, ſpeaking of phthiriaſis, obſerves, "quâ Sylla dictator conſumptus eſt.) Herod, Ennius, and by ſome Plato is ſaid alſo to have been deſtroyed by the louſy diſeaſe.—In more recent times, Amatus Luſitanus has affirmed, that he was witneſs to the caſe of a gentleman, who periſhed miſerably in this diſeaſe: "for ſo univerſally did theſe inſects ſwarm over his body, that two negro ſervants were entirely employed in collecting baſkets full from his perſon, and carrying them to the ſea." Amat. Luſit. Contur. iii. Cur. 58. See alſo Foreſt. Obſ. Med. lib. viii. obſ. 14. Johan. Schenck. Obſ. Med. lib. v. obſ. 2.

The mode in which pediculi are generated being now well aſcertained, and ſuch fatal ſwarms of them being altogether unknown in modern experience, we can ſcarcely give credit to theſe accounts. They are not only in all probability much exaggerated, but have actually originated in miſtake. We have ſhewn in a former article (ſee Insects *infeſting the human body*), that the *larvæ* or grubs of ſeveral winged inſects, eſpecially thoſe of the common fly (Muſca domeſtica, Linn.), and of the black beetle (Tenebrio molitor), not unfrequently breed, both in the internal paſſages, and in external wounds, of the human body. And in warm climates, the flies are ſo numerous about the perſons of the ſick, that the utmoſt care is requiſite to prevent the generation of larvæ from the eggs which they depoſit, not only in ſuperficial wounds, but in the noſtrils, mouth, gums, &c. ſometimes even penetrating to the brain itſelf, and producing death. (See Dr. Lempriere's Obſervat. on the Diſeaſes of the Army in Jamaica, vol. ii. p. 182.) In the ſame way maggots are ſometimes generated in the patches of cutaneous eruptions, as deſcribed by profeſſor Murray of Göttingen in the caſe of leproſy. (See his Obſ. de Vermibus in Lepra obviis. p. 25.—See alſo Bateman's Pract. Synopſis of Cutaneous Diſeaſes, p. 21. and Edin. Medical and Surg. Journal, for January 1811, p. 41.) From this view of the ſubject, therefore, little doubt can remain, that the fatal caſes of antiquity, above alluded to, occurring in the warmer regions of Europe, were in reality caſes of ulceration, ariſing from ſcurvy or ſome other cachectic condition, which afforded a nidus for the breeding of the maggots of flies, and were not true inſtances of the morbus pedicularis.

The generation of lice, however, in connection with the prurigo of elderly people, though not fatal, is frequently a very troubleſome and obſtinate malady, and many external applications have been reſorted to from ancient times to deſtroy theſe loathſome and irritating paraſites. But the deſtruction of them is commonly a mere alleviation; ſince their reproduction is extremely rapid. A decoction of the ſeeds of ſtaveſacre, or of the cocculus indicus, or the powder of either of theſe ſubſtances, alone or mixed with lard in the form of an ointment, are very effectual deſtroyers of the pediculi of the head, and even of the body-lice. The mercurial ointments, ſuch as that of the white precipitated oxyd, are alſo very efficacious in the ſame inſtances. For the *morpiones*, or crab-lice, as they are called from their round and flattened form, which fix themſelves firmly in the ſkin, about the pubes, axillæ, and in fact on every part of the trunk and extremities where there is hair, are inſtantly and completely deſtroyed by inunction with the common blue mercurial ointment. The ſpike-oil, as it has been called, which is the eſſential oil of lavender, mixed with oil of turpentine, has been deemed the moſt efficacious poiſon for theſe morpiones: its virtue depends perhaps principally upon the oil of turpentine, which is doubtleſs the moſt ready inſtrument of deſtruction to all the inſect tribe. Sir Edward Wilmot is ſaid by Dr. Heberden to have uſed, with complete ſucceſs, in a caſe of morbus pedicularis, a compoſition ſomewhat ſimilar to the ſpike-oil; *viz.* of rectified oil of turpentine, and ſpirit of wine, each four ounces, camphor ſix drachms. A ſolution of the corroſive muriate of mercury in ſpirit is alſo often efficacious in the pedicular prurigo of the body, and tends to remove the pruriginous affection of the ſkin, which ſeems to give riſe to the tendency to generate lice. It is to be obſerved, however, as a matter of caution, that none of theſe pungent ſtimulating ſubſtances can be applied to the ſkin, without inflicting extreme pain, unleſs its ſurface be unbroken: for where the cuticle is abraded by ſcratching, or by the breaking of puſtules and veſicles, or by the formation of rhagades or chaps, the irritation and ſmarting excited by them is intolerable, and is followed by conſiderable inflammation.

PHTHIRION, in *Botany*, a name uſed by ſome authors for the *pedicularis*, or red rattle.

PHTHIROPHAGI, in *Ancient Geography*, the name of a people who inhabited the coaſts of the Euxine ſea. Mela.

PHTHISIS, in *Medicine*, from φθιω, *to corrupt*, ſignifying corruption or *emaciation* in general, is commonly limited to that ſpecies of emaciation, which ariſes from a diſeaſe of the lungs; whence the epithet *pulmonalis* is uſually conjoined with it, denoting *pulmonary conſumption*. See Consumption.

PHTHUTH, in *Ancient Geography*, a river of Africa, in Mauritania Tingitana. Ptolemy.

PHU, in *Botany*, a name by which ſome authors call the great garden valerian.

PHUCAGROSTIS, φυκαγρωστις, from φυκος, *a ſea-weed*, and αγρωστις, *graſs*, a name which has been applied to the *Zoſtera*, or Graſs-wrack. Cavolini, an eminent Neapolitan naturaliſt, has given it a temporary adoption, to diſtinguiſh one of the genera, of which he has found ſeveral confounded under *Zoſtera*. His *Phucagroſtis* is, however, well ſhewn by Mr. Konig, in Ann. of Bot. v. 2. 92, to be itſelf the true Linnæan *Zoſtera*; and the name is, moreover, inadmiſſible, as being compounded of two already eſtabliſhed, *Agroſtis* and *Fucus*; in which reſpect it is no leſs faulty than the *Calamagroſtis* of ſome writers.

PHUMANA, in *Ancient Geography*, a town of Aſia, in Babylonia, in the vicinity of Arabia deſerta, according to Ptolemy, who marks it between Chuduca and Coeſa.

PHUPHAGENA, a town of Aſia, in Leſſer Armenia, in the interior of the country towards the mountains between Arana and Mardara, according to Ptolemy.

PHUPHENA, a town of Aſia, in the interior and near the mountains of the Leſſer Armenia, between Iſpa and Arana, according to Ptolemy.

PHUSIANA, a town of Aſia, in the interior of Aſſyria, between Gomara and Iſone, according to Ptolemy.

PHUSIPARA, a town of Aſia, in Leſſer Armenia, between Cieniea and Euſimara. Ptolemy.

PHUT, a country and river of Africa, in Mauritania Tingitana. Pliny.

PHYCIS, in *Ichthyology*, the name of a ſpecies of blennius, called *tinca marina*, or ſea-tench: the leſſer hake of the Britiſh zoology.

Phycis is alſo a name given by Artedi, after Ariſtotle, Pliny, and the reſt of the ancients, to a fiſh nearly allied to the genus of the *blenni*, and called by ſome *trebius* and *fuca*; and, according to Rondeletius, the *tinca marina* of the Italians. Salvian, however, denies that it is the tinca marina, and the matter is yet undecided among the writers on this ſubject.

PHYCITES, in *Natural Hiſtory*, the name given by the ancients to a ſtone which had the impreſſion of a ſea-plant of the fucus or alga kind; probably in the manner in which our black coal ſlate is frequently found to contain the impreſſions of fern and other vegetables.

PHYCTEUM, in *Ancient Geography*, a town of Greece, in the Peloponneſus.

PHYCUS, a promontory and fortreſs of Africa, in Cyrenaica, between Aptuchi Fanum and Apollonia. Ptolemy.

PHYCUSSÆ, iſlands of Libya. Steph. Byz.

PHYGELA, a town of Aſia Minor, in Ionia. Mela and Pliny.

PHYGETHLON, in *Surgery*, a carbuncle, or a phlegmon attended with conſiderable heat, pain, redneſs, &c.

PHYLA, in *Botany*, a genus of Loureiro's, named by him from φυλη, *a tribe*, or *company*, becauſe a conſiderable number of flowers are produced from one common calyx. Loureir. Cochinch. 66.—Claſs and order, *Tetrandria Monogynia*.

Gen. Ch. *Common Calyx* ovate, imbricated, of numerous, crowded, ſpatulate, pointed leaves, containing many flowers. Perianth inferior, of two lanceolate, concave, erect leaves. *Cor.* of one petal, tubular, irregular; limb ſhort, ſpreading, in four nearly equal ſegments, the uppermoſt emarginate. *Stam.* Filaments four, ſhort, in two rows below the mouth of the tube; anthers roundiſh, two-lobed. *Piſt.* Germen ſuperior, roundiſh; ſtyle ſhort; ſtigma thickiſh. *Peric.* none. *Seeds* ſolitary, naked, covering a thread-ſhaped, naked, common receptacle.

Eſſ. Ch. Common calyx imbricated; proper of two leaves, inferior. Corolla four-cleft, irregular. Anthers roundiſh, within the tube. Seed ſolitary.

1. Ph. *chinenſis*.—Native of China, where it is called *Lién fuēn*. The *ſtem* is herbaceous, annual, creeping, with aſcending branches. *Leaves* oppoſite, ovato-lanceolate, pointed, ſmooth, ſerrated towards the point only. *Flower* pale violet, lateral, on a long ſolitary ſtalk. The author ſuſpected an affinity between this plant and *Protea*, guided, as it ſeems, by the artificial characters only, by which many an honeſt man, ſetting a falſe ſtep in the beginning, has, like Gulliver's Laputian mathematicians, been led widely aſtray. Nothing indeed can leſs accord with *Protea*, than the plant indicated by the above deſcription, which we ſtrongly ſuſpect to be no other than *Verbena nodiflora!* In that caſe however the *ſeeds* ſhould have been deſcribed two to each *flower*.

PHYLACA, in *Ancient Geography*, a place in the Peloponneſus, where is the ſource of the river Alpheus. Pauſanias.—Alſo, a town of Epirus, in the Moloſſide. Livy.—Alſo, a town of Macedonia, in Pieria. Ptolemy.

PHYLACISTÆ, among the *Ancients*, officers to whoſe keeping the ſlaves in priſons and work-houſes were committed.

PHYLACTERY, φυλακτηριον, ſignifying a *memorial* or *preſervative*, in *Eccleſiaſtical Hiſtory*, a ſlip of parchment, wherein was written ſome text of holy ſcripture, particularly of the Decalogue; which the more devout people among the Jews incloſed in leather caſes, and bound with thongs on the forehead, and on the left arm. (See Frontal.) On theſe phylacteries were written thirty paſſages out of Exodus and Deuteronomy. The phylacteries for the head had four cavities, into each of which was put one of the four following ſections of the laws, *viz.* Exod. xiii. 1—10. Exod. xiii. 11—16. Deut. vi. 4—9. Deut. xi. 12—13. The other has but one cavity, and into that four ſections are put.

They derived their name from φυλαττω, *I keep*, either becauſe they were ſuppoſed to preſerve the law in memory, or rather, becauſe they were looked upon as a kind of amulets or charms to keep them from danger. They were called תפלין, *tephillin*, by the Jews. The Phariſees, in order to maintain an appearance of greater ſanctity, or to attract notice by their oſtentation, wore broader phylacteries, and larger fringes to their garments than the reſt of the Jews. (Matt. xxiii. 5.) Some authors have inferred from Exod. xiii. 9. and Deut. vi. 8. that theſe phylacteries were of divine inſtitution. But theſe paſſages may be taken in a figurative ſenſe, as they are by the Caraites, who wear no phylacteries at all. In our Saviour's time, however, they were worn by the Jews in general, by the Sadducees, who received only the law, as well as by the Phariſees, but with this difference, that thoſe of the latter were larger than the others.

Phylactery, in the general, was the name given by the ancients to all kinds of charms, ſpells, or characters, which they wore about them, as amulets, to preſerve them from dangers or diſeaſes.

The primitive Chriſtians alſo gave the name phylacteries to the caſes wherein they incloſed the relics of their dead.

PHYLARCHUS, φυλαρχος, among the Athenians. The phylarchi were magiſtrates, who had each of them the government of a tribe committed to his charge; and their buſineſs was to take care of the public treaſures belonging to each tribe, to manage all their concerns, and call them together as oft as any thing happened that required the preſence of the whole body.

PHYLATERIA, a name given by ſome botanical authors to the *polium*, or poly-mountain.

PHYLICA, in *Botany*, an ancient Greek name, occaſionally written either φυλικη or φιλυκη; but to what it properly belongs, commentators have not determined. Theodore Gaza ſuppoſed it our Holly, *Ilex Aquifolium*. It is acknowledged to have been a tree or ſhrub with evergreen leaves, and poſſibly the name may have originated from φυλλικος, *leafy*; in which ſenſe it is well applied to the preſent Linnæan genus, conſiſting of ſhrubs with very copious evergreen foliage.—Linn. Gen. 105. Schreb. 142. Willd. Sp. Pl. v. 1. 1108. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 2. 19. Thunb. Prodr. 44. Juſſ. 381. Lamarck Illuſtr. t. 127. Gærtn. t. 24.—Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Dumoſæ*, Linn. *Rhamni*, Juſſ.

Gen. Ch. *Cal.* Common receptacle of the fructification ſcaly, collecting the flowers into a diſk. Perianth ſuperior, of one leaf, in five deep ſegments, turbinate, villous internally, permanent. *Cor.* none, except five minute, pointed, vaulted, converging ſcales, one at the baſe of each ſegment of the calyx. *Stam.* Filaments five, minute, under the five ſcales; anthers ſimple. *Piſt.* Germen inferior, roundiſh; ſtyle ſimple; ſtigma obtuſe. *Peric.* Capſule roundiſh, three-lobed, with three cells and three valves. *Seeds* ſolitary, roundiſh, gibbous at one ſide, angular at the other.

Eſſ. Ch. Perianth in five deep ſegments, turbinate. Scales five, covering the ſtamens. Capſule inferior, of three cells. Seeds ſolitary.

All the known ſpecies of *Phylica* are natives of ſouthern Africa, chiefly about the Cape of Good Hope. Linnæus defines ſix only in *Sp. Pl.* ed. 2, but the 14th ed. of *Syſt.*

Veg. contains twelve. Willdenow has nineteen; Thunberg's Prodromus ſeventeen. The new edition of the Hortus Kewenſis mentions twelve as cultivated in the gardens about London, moſt of them introduced by the late Mr. Maſſon. They are greenhouſe ſhrubs, flowering for the moſt part in the winter or early ſpring, diſtinguiſhed by a buſhy heath-like habit; copious, minute, terminal, white or woolly *bloſſoms;* and ſmall, ſimple, numerous, ſcattered, linear or ovate *leaves,* whoſe upper ſurface is of a dark or ſhining green, the under pale, hoary, or woolly. Their *footſtalks* are ſhort, and in one inſtance at leaſt accompanied by a pair of awlſhaped *ſtipulas.* As the ſpecies require no critical illuſtration, the following will be ſufficient examples.

Ph. *ericoides.* Heath-leaved Phylica. Linn. Sp. Pl. 283. Willd. n. 1. Ait. n. 1. Curt. Mag. t. 224. (Alaternoides africana, ericæ foliis, floribus albicantibus et muſcoſis; Comm. Hort. v. 2. 1. t. 1.)—Leaves linear, revolute, imperfectly whorled. Flowers woolly.—Miller, and Curtis after him, erroneouſly aſſert this ſpecies to be a native of Portugal, covering extenſive tracts of ground about Liſbon, as heath does in England. It is not mentioned by Brotero, in his Flora Luſitanica, nor does any other writer ſpeak of it but as a Cape plant, brought into England above ſeventy years ago, and ſtill common in every greenhouſe. The *ſtem* is very much and determinately branched. *Leaves* rather above half an inch long, crowded, ſpreading in every direction, bright green, ſomewhat hairy, linear-lanceolate, revolute, with a narrow hairy furrow beneath. *Flowers* in ſmall terminal heads, conſpicuous for the ſnow-white tufted woollineſs which crowns their *calyx,* like what is ſeen on the *corolla* of a Leucopogon; ſee that article.

Ph. *bicolor.* White and yellow Phylica. Linn. Mant. 208. Willd. n. 3. (Ph. ſtrigoſa; Thunb. Prodr. 44?)—Leaves linear, revolute, hairy, ſcattered; woolly beneath. Flowers hairy, longer than the floral leaves.—Found in ſandy ground at the Cape, but a ſtranger to our gardens. Twice as large in every part as the former, with which its habit and *foliage* otherwiſe nearly agree; but the pubeſcence of the *calyx* conſiſts in long ſtraight ſilky hairs, not opaque white woollineſs, and the *flowers* are accompanied by numerous crowded floral leaves, denſely clothed with ſimilar, but tawny, hairs. We have ſeen no ſpecimen of Thunberg's *ſtrigoſa,* and therefore follow Willdenow in citing him with a mark of doubt, though his ſpecific character leaves ſcarcely any room for heſitation.

Ph. *ſtipularis.* Horned Phylica. Linn. Mant. 208. Willd. n. 9. Ait. n. 7. (Chamælea foliis anguſtis ſubtùs incanis, floribus capitatis muſcoſis; Burm. Afr. 117. t. 43. f. 2.)—Leaves linear, revolute. Stipulas acute. Segments of the calyx elongated, awl-ſhaped, externally woolly.—Introduced by Mr. Maſſon in 1786, but has not yet bloſſomed. This is diſtinguiſhed by a pair of minute, awl-ſhaped, acute, browniſh *ſtipulas,* ſituated rather within the inſertion of the *footſtalk,* as in the genus *Pultenæa;* and by the remarkably long woolly points of the *calyx,* which had induced Linnæus, at one period, to call the ſpecies *cornuta.*

Ph. *pinifolia.* Pine-leaved Phylica. Linn. Suppl. 153. Willd. n. 10. Ait. n. 8.—Leaves linear, flat on both ſides, very ſmooth. Spikes panicled. Flowers ſmooth; each about as long as its ſolitary ovate bractea.—Native of lofty mountains. Remarkable for its great ſmoothneſs, and flat fir-like *leaves.* The ſmoothneſs and form of the minute *flowers* are ſuch, that Burmann miſtook it for a ſpecies of *Bæckea,* nor is its habit diſſimilar from that otherwiſe very remote genus.

Ph. *buxifolia.* Box-leaved Phylica. Linn. Sp. Pl. 283. Willd. n. 13. Ait. n. 10. (Chamælea folio ſubrotundo ſubtùs incano, floribus in capitulum collectis; Burm. Afric. 119. t. 44. f. 1.)—Leaves ovate, ſcattered or ternate; downy beneath.—Common in collections, flowering moſt part of the year. The *leaves* are rather elliptical, pointed, almoſt an inch long, and half an inch wide; rough with points, and of a dark ſhining green, above; covered beneath with denſe white wool. *Flowers* numerous, in little round terminal white heads.

Ph. *racemoſa.* Racemoſe Smooth Phylica. Linn. Mant. 209. Willd. n. 18.—Leaves ovate, dotted, ſmooth, or ſlightly fringed. Spikes panicled. Flowers ſmooth; each about as long as its ſolitary heart-ſhaped bractea.—Found about ditches at the Cape, but not yet brought to England. The *flowers* and *infloreſcence* nearly reſemble *pinifolia,* inſomuch that this ſpecies was likewiſe made a *Bæckea* by Burmann in his Prodromus. The ſhort, broad ovate *leaves,* rough with minute dots, and often fringed with hairs, abundantly diſtinguiſh it from *pinifolia* and every other. The *branches* are hairy.

Phylica, in *Gardening,* contains plants of the ſhrubby, evergreen, exotic kind,—baſtard alaternus,—of which the ſpecies cultivated are; the heath-leaved phylica (P. ericoides); the woolly-leaved phylica (P. plumoſa); and the box-leaved phylica (P. buxifolia).

Method of Culture.—They are chiefly increaſed by cuttings and ſlips of the young ſhoots. In ſpring, as about March or April, a quantity of young cuttings, or ſlips of the ſmall ſhoots, ſhould be taken off, planting them in pots of rich earth, plunging them in a hot-bed, or in the bark-bed in the ſtove; giving frequent waterings, and occaſional ſhade from the ſun, when they will ſoon emit roots, and become proper plants fit for potting off ſeparately in autumn: or the young cuttings or ſlips may be planted any time in ſummer, particularly in June and July, in pots as above, and placed under a hot-bed frame, or covered cloſe with hand-glaſſes, being watered and ſhaded; when they will alſo grow, but not to be ſo forward as thoſe of the ſpring planting.

Theſe are ſomewhat tender plants, requiring ſhelter in winter in this climate: of courſe they muſt always be kept in pots, and placed among the greenhouſe exotics, where they will effect a very agreeable variety at all ſeaſons, and flower annually a great part of the autumn and winter, but do not produce ſeed in this climate.

PHYLITÆ, in *Ancient Geography,* a people of India, on this ſide of the Ganges; placed by Ptolemy with the Bittigi, near the river Nanaguna.

PHYLLACHNE, in *Botany,* received that appellation from Forſter, in alluſion to the ſlender chaffy aſpect of its foliage and calyx, the word being derived from φυλλον, *a leaf,* and αχνα, *a huſk.* Forſt. Gen. t. 58. Linn. Suppl. 62. Schreb. 672. Mart. Mill. Dict. v. 3. Swartz in Sims and Konig's Ann. of Bot. v. 1. 286. t. 5. Juſſ. 422. Lamarck Illuſtr. t. 741.—Claſs and order, *Gynandria Diandria.* Nat. Ord. akin, at leaſt, to the *Campanaceæ* of Linn. and Juſſ. See Forstera, with which genus Swartz has united the above-mentioned.

PHYLLAMPHORA, from αμφορευς, *a wine jar,* and φυλλον, *a leaf,* a name given by Loureiro, in his Cochinch. 606, to the Linnæan Nepenthes, ſee that article, in alluſion to the pitcher-like appendage to the leaf. The author had a ſuſpicion that his plant might be that of Linnæus, but he could not make it tally with the deſcription. There is, however, no doubt of their identity.

PHYLLANTHUS, from φυλλον, *a leaf,* and ανθος, *a flower,* becauſe the flowers, in one of the original ſpecies, grow out of the leaves; but that ſpecies is now a *Xylophylla*. Pliny has a *Phyllanthes*, of which we know enough only to prove that it is different from our's. Linn. Gen. 484. Schreb. 628. Willd. Sp. Pl. v. 4. 573. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 5. 333. Juſſ. 386. Lamarck Illuſtr. t. 756. Gærtn. t. 108. Claſs and order, *Monoecia Monadelphia*. Nat. Ord. *Tricoccæ*, Linn. *Euphorbiæ*, Juſſ.

Gen. Ch. Male, *Cal.* Perianth of one leaf, bell-ſhaped, coloured, in ſix deep, ovate, obtuſe, ſpreading, permanent ſegments. *Cor.* none, except the calyx be taken for ſuch. *Stam.* Filaments united into a column; anthers three, two-lobed.

Female, on the ſame plant, and in the ſame ſituation, as the male, *Cal.* Perianth as in the male. *Cor.* Petals none. Nectary a border with 12 angles, ſurrounding the germen. *Piſt.* Germen ſuperior, roundiſh, with three blunt angles; ſtyles three, ſpreading, cloven; ſtigmas obtuſe. *Peric.* Capſule roundiſh, with three furrows, three cells, and ſix elaſtic valves. *Seeds* ſolitary, roundiſh.

Eſſ. Ch. Male, Calyx in ſix deep ſegments. Corolla none. Filament columnar. Anthers three.

Female, Calyx in ſix deep ſegments. Petals none. Nectary a border with twelve angles. Styles three. Capſule three-lobed, with ſix elaſtic valves.

Obſ. Willdenow deſcribes *Ph. obovatus* with ſix anthers.

Much uncertainty has exiſted, and does ſtill exiſt, reſpecting the plants that ſtrictly belong to this genus. Linnæus has but ſix ſpecies in the 2d edition of Sp. Pl. and ſeven in the 14th ed. of Syſt. Veg. He always conſidered *Phyllanthus* as having three ſeparate ſtamens, but this is certainly a miſtake, at leaſt as far as we have been able to examine. Willdenow has augmented the genus to 36 ſpecies, and he wiſhes to unite with it the whole of *Xylophylla*, Willd. Sp. Pl. v. 1. 1500, making ſeven ſpecies more. We conceive the latter propoſal to be inadmiſſible, and theſe genera are kept diſtinct in the recent edition of Hort. Kew. though placed next to each other in the *Monoecia Monadelphia*. This laſt point will be conſidered hereafter, when we come to XYLOPHYLLA. Nine ſpecies of *Phyllanthus* are enumerated as cultivated in the Britiſh collections, where they are moſtly ſtove ſhrubs, chiefly remarkable for their delicate pinnate foliage, reſembling ſome *Mimoſæ*, and turning red in decay. Many of them, however, have ſimple *leaves*. The *flowers* are ſmall, greeniſh, axillary, copious, on ſhort ſlender ſtalks. Very few of the ſpecies are figured in any botanical works, and none in our periodical ones. We ſhall enumerate a few ſpecies.

Ph. *obovatus*. Annual Carolina Phyllanthus. Willd. n. 3. Ait. n. 1. (Ph. carolinenſis; Michaux Boreal-Amer. v. 2. 209.)—Leaves ſimple, obovate, bluntiſh. Flowers axillary, ſtalked, in pairs. Stem branched, round, erect. Native of North America. It was introduced in 1803 by Robert Barclay, eſq. to whom the gardens are indebted for ſeveral of the more curious, though leſs oſtentatious, American plants, overlooked by vulgar collectors and admirers. The preſent is a hardy annual, flowering in July and Auguſt. *Stem* much branched. *Leaves* ſtalked, alternate, not an inch long, entire, ſmooth; bright green above; paler beneath. *Stipulas* ſmall, membranous. *Flowers* ſmall, greeniſh, one male, the other female. *Capſule* ſcarcely ſo big as hemp-ſeed.

Ph. *bacciformis*. Berry-ſhaped Phyllanthus. Linn. Suppl. 415. Willd. n. 25. Konig in Ann. of Bot. v. 1. 357. (Agyneia impubes; Venten. Jard. de Cels. t. 23; but not of Linnæus.)—Leaves two-ranked, elliptical. Branches two-edged. Flowers axillary; the upper ones female, ſolitary; the lower male, three together.—Native of Tranquebar. *Root* annual. *Stems* numerous, ſpreading widely, beſet with numerous leafy *branches*. *Leaves* broadly elliptical, hardly an inch long. *Stipulas* awl-ſhaped. *Flowers* green. Mr. Konig has ſhewn the miſtake of M. Ventenat, in ſuppoſing this the true *Agyneia impubes* of Linnæus, who is thereby vindicated from the abundance of errors in the deſcription, with which the learned, not uncandid, Frenchman rather too haſtily charges him. The *Agyneia* in queſtion is figured in the above Ann. of Bot. t. 7. f. 4.

Ph. *Emblica*. Shrubby Eaſt Indian Phyllanthus. Linn. Sp. Pl. 1393. Willd. n. 36. Ait. n. 9. (Myrobalanus Emblica; Rumph. Amboyn. v. 7. 1. t. 1. Nilicamaram; Rheede Hort. Malab. v. 1. 69. t. 38.)—Leaves pinnate, bearing the flowers; leaflets oblong, rather acute; footſtalks round, downy. Flowers aggregate. Stem ſhrubby. Native of the Eaſt Indies; long cultivated in our ſtoves. No time for its bloſſoming is marked in the Hort. Kew. but we had a flowering ſpecimen from Mr. Saliſbury's collection in 1788. The *leaves* are elegantly tinged with red. We can hardly believe them to be really pinnate and floriferous, but ſhould rather conſider as *branches*, what are termed their common *footſtalks*, and from the lower part of which copious axillary tufts of little yellowiſh *flowers* come forth. The *fruit* is as large as an ordinary gooſeberry, and is figured under the name of *Emblica*, in Gærtner t. 108. It does not appear to be more pulpy than that of other ſpecies.

PHYLLANTHUS, in *Gardening*, furniſhes plants of the evergreen exotic tree and ſhrubby kind: the ſea-ſide laurel, of which the ſpecies cultivated are, the annual phyllanthus (P. niruri); the great-leaved phyllanthus (P. grandifolia); and the ſhrubby phyllanthus (P. emblica).

Method of Culture.—Theſe plants, where ſeeds can be procured from their native ſituations, may be raiſed in that way. They ſhould be ſown in pots filled with light earth, and plunged in a hot-bed; and when the plants have acquired ſome growth, they ſhould be planted out into ſeparate pots filled with the ſame ſort of mould; being replunged in the hot-bed, due ſhade and water being given, until they become perfectly rooted; after which they ſhould be conſtantly kept in the bark-bed of the ſtove, and have the management of other plants of the ſame tender ſort.

They may alſo ſometimes be raiſed by planting out ſlips, or by layers managed in the ſame way as thoſe from ſeeds.

They afford a fine variety in their beautiful foliage, and the flowery kinds have a ſingular effect in their flowers.

PHYLLAUREA, in *Botany*, a hybrid Greek and Latin name, from φυλλον, *a leaf*, and *aureus*, *golden*, given by Loureiro to the *Croton variegatum* of other authors, of which he makes a diſtinct genus; Lour. Cochinch. 575. We greatly doubt the propriety of the meaſure, and the name is certainly inadmiſſible.

PHYLLEIUS, in *Ancient Geography*, the name of a country, a mountain, and a town of Macedonia.

PHYLLIREA, in *Botany*. See PHILLYREA.

PHYLLIS is, by Linnæus, in his Philoſophia Botanica, reckoned among the poetic names, familiar in ancient ſtory, like *Hyacinthus*, *Narciſſus*, &c. But in his Hortus Cliffortianus, he mentions having particularly choſen this appellation for the plant which now bears it, becauſe the beauty of the ſhrub chiefly conſiſts in its leaves. *Phyllis* would have been more peculiarly appoſite for any ſhrub or tree producing an exuberant foliage ſuddenly from naked branches, like the Almond, into which the unfortunate Thracian queen was ſuppoſed to be metamorphoſed.

Linn. Gen. 126. Schreb. 177. Willd. Sp. Pl. v. 1. 1354. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 2. 114. Juſſ. 198. Lamarck Illuſtr. t. 186. Gærtn. t. 25. Claſs and order, *Pentandria Digynia.* Nat. Ord. *Stellatæ*, Linn. *Rubiaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth ſuperior, obſolete, of two minute leaves. *Cor.* Petals five, lanceolate, obtuſe, revolute, ſcarcely connected at the baſe. *Stam.* Filaments five, ſhorter than the corolla, capillary, flaccid; anthers ſimple, oblong. *Piſt.* Germen inferior, obovate; ſtyle none; ſtigmas two, awl-ſhaped, downy, reflexed. *Peric.* none. Fruit oblong, ſomewhat turbinate, obtuſe, angular. *Seeds* two, parallel, convex and angular at the outer ſide, flat at the inner, broader upwards.

Eſſ. Ch. Stigmas rough. Calyx of two leaves. Petals five. Seeds two.

Obſ. Linnæus remarks that the ſtigmas reſemble thoſe of the graſſes, the elm, and *Tetragonia.* He ſeems originally to have had, like Boerhaave, who called this plant *Bupleuroides*, an idea of its affinity to the umbelliferous order; but he has juſtly referred it ſubſequently to his *Stellatæ;* ſo that what regards the infloreſcence in his Genera Plantarum is entirely miſplaced.

1. Ph. *Nobla.* Baſtard Hare's-ear. Linn. Sp. Pl. 335. (Valerianella canarienſis fruteſcens, Simpla nobla dicta; Dill. Elth. 405. t. 299. Bupleuroides; Walth. Hort. 11. t. 6.)—Native of the Canary iſlands, where it is called *Simpla nobla.* It has been known for above a century in our gardens, where it is kept in the greenhouſe, and flowers in June and July, but is valued rather for variety than beauty. The *ſtem* is ſhrubby, two or three feet high, with round ſmooth leafy *branches;* the lower part of a light corky aſpect. *Leaves* oppoſite, on ſtalks, elliptic-lanceolate, acute, entire, ſmooth, two or three inches long. *Stipulas* between the footſtalks, oblong, erect, ſtrongly toothed and glandular, eſpecially the upper ones. *Panicle* terminal, leafy, oblong, ſmooth, of numerous ſmall green *flowers. Fruit* the ſize of a grape-ſtone.

This is the only known ſpecies of its genus, *Ph. indica*, Sp. Pl. 336, being ſtruck out by Linnæus in his Mantiſſa altera, 349.

Phyllis, in *Gardening*, contains plants of the ſhrubby, evergreen, exotic kind, of which the ſpecies cultivated is the baſtard-hare's-ear (P. nobla).

Method of Culture.—The plants may be increaſed by ſowing the ſeeds in the early ſpring months, as about March, in pots filled with light earth, and plunged in a hot-bed; and when the plants have attained ſome growth, they ſhould be planted out in ſeparate pots, replunging them in the hot-bed, due ſhade being given till they become well rooted. In the ſummer ſeaſon they ſhould be ſet out in a ſheltered ſituation, ſo as to have the morning ſun, and be frequently watered. In the winter they muſt be well ſheltered from froſt, but have as much air as poſſible in mild weather.

In the ſecond year, when the plants are ſhaken out of the pots and placed in a proper ſituation in the open ground, they flower better, and afford more perfect ſeeds, than when kept in pots.

They may alſo be raiſed by cuttings planted out in the ſummer ſeaſon.

New plants ſhould be raiſed every two or three years, as they do not laſt long.

They afford an agreeable variety among other evergreen plants of the greenhouſe kind.

PHYLLITIS Marina, in *Natural Hiſtory.* See Hart's *tongue.*

PHYLLOBOLIA, φυλλοϐολια, in *Antiquity*, a cuſtom that prevailed among the ancients to ſtrew flowers and leaves on the tombs of the dead. The Romans adopted this cuſtom from the Greeks, and added likewiſe wool. See Burial.

The phyllobolia was alſo uſed on occaſion of a victory obtained at any of the public games; when not only the victors, but likewiſe their parents, were ſtrewed with flowers and leaves.

PHYLLODES, in *Botany.* See Phrynium.

PHYLLOMA, ſo named by Mr. Ker in Curtis's Magazine, from φυλλον, *a leaf*, and λωμα, *a fringe* or *border*, alluding to the coloured toothed margin of the leaves. Ker in Curt. Mag. v. 38. 1585. Claſs and order, *Hexandria Monogynia.* Nat. Ord. *Coronariæ*, Linn. *Aſphodeli*, Juſſ.

Gen. Ch. *Cal.* none. *Cor.* Petals ſix, oblong, nearly erect, equal, cohering by their claws; three of them internal. *Stam.* Filaments ſix, inſerted into the receptacle, thread-ſhaped, erect, equal, rather ſhorter than the corolla; anthers oblong, incumbent. *Piſt.* Germen ſuperior, roundiſh, three-lobed; ſtyle awl-ſhaped; ſtigma ſimple. *Peric.* Berry tough, ſpherical, depreſſed, with three furrows, and three cells. *Seeds* numerous in each cell, in two rows, horizontal, oblong, angular, poliſhed.

Eſſ. Ch. Corolla of ſix petals, erect. Filaments thread-ſhaped. Berry of three cells. Seeds numerous, angular.

1. Ph. *marginatum.* Aloe-leaved Phylloma. (Ph. aloiflorum; Curt. Mag. t. 1585. Dracæna marginata; Ait. Hort. Kew. ed. 1. v. 1. 454. ed. 2. v. 2. 277. Willd. Sp. Pl. v. 2. 157.)—The only known ſpecies, ſaid to be a native of the iſland of Bourbon. M. Richard is mentioned as having ſent it to Kew in 1766. There is a fine ſpecimen of this plant in the ſtove at Chelſea, which flowers in the ſpring, and often ripens fruit. The *ſtem* is ſhrubby, ſeveral feet high, and probably forming, in its native country, a ſmall and thick tree, with all the appearance of an arboreſcent *Aloe. Leaves* a yard long, ſucculent, ſmooth, taper-pointed, green, with a dull red, ſtrongly toothed, or jagged, edge. *Common flower-ſtalk* axillary, compreſſed, ſimilarly coloured, but not toothed, at the edges; *partial* ones alternate, round, ſpreading, red. *Flowers* numerous, racemoſe, each ſcarcely an inch long, of a tawny yellow. *Bracteas* ſolitary, taper-pointed, red. *Fruit* purpliſh-black, nearly the ſize and ſhape of a bullace plum.

The even *filaments*, and numerous *ſeeds*, well diſtinguiſh this, as a genus, from *Dracæna.* Its habit is like *Aloe*, but their characters are ſufficiently different. We retain the excellent original ſpecific name, as far preferable to *aloiflorum*, and certainly requiring no alteration.

PHYLLOS, in *Ancient Geography*, a country of the Peloponneſus, in Arcadia, according to Statius in his Thebaid.

PHYLLUS, a town of Theſſaly, in which Strabo has placed a temple of the Phyllæan Jupiter.

PHYLOBASILES, φυλοϐασιλεις, among the Athenians, magiſtrates, who, with reſpect to particular tribes, had the ſame office that the *baſileus* had with reſpect to the commonwealth.

They were choſen out of the eupatridæ or nobility, had the care of public ſacrifices, and other divine worſhip peculiar to their reſpective tribes, and kept their court in the portico called *baſileion*, and ſometimes in the *bucoleian.*

PHYMA, φυμα, from φυομαι, *to grow*, as plants from the earth, a term uſed by the ancients to denote almoſt every ſpecies of external and ſuperficial tumour, ariſing without any obvious external injury. It comprehends, therefore, boils, glandular enlargements, cutaneous tubercles, and even large inflamed puſtules, or ſmall abſceſſes. See Galen, in Comment. ad bib. vi. Epidem. Celſus, de Med. lib. ii. cap. 7.

PHYMA, in *Surgery*, any ſuperficial inflammatory ſwelling, which quickly falls into a ſtate of ſuppuration.

PHYMOSIS. See PHIMOSIS.

PHYRAMA, in the *Materia Medica*, a name given by ſome of the old writers to the gum ammoniacum, particularly to that part of it which was ſoft and ductile between the fingers. It is not clear that the gum ammoniacum of thoſe times was the ſame thing which we now know by that name; at leaſt it is certain, that the other kind of it, which they called *thrauma*, or *ammoniacum thrauſtum*, was not; for Dioſcorides deſcribes this as being of a reddiſh-brown colour, and very friable; and Avicenna ſays, that it marked a fine yellow or gold colour upon paper. Theſe are properties by no means agreeing with our gum ammoniacum; and if juſtly applicable to that, muſt prove that it could not be the ſame; and the characters given by Avicenna of its bitterneſs, and making a yellow ſtain upon paper, ſeem to make it the gamboge. This, however, by no means can agree with the other virtues attributed to it.

PHYSALIS, in *Botany*, φυσαλις of the Greeks, from φυσα, *a bladder*, an old name, applied by Linnæus to the *Alkekengi* of ſome preceding writers, the bladdery inflated calyx of which it well announces.—Linn. Gen. 99. Schreb. 134. Willd. Sp. Pl. v. 1. 1019. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 1. 392. Brown Prodr. Nov. Holl. v. 1. 447. Juſſ. 126. Lamarck Illuſtr. t. 116. Gærtn. t. 131. (Alkekengi; Tourn. t. 64.)—Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Luridæ*, Linn. *Solaneæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, ſwelling, ſmall, five-ſided, cut half way down into five pointed ſegments, permanent. *Cor.* of one petal, wheel-ſhaped; tube very ſhort; limb large, plaited, cut half way down into five broad acute ſegments. *Stam.* Filaments five, awl-ſhaped, very ſmall, converging; anthers erect, approaching each other. *Piſt.* Germen ſuperior, roundiſh; ſtyle thread-ſhaped, rather longer than the ſtamens; ſtigma obtuſe. *Peric.* Berry nearly globoſe, of two cells, ſmall, within the enlarged, inflated, cloſed, five-ſided, coloured calyx. *Receptacle* kidney-ſhaped, double. *Seeds* numerous, kidney-ſhaped, compreſſed.

Eſſ. Ch. Corolla wheel-ſhaped, plaited. Anthers converging, burſting lengthwiſe. Berry of two cells, within the inflated, angular, membranous calyx.

A genus of lurid, chiefly downy, viſcid and fœtid plants, almoſt entirely extra-european, whoſe fruit in ſeveral inſtances is eatable, though principally valuable only for an acidity, grateful in hot climates. The ſpecies are by no means clearly aſcertained, as many of them nearly reſemble each other, and few are cultivated except for curioſity; their vulgar dunghill aſpect, and rank growth, being hardly compenſated by the ſlight beauty of their flowers, or the ſingularity of the bladdery calyx. Linnæus has ten ſpecies in his Sp. Pl.; thirteen in Syſt. Veg. ed. 14. Willdenow reckons up ſeventeen, fourteen of which are mentioned in Hort. Kew. Mr. Brown has added one, from New Holland. Ten are perennial, and ſix of thoſe are ſhrubby; ſeven are annual, and very much branched.

In the firſt ſection are

Ph. *ſomnifera.* Cluſtered Winter-cherry. Linn. Sp. Pl. 261. Willd. n. 1. Ait. n. 1. Cavan. Ic. v. 2. 2. t. 103. (Solanum ſomniferum; Matth. Valgr. v. 2. 417. Ger. Em. 339.)—Stem ſhrubby. Branches ſtraight. Flowers crowded—Native of Mexico; naturalized, apparently, in Spain. It requires the protection of a green-houſe in England, where it has been cultivated from the time of Gerarde to the preſent day, flowering in July and Auguſt. The whole plant is downy, of a pale dull green. *Leaves* ovate, entire, about an inch or two long, ſcattered, on ſhortiſh *ſtalks*. *Flowers* ſmall, pale and inconſpicuous, crowded among the leaves along the branches. *Fruit* ſcarlet, the ſize of a black currant, concealed by the greeniſh downy *calyx*. The bark of the *root* is ſaid to be a ſafe opiate, milder than opium.

The *Atropa fruteſcens* of Linnæus is ſo like this plant in habit, that he juſtly obſerves they can hardly belong to different genera; and Cavanilles has, we think not improperly, referred that *Atropa*, though ignorant of its being already deſcribed, to *Phyſalis*, by the name of *ſuberoſa*, in his Ic. t. 102. The *calyx*, though not cloſed, is ſufficiently inflated in its lower part to excuſe this meaſure.

Ph. *viſcoſa.* Clammy Winter-cherry. Linn. Sp. Pl. 261. Willd. n. 7. Ait. n. 6. Jacq. Hort. Vind. v. 2. 64. t. 136. (Alkekengi bonarienſe repens, baccâ turbinatâ viſcoſâ; Dill. Elth. 11. t. 10.)—Leaves wavy or toothed, obtuſe, ſlightly downy. Stem herbaceous; the upper part cymoſe. Fruit umbilicated, viſcid.—Native of the Braſils; a green-houſe plant in England, but rarely kept, flowering in July. The *root* is creeping. *Flowers* of a very pale uniform yellow, without ſpots. *Berry* ſcarlet, covered with a viſcid fluid, and encloſed in a downy *calyx*.

Ph. *Alkekengi.* Common Winter-cherry. Linn. Sp. Pl. 262. Willd. n. 9. Ait. n. 8. Sm. Fl. Græc. Sibth. t. 234, unpubl. (Solanum Halicacabum; Matth. Valgr. v. 2. 416. Ger. Em. 342.)—Leaves two together, acute, nearly entire. Stem herbaceous, ſomewhat branched below. Root creeping.—Native of ſhady rocky places in the ſouth of Europe, very hardy in our gardens, where it ſpreads widely by means of its perennial creeping *roots;* flowering in June, but chiefly remarkable for its large, orange-coloured, permanent, drooping *calyces*, encloſing *fruit* of the ſame colour, and uſed for decorating many a ruſtic chimney-piece during winter. The *ſtems* are ſcarcely above 12 or 18 inches high. *Leaves* dark green. *Corolla* white. Dioſcorides ſpeaks of the berries as uſed, with other plants, to twine into garlands; and he records their medical qualities of curing the jaundice, and promoting the urinary ſecretion. For the latter quality they are celebrated in Lewis's Diſpenſatory, under the name of *Alkekengi*, though excluded from the more conciſe Pharmacopeia of the College.

Among the reputed annual ſpecies are,

Ph. *pubeſcens.* Downy Winter-cherry. Linn. Sp. Pl. 262. Willd. n. 12. Ait. n. 11. Brown Prodr. Nov. Holl. v. 1. 447. Fl. Peruv. v. 2. 41. (Ph. edulis; Sims in Curt. Mag. t. 1068. Alkekengi virginianum, fructu luteo, vulgò *Capuli;* Feuill. Peruv. v. 3. 5. t. 1. f. 2.)—Stem angular, much branched. Leaves heart-ſhaped, ſomewhat waved, downy. Flowers pendulous. Calyx-teeth ſharp.—Native of the warmer parts of America, but now naturaliſed in the Eaſt Indies, at the Cape of Good Hope, and even at Port Jackſon, New South Wales, where Mr. Brown informs us it is very plentiful, and known by the name of the Cape Gooſeberry, the berries being eaten, either raw, or in various articles of cookery. Dr. Sims ſpeaks of this fruit as agreeably acid and ſweet, with a fragrance like a mixture of apple and melon, and he ſays the plant is perennial and evergreen in a ſtove, though uſually reckoned herbaceous and annual. The *flowers* are pale yellow, with five large purple ſpots. The *calyx* of the *fruit* is nearly globular, ribbed, tawny. *Berry* yellow. This may be the ſame with the Linnæan *Ph. peruviana*, but we find nothing poſitive on that ſubject.

Ph. *parviflora.* Small-flowered Winter-cherry. Br. Prodr. Nov. Holl. v. 1. 447.—Stem angular, diffuſe. Branches wavy. Leaves ovate, downy, nearly entire. Calyx-teeth acute. Seeds dotted.—Found by Mr. Brown in the tropical part of New Holland. *Root* annual. *Anthers* yellow.

Ph. *proſtrata.* Trailing Winter-cherry. L'Herit. Stirp. 43. t. 22. Willd. n. 17. Ait. n. 14. Andr. Repoſ. t. 75. Jacq. Ic. Rar. t. 38.—Stem procumbent, much branched, round, hairy. Leaves ovate, wavy, ſomewhat fleſhy.—Native of Peru, from whence it was brought by Dombey to the French gardens, and thence introduced amongſt us. It is a very tender annual, impatient of cold or wet while young, but in a hot dry ſummer it bears the open air, and is conſpicuous for a profuſion of delicate bright blue *flowers.* The *berry* is ſmall, dull purple, or brown.

Physalis, in *Gardening*, compriſes plants of the herbaceous and ſhrubby ornamental kind, of which the ſpecies cultivated are, the tooth-leaved winter cherry (P. angulata); the woolly winter cherry (P. pubeſcens); the common winter cherry (P. alkekengi); the Pennſylvanian winter cherry (P. penſylvanica); the clammy winter cherry (P. viſcoſa); the cluſtered winter cherry (P. ſomnifera); the flexuous Italian winter cherry (P. flexuoſa); the tree-like phyſalis, or winter cherry (P. arboreſcens); and the Curaſſavian winter cherry (P. curaſſavica).

In the firſt ſort there is a variety which is taller, with entire leaves, ſmaller flowers of a paler yellow colour.

Method of Culture.—All theſe plants are capable of being increaſed by ſeeds; the ſecond, third, fourth, and fifth ſorts, alſo by parting the roots; the ſixth, ſeventh, eighth, and ninth, likewiſe by cuttings.

In the firſt ſort, the ſeed ſhould be ſown in the early ſpring, as April, in pots of light earth, plunging them in a moderate hot-bed. When the plants have acquired a few inches in growth they ſhould be removed into ſeparate pots, gradually inuring them to the open air, in order that they may be removed with balls into the clumps or borders. But it is probably a better method to ſow them in the latter end of May in the places where they are to remain, as they do not bear tranſplanting well. They muſt be raiſed annually.

In the herbaceous kinds the ſeeds ſhould be ſown in the autumn as ſoon as they are ripe, or early in the ſpring, in the beds, borders, or clumps where they are to remain; or they may be tranſplanted into other beds to remain till the following autumn, when they may be removed to the ſituations where they are to remain.

The roots may be parted either in the early autumn or ſpring ſeaſon, when the weather is mild. The divided parts ſhould have root-fibres left at the bottoms and a bud in each at the tops in order to their ſucceeding properly.

In the ſixth and ſeventh ſorts, the ſeed ſhould be ſown in pots of light mould in the early ſpring and plunged in a mild hot-bed. When the plants have had a little growth they ſhould be pricked out into ſeparate ſmall pots, proper ſhade and water being given; being afterwards managed as the ſhrubby exotics of leſs tender plants.

They may likewiſe be raiſed from cuttings made in the latter ſpring or ſummer months, which ſhould be placed in pots of light mould and plunged in the hot-bed, due ſhade and water being given till they have ſtricken root.

And the two laſt ſorts may be raiſed from ſeeds or cuttings in the ſame way, by the aid of the bark hot-bed of the ſtove.

The firſt and the other herbaceous ſorts are curious ornamental plants in the borders, clumps, and other parts of pleaſure-grounds, and the four beſt ſhrubby ſorts in the greenhouſe and ſtove collections.

PHYSALUS, a name given by Rondeletius to a ſpecies of ſea-inſect, of the ſcolopendra marina kind, ſuppoſed by ſome to be the ſame with the ſcolopendra marina, or centipes, of the Iriſh ſea, deſcribed by Molyneux; but this does not appear to be the caſe, on a ſtrict enquiry. The phyſalus of Rondeletius has no mouth, whereas the ſea centipes of Ireland has a remarkably large one; that of Rondeletius is wider in the middle, and tapers at each end; but the Iriſh kind is largeſt at the head, and tapers from thence all the way to the tail. Rondeletius's has tubercles on the back, but the Iriſh one has only hairy ſtripes, and his is a poiſonous animal, whereas that of Ireland was found in the ſtomach of a cod-fiſh, which had eaten it as food. The figure given by Rondeletius agrees alſo very well with the account he gives, but not with the figure of that drawn upon the ſpot from the Iriſh fiſh, and given in the Philoſophical Tranſactions. On the whole, nothing is more plain than that theſe are two diſtinct ſpecies of animals, though of the ſame genus, Phil. Tranſ. N° 225. See Scolopendra.

Physalus, in *Zoology*, a ſpecies of Balæna, with a double opening to the ſpiracle on the middle of the fore-part of the head; and a ſoft fin on the hinder part of the back; the balæna, having three fins and a ſmooth belly, of Briſſon; the balæna, without teeth, having a narrow body and a fin on the back, of Ray; the phyſalus bellua, phyſeter of Geſner; the phyſeter of Pliny, Willoughby, and others; the finn-fiſke of Egede, &c.; the fin-whale of Pennant's Arctic Zoology; the fin-fiſh of the Britiſh Zoology; and the fin-backed whale of Dudley, Phil. Tranſ. abr. vii. 425. This fiſh inhabits the Atlantic both on the American and European coaſts. It is equal in length to the common whale, but not above a third, or even fourth part of the circumference, and produces much leſs blubber; the opening of the mouth is larger; the horny laminæ, or whale-bone, are ſhorter, and of a blueiſh colour. Its fleſh is better taſted; and it throws the water from the ſpiracles with greater force. The upper part of the body of this animal is of a clear brown colour, and the lower parts white; the lips are brown and reſemble a twiſted rope; on the lower part of the back, near the tail, there is a ſtraight, ſoft, ſharp-pointed fin, between three and four feet long, without rays or bones, from which circumſtance the Engliſh name of the ſpecies, to diſtinguiſh it from the common whale, having no back fin, is derived. From the violence with which this ſpecies throws out the water from its ſpiracle, it is ſuppoſed to be the φυσαλος of the ancients. This ſpecies feeds on ſmall fiſhes of the clupea, ſcomber, and other genera. It is neglected by the whale-fiſhers, on account both of its great fierceneſs and the ſmall quantity of blubber which it affords: even its appearance in the whale ſeas is diſliked, as it is ſuppoſed to drive away the common ſpecies, which is ſo much in requeſt.

PHYSARUM, in *Botany*, a genus of *Fungi* in Perſoon's Syn. 168, whoſe ſpecies are by other writers referred either to *Trichia* or *Reticularia.* Bulliard has deſcribed ſome of them under the name of *Sphærocarpus*, which properly belongs to one of the *Hepaticæ*, as we propoſe to ſhew in its proper place. Perſoon's character of *Phyſarum* is as follows.

Caſe rigid, ſimple, moſtly ſomewhat rugged, and rather powdery. Threads internal, ſcattered, moſtly adhering like network to the caſe. He defines 16 ſpecies, all ſmall, found either on the trunks of trees, on the ground, or amongſt moſs.

PHYSCA, or Physce, in *Ancient Geography*, a town of the Lower Mœſia, between the mouths of the rivers Axiacus and Tyras. Ptolemy.

PHYSCÆ, a town of Macedonia, in Mygdonia, between Bærus and Terpillus. Ptolemy.

PHYSCELLA, a town of Macedonia, on the gulf Mecybernæus, according to Pliny and P. Mela.

PHYSCIA, in *Botany*, from φυσκη, *a bladder*, alluding to the concave or inflated receptacles, or ſhields, of ſome ſpecies; ſee Lichenes, n. 20.

PHYSCONIA, in *Medicine*, probably from φυσκη, *an inflated bladder*, a term uſed by the noſologiſts to expreſs every ſpecies of abdominal tumour, which is hard, not ſonorous like tympanites, nor fluctuating like dropſy, nor produced by pregnancy. Under the appellation of Phyſconia a great variety of morbid enlargement in the abdomen is, therefore, neceſſarily included; ſuch as ſcirrhous, fatty, and other tumours of the omentum, morbid growth connected with the ovaria, or uterus, with the inteſtines or meſentery, with the liver, kidnies, &c. As theſe tumours are, in fact, extremely different in their nature and origin, the method of treatment appropriate to each can only be determined by an inveſtigation of each variety; but it muſt be acknowledged, that, as they reſult from actual organic change in the ſtructure of the parts diſeaſed, little that is effectually curative is within the reach of art. See Sauvages, Noſol. Meth. claſs x. genus 8.

PHYSCUS, in *Ancient Geography*, a town of Aſia Minor, upon the coaſt of the Doride, over-againſt the iſland of Rhodes, according to Diodorus Siculus. Strabo ſays that it had a port. It was called Phyſcia by Steph. Byz. and Phuſca by Ptolemy.—Alſo, a port of Aſia Minor, in Caria, N.E. of mount Loryma, W. of the promontory Pedalium. In this port there were a town and a river of the ſame name.—Alſo, a town of Greece, in the country of the Locri Ozoli. Plutarch.—Alſo, a port of the iſland of Rhodes.—Alſo, a river of Aſia, in the vicinity of Aſſyria.—Alſo, a mountain of Italy, in Magna Græcia, near Crotona.

PHYSETER, the *Cachalot*, in *Ichthyology*, a genus of animals of the claſs and order Mammalia Cete, of which the generic character is, teeth in the lower jaw, and none in the upper. The name phyſeter is of Greek origin, and is derived from the verb φυσαω, *to blow*. It has this name from its quality of taking in a great quantity of ſea-water, and then blowing it out again with great force and violence. There are four ſpecies in the Linnæan ſyſtem by Gmelin, which are as follow.

Species.

* Catodon; leſſer Cachalot. It has no dorſal fin; but a fiſtula or ſpiracle on the ſnout. It is about 25 feet in length; inhabits the Northern ſea, and has been found on the coaſt of Scotland. The head is round, and the mouth ſmall. In its general ſtructure is very nearly allied to the macrocephalus, to be next deſcribed, but the mouth is ſmaller.

* Macrocephalus; blunt-headed Cachalot. This has no dorſal fin, but the fiſtula is on the neck. This is one of the largeſt ſpecies of whales, often meaſuring ſixty feet. The head is of an enormous ſize, conſtituting more than a third of the animal; the mouth is wide; the upper lip rounded, thick or high, and much broader than the lower, which is of a ſharpiſh form, fitting as it were into a longitudinal bed or groove. The teeth that are viſible are ſituated only in the lower jaw, and, when the mouth is cloſed, they are received into ſo many correſponding holes or cavities in the upper; they are numerous, rather blunt, and of a conical form, with a ſlight bend or inclination inwards. The front of the head is very abrupt, deſcending perpendicularly downwards, and on its top, which has been improperly termed the neck by ſome authors, is an elevation or angular prominence containing the ſpiracle, which appears externally ſimple, but is double within. The head is diſtinguiſhed or ſeparated from the body by a tranſverſe furrow or wrinkle. The eyes are ſmall and black; and the ears or auditory paſſages extremely ſmall. About the middle of the back is a kind of ſpurious fin or dorſal tubercle, of a callous nature, not moveable, and ſomewhat abrupt or cut off behind. The tongue is of the ſhape of the lower jaw, clay-coloured externally, and of a dull red within. The throat is ſmall; the body cylindrical beyond the pectoral fins, growing narrower towards the tail. The colour of the whole animal is black, but as it grows old it becomes whitiſh beneath. It ſwims very ſwiftly, and is ſaid to be a violent enemy to the white ſhark. (See Squalus.) The Greenlanders uſe the fleſh, oil, tendons, &c. in the ſame manner as they do thoſe of the Narwhal. (See Monodon.) This ſpecies of whale is reckoned difficult to catch, being very tenacious of life, and ſurviving ſeveral days the wounds that it receives from its purſuers. It has a vaſt cavity within the upper part of the head, in which ſpermaceti is found. This, when freſh, is nearly fluid; but when expoſed to the air it concretes into opaque maſſes. The celebrated perfume ambergris is found in maſſes in the inteſtines, being the fæces of the whale when it is ſick. (See Ambergris.) The three varieties of this ſpecies are; 1. Black; back gibbous. Found in European ſeas. 2. Blackiſh-aſh, with a gibbous back, which inhabits the coaſts of New England, and is from ſixty to ſeventy feet in length. 3. Whitiſh, with a ſmooth back. This laſt is found in Davis's ſtraits, is only about fifteen feet long, of a yellowiſh-white; teeth a little incurvate, compreſſed, rounded at the tips.

* Microps; Sharp-noſed Cachalot. The dorſal fin of this ſpecies is long; and the upper jaw is longer than the lower. There are two varieties; in the *firſt* the teeth are ſharp and hooked; it is about ſeventy feet long, is of a dark tawny colour: has forty-two teeth round, a little compreſſed; dorſal fin long and ſharp: in the ſecond the teeth are ſharp and ſtraight; this is from eighty to one hundred feet in length; the upper parts are blackiſh, and beneath it is white; it has a high bunch on the upper part of the back; the fin is near the tail; the eyes are bright yellowiſh; the tongue ſmall and acute; the teeth are ſet in the jaw like a ſaw. This ſpecies ſwims ſwiftly, and is ſaid to be a great enemy to the porpoiſe, which it purſues and preys upon.

* Tursio; High-finned Cachalot. This ſpecies is particularly diſtinguiſhed by the great length and narrow form of its dorſal fin; the teeth are flat at the tip. This is ſaid to be ſometimes one hundred feet in length; at a diſtance the dorſal fin has the appearance of a maſt of a ſhip. It inhabits the Northern ocean.

PHYSIC, or Physick, φυσικη, the art of healing, properly called *medicine*.

The word is formed from φυσις, *nature*; becauſe medicine conſiſts principally in the obſervation of nature.

For the riſe, progreſs, diviſion, &c. of phyſic, ſee Medicine.

Physic, *Hermetical*. See Hermetical.

Physic, *Bachelor of*. See Bachelor.

Physic *Nut*, in *Botany*, the name of a ſpecies of the jatropa. See Cassada.

PHYSICAL, φυσικος, ſomething belonging to, or really exiſting in nature.

In this ſenſe we ſay, a phyſical point, in oppoſition to a mathematical one, which laſt only exiſts in the imagination. Or a phyſical ſubſtance, or body, in oppoſition to ſpirit, or metaphyſical ſubſtance, &c.

PHYSICAL or ſenſible horizon. See HORIZON.

PHYSICAL *agent*, *cauſe*, *certitude*, *concrete*, *continuity*, *evidence*, *fate*, *good*, *liberty*, *neceſſity*, *part*, *perfection*, *poſſible*, *predetermination*, *premotion*, *qualities*, and *quantity*. See the ſeveral ſubſtantives.

PHYSICAL *Education*, is that branch of education which reſpects the care and culture of the bodily powers, conſidered in reference to their ſubſerviency to the mental powers, and the influence of the ſtate of them upon the mind. As we have already obſerved in EDUCATION, the organs of ſenſation muſt have vigour and ſenſibility, in order to bring the ſyſtem of thought and feeling into its due ſtate of perfection, both as to comprehenſiveneſs and vigour, and as to proper direction: and much of intellectual improvement and moral culture depends upon the ſtate of the muſcular and nervous ſyſtem in general. The education of the human being, as far as reſpects theſe objects, may be termed *phyſical;* and by phyſical education, therefore, we underſtand that ſeries of means by which the external organs of the mind, the organs of ſenſation, and the muſcular and nervous ſyſtem, ſo far as the mind is directly concerned in their operations, are to be preſerved in a ſound and healthy ſtate, and improved in activity and vigour.

When we conſider the influence of the body on the mind in its greateſt extent, we are fully aware that whatever affects the health and vigour of the body, may, with ſtrict propriety, be regarded as an object of education; and in this point of view, the whole treatment of infancy, childhood, and youth, in reſpect to health, whether its continuance or reſtoration, might properly come under the head of phyſical education. But in the article above referred to, we expreſſed our intention not to encroach upon the ſcience of pathology; it would lead us into a field by far too extenſive for our limits, without affording any material aid in the object we have in view. The judicious mother may learn much from books on the diſeaſes of infancy and childhood, which will operate by way of caution and prevention; but we ſtrongly recommend her not in general to undertake herſelf the management of thoſe diſeaſes, but to obtain good medical advice. We do not doubt that the parent who has a tolerable acquaintance with the nature of the bodily conſtitution, and has had the advantage of much experience and obſervation, will often be the beſt phyſician for her children: but there are few who would not be benefited by the advice of others in all caſes which may permanently affect the health; and, in general, by far the ſafeſt and beſt way is, early to call in that aid which medical ſkill may ſometimes effectually afford, without tampering with the conſtitution by the uſe of powerful remedies, or even of common ones too frequently. Still, however, we are ſatisfied that the judicious mother may derive from books much important information reſpecting the medical treatment of her children, particularly in the early periods, and in the way of *prevention;* and we may be allowed, as we go along, to recommend one work which we have reaſon to believe of great value, *viz.* Underwood on the Diſeaſes of Children. In mentioning this, we are at the ſame time aware that much that is valuable may be derived from Moſs, Hamilton, &c.

While we are referring, as we frequently have done in the preceding articles on this ſubject, to the mother's ſhare in early education, we feel aſtoniſhed that the moſt important objects of female education are ſo much neglected. Were they generally educated with a ſpecific view to their afterwards filling ſome of the moſt important relations of domeſtic life, the next race, or, at fartheſt, that which follows, would be, without example, wiſe and good. If ſuch were the views adopted in education, it would then be a primary object to cultivate their *underſtandings;* to give them ſolidity, accuracy, and comprehenſiveneſs of judgment; and to ſtore their minds with that correct and important information, which would enable them, in their turn, to train up their own offspring, or the offspring of others, in that way which would give them the greateſt probability of being vigorous, healthy, and active in their bodily powers, and lay the beſt foundation for intellectual and moral excellence. A woman may not be a wife or mother, but ſhe can ſcarcely fail, if properly prepared for thoſe relations, to be led, in ſome way or other, to fill ſituations in life, bearing conſiderable reſemblance to them in their effects on the improvement and happineſs of others.

In MORAL *Education*, col. 1—3, we have referred to the intimate connection which exiſts between the cultivation of the moral and intellectual powers. In fact, neither can be neglected without ſerious injury to both; though the influence of moral education upon the culture of the underſtanding, is decidedly the greateſt and moſt extenſive. Phyſical education, in like manner, bears a cloſe connection with the other branches; and, indeed, it lies at the foundation of both. But it can ſeldom, if ever, be neceſſary to make it an object *altogether* independent of the culture of the mind; and if purſued ſolely in reference to the animal health and ſtrength, there is no doubt that the ſeeds of their deſtruction will often be ſown, by the very means which are employed to promote them. This is a truth which may, at firſt ſight, appear rather paradoxical; but we leave it, with full confidence, to the conſideration of the judicious obſerver, who will find it more particularly true with reſpect to boys. We are perfectly diſpoſed to admit that the care of the bodily health ſhould be a primary object in the early periods of education: and we are certain, that by making this, in a proper manner, a primary object, the ulterior ends of education will be beſt accompliſhed: but then it ſhould be purſued with a view to thoſe ends; and if it be not, it will itſelf, in all probability, defeat its own purpoſe. An unreſtrained mind in a vigorous body cannot fail to be eventually a ſlave of the body. In ſubſequent periods of education, mental and moral culture may, and muſt be, the leading objects; but they too will, in a conſiderable degree, defeat their own ends, if purſued without reference to the bodily health and vigour. We would by no means intimate that debility of body, or extreme phyſical ſenſibility, is *neceſſarily* attended with ill effects on the moral and intellectual ſyſtem. Under judicious management, they often have led to high degrees of moral worth, and have not prevented very great progreſs in mental culture; but their general tendency is, on the one hand, to produce debility of mind, and the moral qualities connected with it, cowardice, meanneſs, &c.; or, on the other, that extreme inſenſibility which will either ſpeedily conſume the powers of body and mind, or ſink into ſelfiſhneſs of the moſt injurious kind, becauſe it often wears the garb of benevolence.

Whatever be the nature of the immediate organs of the percipient principle, there can be no doubt that they depend greatly upon the bodily ſyſtem. Whatever be the nature of the organiſation upon which ſenſation, retention, aſſociation, memory, and imagination depend, it is indiſputable, that it is moſt intimately connected with the material organiſation which is connected with any of the operations of the mind. As far as the judgment depends on theſe ſubordinate powers, this alſo muſt be affected by whatever affects them. Taking the term in its wideſt ſenſe, the memory is neceſſary to the judgment ; it ſupplies it with its materials for diſcrimination, compariſon, &c. ſo that without it there could be no exerciſe of judgment ; and if there be a deficiency in the calls for this exerciſe, whatever "high capacious powers, lie folded up in man," however great the natural capabilities of the mind, they never can be properly and fully evolved. That the elementary powers forming the memory and imagination, are very greatly dependent upon the body, is a point ſo well aſcertained, that we may aſſume it as a fundamental poſition ; and the cloſe connection, therefore, between the culture of the underſtanding and a ſound and vigorous phyſical ſyſtem follows at once as a neceſſary conſequence.

We conſider it as an eſtabliſhed truth in mental ſcience, that ſenſations are the rudiments of all our mental pleaſures and pains, and alſo of all our intellectual ideas, except thoſe immediately derived from conſciouſneſs. The reader of the article *Mental* PHILOSOPHY would perceive that we do not neglect the direct influence of the underſtanding in aiding, modifying, or reſtraining the operation of the aſſociative power on the relics of ſenſation : but however great this influence, the above ſtatement is no leſs true ; and we think it an important truth. We have, however, already ſaid enough on this fundamental poſition in the firſt diviſion of INTELLECTUAL *Education*, and near the beginning of the ſecond in MORAL *Education* (ſee alſo MENTAL *Philoſophy*, Div. II.) : and we ſhall, therefore, only add here, that the buſineſs of phyſical education, as we have defined it, is, to keep not only what are generally known by the appellation of the external organs of ſenſation, but the whole muſcular and nervous ſyſtem, in a ſound and vigorous ſtate, or to bring it into that ſtate, and this not only with a view to the health of the body, but alſo to the intellectual and moral welfare,—in other words, to the worth and happineſs of the individual.

The capacity of ſenſation may, no doubt, depend upon the peculiarities of the mind itſelf, of the percipient principle (whatever that be) ; but without reſorting to an opinion which probably can never be proved, we ſee enough in the diverſities of the bodily organs of ſenſation, taken in all its varieties, to account for all the known diverſities in *ſenſation*, (conſidered of courſe as diſtinct from perception) ; and we, therefore, do not heſitate in the belief, that this elementary principle of the mind depends upon the corporeal ſyſtem. How far this is the caſe with reſpect to aſſociation, conſidered as diſtinct from ſenſation and retention, we have no certain means of aſcertaining ; but various facts lead to the belief that it is to a very great extent. The power of retention, there can be no doubt, depends greatly upon the ſtate of the corporeal ſyſtem ; and, indeed, the ſtatements of different writers reſpecting the influence of the bodily ſtate on the memory, may be applied partly to the aſſociative power, and partly to the power of retention. Altogether, however, there is no room for reaſonable doubt, that the elementary powers of the mind, by which almoſt the whole of its furniture (of intellect and affection) is acquired, depend in their original operation upon the ſtate of the phyſical ſyſtem, and are modified by it through life. Indeed there are few who by the influence of external cauſes or of their own voluntary efforts, are able to cement that influence.

We are fully ſatisfied that there are decided original differences, not only in the powers of ſenſation, retention, and aſſociation, but even in the judgment ; and probably the three former are, by their very nature, directly dependent upon original peculiarities of the phyſical organiſation, the varieties of which, if we may judge from external appearances, are indefinitely great. But we ſee no reaſon to doubt that the defects or exuberances of all of them, may be conſiderably, though not entirely, corrected by direct or indirect culture ; and that this muſt be done, in the firſt inſtance, by means of phyſical education. If there be an exceſſive degree of phyſical ſenſibility, the object muſt be to leſſen it. In all probability, when the body is healthy, there ſeldom, if ever, is too little, as far as reſpects the mere capacity of pleaſure and pain ; but in reference to the acquiſition of intellectual ideas, the organs of ſenſation often admit of great improvement in the power of receiving and conveying to the mind the rudiments of knowledge. However, the grand point is, if poſſible, to make and preſerve the body ſound and vigorous, in that ſtate in which "life is felt in every limb :" preſuming that the influence of this ſtate upon the mental and moral powers, if accompanied with a proper attention to their culture, cannot be otherwiſe than beneficial ; and that the contrary muſt often be highly prejudicial : directing the attention to the ſupply or correction of the influence of the body on the mind ; and in all inſtances aiming to make the degree of muſcular or nervous health poſſeſſed, as beneficial as poſſible in its effects on the internal furniture of intellect and affection.

Conſidering the mutual dependence of the body and the mind on each other, and (from the little which we have ſtated on the ſubject, and other circumſtances which will readily occur to the intelligent reader) the intimate connection which exiſts between phyſical, and intellectual, and moral education, it will ſcarcely be expected that we ſhall be able to draw a minute line of diſtinction between theſe branches of our ſubject : indeed we ſhall find it leſs practicable here than in our former articles, (in which, however, greater minuteneſs than our plan admitted, would have brought their connection more forcibly into view) ; nor ſhall we attempt to preſerve ſuch diſtinction. Our leading object will be,—the education of the body ; but as it ſhould always be purſued with a view to its influence on the happineſs, and on the developement and culture of the intellectual and moral powers, we ſhall take it without any very nice diſcrimination, which in our apprehenſion would be wholly uſeleſs and impracticable. In ſeveral inſtances we ſhall be led to ſtate conſiderations moſt cloſely affecting moral education, in conſequence of their intimate connection with our immediate ſubject ; but we doubt not that, in general, this will be ſeen to be predominant in almoſt every portion of this article.

The great point clearly is, to preſerve, or to produce, that health and vigour of the bodily ſyſtem in general, and that ſoundneſs and ſuſceptibility of the organs of ſenſation, which powerfully contribute to intellectual and moral improvement, as well as to the happineſs and uſefulneſs of the individual.

We ſhall not find it neceſſary to enter very minutely into detail on the means by which theſe objects are to be effected. The education of the body, where there is no exceſs of refinement, or perverſion of falſe philoſophy,—where, in ſhort, it is left to the guidance of good ſenſe under the influence, not of parental anxiety but of parental care,—can ſeldom fail, in ordinary caſes, if the baſis of a good conſtitution previouſly exiſt, to go on ſucceſsfully : and in extraordinary caſes, it requires the aid of what we cannot attempt to ſupply,—medical ſkill. Much information, too, may be derived from books which are acceſſible to moſt parents ; and as we are more deſirous of making our pages the vehicle of uſeful truth, than of ſtriking novelties, we ſhall freely avail ourſelves of that information, where it appears to us juſt and important. In this object we have found a work, entitled "The Parent's Friend," of conſiderable ſervice ; and as we were not ac-water, of the natural temperature, ſhould only be gradually reſorted to, and never until the ſtrength of the infant is ſufficient to reſiſt its chilling influence. When the ſkin is in a hot and dry ſtate, the body may then be bathed with advantage in tepid water ; or the child ſhould be taken into a room without a fire, and gently carried about till it returns to its natural temperature. This, when there is no feveriſh diſeaſe, will ſoon happen. The ſame plan ſhould be purſued when it is hot, reſtleſs, or uneaſy at night, for which purpoſe it ſhould be taken out of bed. On the other hand, when the extremities are cold and clammy, gentle friction before a moderate fire with the hand, or with a ſoft fleſh bruſh, is recommended, with the internal uſe of ſmall quantities of thin animal broth, a little above blood heat. To this, immerſion in a warm bath at 96° may be added, and repeated, if occaſion require, four or five times in the day. Beddoes.

In cold ſeaſons, the removal of children into the open air ſhould not be precipitated. It is better to be content with habituating them to thoſe variations of temperature which different rooms in the ſame houſe will at firſt ſupply. They ſhould not at firſt be carried into the cooler room, except when they are rather warm, and then only for a ſhort time. Where likely to be met by ſtreams of air, the whole head ſhould be covered, allowing ſufficient breathing room. They ſhould be rendered hardy, by expoſure to a cold calm atmoſphere, for a ſhort time at firſt, and at no time till they are chilled. They ſhould never encounter rude blaſts till they can move briſkly enough to produce warmth from within, and then only at intervals ſucceſſively prolonged. "The parents who feel a juſt confidence in the robuſtneſs of their offspring, will do no injury by proceeding with a meaſured pace. We have acceſs to no river Styx, in which one immerſion ſhall render us invulnerable to the elements." The ſuperiority of thoſe who have been accuſtomed to face the ſevereſt variations of temperature, to the "inactive fire-ſide tenderling" in vigour and health, would naturally enough lead to the ſuppoſition,—that to endue a young perſon with theſe deſirable qualities, nothing more was neceſſary than to expoſe him ſufficiently to the cold. From this prejudice many conſtitutions have ſuſtained irreparable injury. The true principle is, *gradually to inure the habit to cold;* and a good conſtitution may thus be enabled to bear ſevere and long continued cold without detriment : but *as ſoon as a chill comes on, the proceſs ſhould be ſuſpended;* for in the ſtrongeſt conſtitution, "long continued and repeated chills will, in the firſt inſtance, enfeeble, and, in the ſecond, bring on a ſuſceptibility to the operation of the powers that ſuperinduce violent diſeaſes." Beddoes.

One great ſource of injury from diminiſhed temperature, is to be found in the cuſtom of bathing or ſwimming, when too long protracted : but ſome remarks on this head will come more properly under the next diviſion.

A grand cauſe preventing that invaluable ſtate of the bodily ſyſtem, which we will term hardineſs, is the dependance placed upon external warmth for producing a comfortable ſtate of ſenſation. It is a fact inconteſtibly proved that the continued application of external warmth *renders the living ſyſtem leſs capable of being called into ſtrong, healthy, or pleaſurable action.* Every muſcle ſteeped in a heated medium, loſes of its contractility : every nerve grows languid ; and when excited, acquires a diſpoſition to throw the moving fibres with which it is connected into convulſive movements. Inſtead of accuſtoming our children therefore to heated apartments, from which every breath of air is excluded, we ſhould lead them to ſeek for warmth by exerciſe, or provide them with it by that kind and degree of clothing which will confine the animal heat, and thus in reality encreaſe it. Beddoes.

Till hardineſs has been acquired, and perhaps even after, ſudden variations of temperature can ſcarcely fail to be attended with injurious effects upon the bodily ſyſtem. This is the chief cauſe of colds, or catarrh. The inflammatory ſpecies of catarrh are not ſimply owing to cold, but ariſe from the concurrent or ſucceſſive action of cold and heat, or of ſtimuli equivalent to heat. If the cold to which the ſyſtem has been expoſed was conſiderable, heated apartments and warm ſpirituous liquors concur in carrying inflammation to its juſt height. It is well known that frozen limbs will inflame ſo as to mortify, if they be not carefully kept from the contact of mediums which are conſiderably above the freezing point ; and the remedy is to rub them with ſnow. When the mucous membrane has been chilled by froſty air, it is reaſonable that a ſimilar method ſhould be adopted,—gentle exerciſe in an atmoſphere not much exceeding the temperature by which it has been chilled, and the avoiding for the day all kinds of heating liquids. Beddoes.

The beneficial effects ariſing from the expoſure of the bodily ſyſtem to the external air, ſeparate from thoſe ariſing from exerciſe, are, in the firſt place, ſupplying it with air containing a due proportion of oxygen, which can ſeldom be obtained in rooms conſtantly inhabited by ſeveral perſons unleſs thoroughly and frequently ventilated ; and next, taking away a portion of the ſuperfluous heat from the body. Hence, though exerciſe within doors is much better than no exerciſe at all, yet the bracing invigorating effects of the external air can ſeldom be thus obtained, and indeed never, except in a cool room kept well ventilated. When children, therefore, have ſufficiently gone through the hardening proceſs to bear it, they cannot be too much in the external air, as long as they are free from chillineſs. The dry cold eaſterly and north-eaſterly winds, and the dampneſs ſo frequent in our climate, on the one hand, and the exceſſive heats of ſummer on the other, ſhould certainly excite the parent's caution ; but when the air has ſufficient coolneſs in ſummer, and is ſufficiently dry in the other parts of the year, almoſt continual expoſure to it, with the above precaution, cannot fail to be beneficial to the conſtitution properly prepared for it. As the requiſition of phyſical health ſhould be the chief object of the firſt period of education, the parent ſhould embrace every opportunity of giving his children the full benefit of this means of health.

Regularity in mental employments is of very great importance, and the habit ſhould be early formed, but the requiſite arrangements ſhould be ſo contrived, as to interfere as little as poſſible with this moſt eſſential point.

It is a well-known and important principle of chemical philoſophy, that ſolids when changing into fluids, and fluids when changing into vapour, abſorb heat. And where this is not ſupplied with ſufficient rapidity by the immediate cauſe of the fluidity or evaporation, the ſubſtance undergoing the change abſtracts heat from all the ſurrounding ſubſtances, in other words produces a greater degree of cold. It is on this account that, though the atmoſphere may be warm during a thaw, the body, when near the melting ſubſtance, generally feels chill ; and that the ſame effect is experienced in damp weather, ſince the heat of the body produces a degree of evaporation from the damp on its ſurface ; and the ſame effect is produced in a greater degree, and often without being immediately experienced, when wet clothes (the ſhoes and ſtockings for inſtance) are rapidly dried whilſt they are worn, and at the ſame time the body not ſupplied with natural heat by exerciſe of any kind. Indeed there are few conſtitutions, unleſs they have gone through the proceſſes of hardening to an uncommon degree, which can avoid being injured by this common practice. The intenſe degree of cold produced by evaporation, may be perceived by pumping on the hand, ſo as to have only an occaſional ſtream of water upon it in different parts: if the hand were kept ſtill in water at the ſame temperature, much leſs cold would be experienced. In like manner, if the lower extremities be placed in warm water, and the water be gently agitated, ſo as to expoſe part of the wet ſurface of the leg to evaporation, this part will be found very cold, while the reſt is very warm. Thoſe who are much accuſtomed to obſerve their ſenſations, may perceive that even when the water is ſtill, if there be ſufficient warmth to produce evaporation, the part of the leg immediately above that which is immerſed, feels colder than the reſt, nearly as though there were a ring of metal round it. Perhaps, however, the effect may be moſt completely perceived, by firſt ſtanding a little before a quick fire, and then ſuſpending cloſe before one a piece of damp flannel; if ſufficiently near, and the heat ſufficiently ſtrong to produce a rapid evaporation, the cold produced (in other words the loſs of heat) will be very ſenſibly felt, and might be made evident by the employment of a thermometer.

By attention to this principle, parents will take care, if their childrens' clothes are wet, that they either keep in ſome degree of exerciſe till they are dry, or have them removed; that their ſkin is well dried after waſhing or bathing; that their linen is properly aired (not warmed, except for weakly children) before it is put on; and that no clothes ſhould be put to dry in the room in which they live. Inattention to this laſt circumſtance, in the nurſery particularly, is a common cauſe of chill and colds among infants. When we conſider, however, how little injury is experienced by alternations of heat and cold in the hands, or by their expoſure to damp, how little, too, where the feet are continually expoſed to them without the protection of ſhoes and ſtockings, and how frequent the circumſtances in real life where ſome conſiderable expoſure muſt be experienced; it is clear that caution ſhould not be carried too far; the only point is *that the hardening ſyſtem be introduced by degrees*, and that thoſe degrees be determined by the previous ſtate of the ſyſtem, *i. e.* its capacity to endure them. To attempt to carry them on with a weakly child, as rapidly as with a healthy one, would be foolhardineſs.

We referred in a preceding paragraph to the injurious influence of the eaſterly and north-eaſterly winds in ſpring. Theſe are not only cold, but extremely dry; and by their dryneſs alone they muſt act as powerful refrigerants on moiſt ſurfaces. Their effect in producing this diminution of heat is proved by the following obſervations of the late accurate and ingenious Dr. James Hutton of Edinburgh. "I uſed to amuſe myſelf in walking in the fields, by obſerving the temperature of the air with the thermometer, and trying its dryneſs by the evaporation of water. The method I purſued was this: I had a thermometer, included within a glaſs tube, hermetically ſealed; this I held, in a proper ſituation, until it acquired the temperature of the atmoſphere; and then I dipped it into a little water, alſo cooled to the ſame temperature. I then expoſed my thermometer, with its glaſs caſe thus wetted, to the evaporation of the atmoſphere, by holding the ball of the thermometer, or end of the tube, in which the ball was incloſed, towards the current of the air, and I examined how much the evaporation from that glaſs tube cooled the ball of the thermometer which was included. During the ſummer ſeaſon, in the dryeſt weather that I could find, I never ſunk the thermometer in that manner, to the beſt of my remembrance, above two, three, or four degrees. But in a cold eaſt wind in the ſpring, I once ſunk it between nine and ten degrees. It was, I believe, about the month of March or April; the ſky was cloudy above, and no ſunſhine, and the wind was cold to the feeling, ſteady blowing, but not ſtrong." Hence we perceive, that the ſuperior dryneſs of the air in March makes moiſture evaporate faſter than the ſuperior heat of the ſummer air: and this is independently of all ſunſhine. It is evident the ſurfaces along which the dry cold air paſſes in breathing, muſt be affected in the ſame manner as the ſurface of the wetted glaſs tube; and theſe ſurfaces thus cooled, will be ready to be thrown into intenſe action by the rays of a powerful ſun in a ſheltered ſpot, or beſide a briſk fire at home. Beddoes.

If circumſtances require expoſure to the external air in ſuch circumſtances, before the general ſyſtem is properly hardened, a ſimple expedient which Dr. Beddoes recommends to adults, where there is a diſpoſition to catarrh, may be employed with great advantage; *viz.* to place a ſufficient number of folds of gauze or muſlin over the mouth and noſe; it will not only warm the air before it enters the reſpiratory paſſages, but likewiſe give it moiſture when the air is dry as well as cold. There are probably few travellers who have not experienced the beneficial effects produced by faſtening their comforters over the lower half of the face.

II. *Cleanlineſs*, *Bathing.*—We perſuade ourſelves that it cannot be requiſite, in the preſent day, to urge upon parents the neceſſity of the ſtricteſt attention to the cleanlineſs of their children. The old maxim, "cleanlineſs is next to godlineſs," has a degree of truth, in a moral as well as phyſical point of view, which it may require ſome experience in life to perceive, but which obſervation will completely prove to all who will not abſolutely cloſe their eyes to what paſſes without them. A want of cleanlineſs is almoſt univerſally united with careleſsneſs and indolence. It renders the body ſuſceptible of infection, while the contrary practice affords the greateſt ſecurity againſt virulent diſeaſes. There can be no reaſonable doubt that cleanlineſs is one grand cauſe why the rich eſcape ſo much more than the poor from infectious fevers; and that their prevalence and virulence among the poor, are, in a great meaſure, to be attributed to the want of it in their perſons and in their dwellings, &c. Perſonal cleanlineſs, and cleanlineſs in the apartments in which children live, ſhould be moſt ſtrictly enforced; and ſuch a regular ſyſtem ſhould be early adopted, as may ſecure this moſt deſirable end. No day ſhould paſs, except when the bodily health is materially interrupted, without a complete waſhing, not only of the extremities, but of every part of the body; and if this cannot ſafely be done with cold water, it is extremely ſeldom that it may not with cool or tepid water. Children ſhould be early accuſtomed to waſh themſelves, but it ſhould be under careful inſpection till they have completely formed the habit of doing it thoroughly; and when this is done, it will be as unpleaſant to them to omit it, as to ſome it appears to be to make themſelves clean. When paſt the early periods of childhood, it will often be impracticable to carry on the ſyſtem of univerſal waſhing; but it ſhould be made as general as poſſible, and for the purpoſe of cleanlineſs, as well as of invigoration, the bath ſhould be employed as frequently as domeſtic circumſtances, or the ſtate of the conſtitution will allow: with reſpect to the former, by ſuitable management they might generally be made to bend to the latter.

Bathing certainly ought to be regarded as having a powerful efficacy on the ſyſtem; and if its effects appear to be injurious, before it is much perſevered in, medical advice ſhould be obtained. The advocates for *tepid* bathing ſeem to have great reaſon to recommend it as a valuable remedy, or even as a preſervative in caſes where the conſtitution is weakly, and has conſumptive tendencies ; but the facts which they adduce, rather prove it, we apprehend, to have a ſtimulating and relaxing influence, than an invigorating efficacy ; and the warm bath at leaſt ſhould ſeldom be employed, except by medical direction, in reference to the particular caſe. As our preſent object is not the recovery of health, but the invigoration of a ſyſtem which is at leaſt tolerably free from direct tendencies to diſeaſe, we will leave the ſubject of warm bathing to the phyſician. No doubt cold alſo requires caution. Where the conſtitution has any direct phthiſical tendencies, or is peculiarly weakly, it would be raſh to expoſe a child to it ; but we cannot doubt that in other caſes, cold, or at leaſt cool, bathing, employed with precaution, and in that way which experience may ſhew to have the moſt beneficial effects upon the ſyſtem, has a highly important effect in giving ſtrength and activity, or in keeping up the tone and vigour of thoſe who are already robuſt.

If the *cold* bath is employed, the ſyſtem ſhould be *gradually* brought to the capacity of bearing it. There are exceptions to the neceſſity of this rule : and amongſt the ancient Germans, (as at preſent among the Ruſſians,) immerſion in cold water was employed in the earlieſt periods of infancy : thoſe who ſurvived the experiment were without doubt rendered more hardy by it ; but in all probability, numbers ſunk under it. It is an experiment which no parent ought to try, without a well-grounded confidence in the ſtrength of his child's conſtitution ; and as the ſame effects may be *ſafely* produced in a more gradual way, it ſeems to us a riſk which few circumſtances can juſtify.

We ſtrongly recommend to the intelligent parent, the peruſal of Dr. Currie's Medical Reports " on the effects of water, cold and warm, as a remedy in fever, and other diſeaſes, whether applied to the ſurface of the body, or uſed internally." It is a work which can ſcarcely fail to afford a warm intereſt to any one accuſtomed to accurate obſervations and ſcientific reſearches. The 15th chapter, containing " an account of the remarkable effects of a ſhipwreck on the mariners, with experiments and obſervations on the influence of immerſion in freſh and ſalt water, hot and cold, on the powers of the living body," muſt be regarded as a fine ſpecimen of philoſophical inveſtigation ; and a young perſon, properly prepared for it by previous information, would find it a highly uſeful *ſtudy*. We recommend this work to the parent, becauſe he will find in it ſome highly important principles reſpecting the effect of water upon the animal ſyſtem, which may be applied with great advantage in a ſtate of health, and which, in thoſe emergencies which ſometimes occur in ſickneſs, may be the means of preſerving life in his family, or among his neighbours. To enable a perſon to employ theſe principles in caſes of illneſs, he muſt ſtudy ſome parts of the work itſelf (ſee BATHING); but we ſhall ſelect thoſe which will prove of immediate importance in phyſical education. It is to be obſerved that Dr. Currie applies the term *tepid* to water heated to that degree which is warm, but not hot to the ſenſations, which, in the way of *affuſion*, is from 87° to 97°. When the body is *immerſed*, it may be applied to water ſome degrees higher. (Vol. i. p. 69.) " By the term *cool*," he afterwards ſays, p. 75, " I indicate from 87° to 75° ;" and as this obviouſly refers to affuſion, we may ſuppoſe that *cool* in *immerſion* extends from about 82° to about 70° : but as far as the ſenſations are concerned, there is no doubt that great variation will be experienced from the comparative temperature of the air, and its bracing effects on the ſyſtem. The writer of this article recollects finding freezing water produce a ſenſation of comparative warmth, while immerſed for a ſhort time in it ; and in the employment of a ſhower bath, in the winter months, has generally *felt* the water to be warmer in a cold froſty morning, than in a mild damp atmoſphere, when the water itſelf muſt have been of conſiderable higher temperature. 1. The principle which Dr. Currie lays down reſpecting the uſe of the aſperſion or affuſion of cold water, in fever, will afford a good direction reſpecting the uſe of cool or cold bathing generally. It may be ſafely uſed, " *when there is no ſenſe of chillineſs preſent*, when the heat of the ſurface is ſteadily above what is natural, and *when there is no* general or profuſe ſenſible perſpiration." (P. 17.) For our purpoſe, the ſecond clauſe may be changed into—" *when the heat of the ſurface is not lower than what is natural*," and the whole will then form an excellent aphoriſm. 2. The following ſtatement appears to us, from repeated experience and obſervation, to convey the preciſe effects of cold bathing, where judiciouſly conducted. After having expreſſed his opinion (p. 70.), that in ſome caſes the heat is lowered more ſpeedily by the affuſion of tepid than of cold water, Dr. Currie adds : " the evaporation from the ſurface is more copious from the tepid affuſion ; and on this the cooling of the body very much depends. But this is not all. The tepid affuſion is little, if at all, ſtimulating, and does not, like the *cold affuſion*, *rouſe the ſyſtem to thoſe actions by which heat is evolved, and the effects of external cold are reſiſted*." It is on this principle that Dr. Currie conſiders the tepid affuſions as a valuable remedy, in a great part of the feveriſh affections of children. 3. Speaking of the effects of ſpunging or wetting the body with cold or warm vinegar or water (p. 73.), he ſays : " According to my experience, it is not only leſs effectual, but in many caſes leſs ſafe ; for *the ſyſtem will often bear a ſudden, a general, and a ſtimulating application of cold, when it ſhrinks from its ſlow and ſucceſſive application*." On this principle, which, we are ſatisfied from various conſiderations, is fully applicable to cool or cold bathing, we heſitate not to recommend immediate immerſion, either by plunging in entirely, which, with care, can ſeldom be injurious, or getting in deep at once, and ſpeedily covering the head with water ; or, if the ſhower bath is employed, that the holes ſhould be ſo large as to allow the water to come through rapidly. Experience will ſhew that this laſt precaution is of conſiderable importance. If the holes are ſmall, the ſenſation is itſelf unpleaſant and continued, and the partial evaporation often produces chillineſs. When this is the caſe, bathing never can be beneficial. 4. The cool affuſion " operates as a gentle ſtimulant, and may be uſed as a milder form of the cold affuſion. Like the cold affuſion, *its application ſhould be ſudden and momentary, when the object is to increaſe the tone of the ſyſtem*, or to diſſolve a morbid catenation. When it is employed to moderate inordinate heat, it may be uſed more ſlowly, provided it does not interrupt the catenation on which reſpiration depends." (P. 76.) We are not forgetful of the difference between the diſeaſed and the healthy ſtate of the body ; but we ſee every reaſon to believe that this, and ſimilar cautions, are applicable to both. 5. " The pernicious effects of cold water applied internally and externally, during profuſe perſpiration, depend upon the ſame cauſes, *viz.* that perſpiration itſelf is a cooling proceſs, under which, when profuſe, the heat of the body, whatever its natural ſtate may be, is ſinking ; that under ſuch circumſtances, we find, as a matter of fact, that it parts with its remaining heat more eaſily ; and on the ſudden application of cold, that this heat ſinks to a degree which diſturbs, and ſometimes wholly interrupts the actions on which life immediately depends." The 12th chapter is one which cannot fail to be very intereſting to the general reader. It is entitled "Of the diſeaſe that ariſes from drinking cold liquids, or uſing the cold bath after ſevere exerciſe;" and contains many remarks, which the claſſical ſtudent will find of advantage to him in his reſearches. Into theſe we muſt not enter, but confine ourſelves to our preſent object; including, however, ſome poſitions more immediately reſpecting the uſe of cold water internally. The general fact is, 6. That the fatal effects proceeding from drinking cold water, in caſes where the ſyſtem has been extremely heated by bodily exertion, have occurred in circumſtances, "where the ſyſtem, after having been much heated and enfeebled by ſevere exertion, is loſing its preternatural heat from profuſe ſweating, and in general alſo from the ceſſation of the exertions, by which this heat was originally produced. Here two powerful cauſes combine to cool the body; and if, under their operation, a ſudden application of cold is made either to the ſtomach or the ſurface, the living power will, we know, reſiſt it faintly, and the fatal conſequences be accounted for." Dr. Currie then gives a number of caſes, which ſhould be read by the parent to his children, as ſoon as they are capable of fully underſtanding them, and afterwards brought back to their memory, as circumſtances direct; and the ſame by the tutor to his pupils. And the parent and preceptor ſhould be acquainted with one ſimple remedy, which, in caſes where the injury has not been too great, may prove effectual in reſtoring vital heat, namely, "the application of a bladder filled with water, heated to 110° or 115°, to the pit of the ſtomach." 7. "There is no ſituation in which the application of cold to the body, whether to the ſurface or the ſtomach, is ſo ſafe, or in general ſo ſalutary, as when the heat of the body, from whatever cauſe, is preternaturally great; provided that the body is not already in a ſtate in which it is rapidly parting with this heat, and no diſeaſe has taken place in the general ſenſibility, or in the ſtructure of any of the parts; and that when the body is preternaturally heated, the degree to which cold water may be drunk may be always decided by the ſteadineſs of the ſenſation of heat, and the tenacity with which the preternatural heat is actually retained. With this obſervation, however, muſt be connected another, "that the heat preternaturally accumulated by exerciſe is held with leſs tenacity than even the heat in intermittents. It is diſſipated by the perſpiration that exerciſe occaſions; and is ſpeedily loſt, when to profuſe perſpiration is added a ſtate of reſt. It is then that a large draught of cold liquid is eſpecially dangerous. But while the preternatural heat is ſuſtained by continued exertion, cold liquids may be taken *in moderate quantities*, without producing any injurious effects. They may even, I apprehend, be drunk copiouſly, without producing ſuddenly the fatal effects already deſcribed: but in copious draughts, they are found oppreſſive to the ſtomach during exerciſe, and excite languor, nauſea, and ſometimes vomiting." Dr. Currie afterwards explains the difference between the influence of water taken into the ſtomach and uſed externally; which ariſes, he obſerves, partly from the weight and bulk of the fluid, particularly oppreſſive under the conſtant action and agitation of the voluntary muſcles, and partly from the evaporation from the ſurface being promoted by the immediate acceſs of external air. To theſe muſt be added another ſimple conſideration, that where the external application is voluntary, it may be much more readily removed, and its injury checked, than where it is taken into the ſtomach; and this is of obvious importance. "With theſe exceptions," he adds, "the operation of cold liquids on the ſtomach, and on the ſurface of the body, are analogous in the caſe of preternatural heat produced by bodily exertion, as in all other caſes of preternatural heat. As it is ſafe to drink cold water, in proportion as the heat from exerciſe is great and ſteady; ſo alſo is it ſafe, according to this ratio, to pour it on the ſurface, or to immerſe the body in the cold bath." 8. "In the earlier ſtages of exerciſe, before profuſe perſpiration has diſſipated the heat, and fatigue debilitated the living power, nothing is more ſafe, according to my experience, than the cold bath. This is ſo true, that I have for ſome years conſtantly directed infirm perſons to uſe ſuch a degree of exerciſe before immerſion, as may produce ſome increaſed action of the vaſcular ſyſtem, with ſome increaſe of heat; and thus ſecure a force of re-action under the ſhock, which otherwiſe might not always take place. The popular opinion, that it is ſafeſt to go perfectly cool into the water, is founded on erroneous notions, and is ſometimes productive of injurious conſequences. Thus, perſons heated, and beginning to ſweat, often think it neceſſary to wait on the edge of the bath till they are perfectly cooled; and then plunging into the water, feel a ſudden chillineſs that is alarming and dangerous. In ſuch caſes, the injury is generally imputed to going into the water too warm; whereas in truth it ariſes from going in too cold. But though it be perfectly ſafe to go into the cold bath in the earlier ſtages of exerciſe, nothing is more dangerous than the practice, after exerciſe has produced profuſe ſweating, and terminated in languor and fatigue: becauſe, as has already been repeated more than once, in ſuch circumſtances, the heat is not only ſinking rapidly, but the ſyſtem parts more eaſily with the portion that remains."

From the preceding obſervations it is obvious, that the cold bath ſhould only be employed where the ſyſtem has ſtrength to ſtand the ſhock; and then its effects can ſcarcely fail to be beneficial, in invigorating the ſyſtem, and preparing it to reſiſt the influence of external cold. We recollect the caſe of a youth, of about 17, by no means of robuſt habit, and very liable to colds, who never was ſo little ſubject to them as during the winter, in which he perſevered in the uſe of a cold ſpring water bath every other day. A walk of about half a mile to the bath prepared him for it: he undreſſed as quickly as poſſible, plunged once into the bath, and when well rubbed and quickly dreſſed, on his walk home, he had the moſt pleaſing ſenſations of vigour and activity. As the ſyſtem ſhould be properly prepared for the excitement of cold bathing, we deem it an important precaution, at leaſt for weakly children, not to employ it faſting. After a full meal, it can ſeldom fail to be injurious; but no time can be better than an hour or two after an early moderate breakfaſt. If this cannot be made convenient, a partial breakfaſt may anſwer the purpoſe. We obſerve this caution of experience given alſo by other writers on the ſubject. "I ſee no ſenſe," ſays Dr. Beddoes, "in the common notion, that it is beſt to bathe with an empty ſtomach. I would not recommend the cool bath to a perſon full gorged; but it is deſirable that the ſtomach ſhould be in a ſtate of gentle activity, as well as the external ſurface of the body."

Till the ſyſtem has acquired conſiderable vigour, the cold bath ſhould be employed ſolely with a view to its effects. Children, if the commencement of it is managed with caution, ſo as not to excite terror, will ſoon learn to like it, and would willingly ſtay in it. In ſummer, when the water has been expoſed to the air, ſo as to acquire its temperature, this may be allowed, but rather ſparingly. When boys learn to ſwim, unleſs the water be too cold, the exerciſe they take in it will conſiderably check its injurious effects ; but there can be little doubt that the practice, ſo common among boys, of going very frequently into the water, (two or three times in the day, for inſtance,) and ſtaying there a long time, eſpecially if not conſtantly employed there in active exertion, has ruined many a conſtitution. Till young perſons have learnt that it is a part of duty, as well as prudence, to take care of their health, and have acquired the requiſite information to prevent injury, bathing ſhould never be practiſed except under the eye of ſome judicious friend. The morning is, on various accounts, the beſt time for this exerciſe, as well as for bathing in general ; and more particularly becauſe the ſyſtem is not likely to have been exhauſted by exertion and profuſe heat, and will be able, by activity in the water, to keep off chillineſs. After the firſt approach of this, no perſon ought to ſtay an inſtant in the water.

The temperature of the water muſt be an object of conſiderable attention and caution, before robuſt health has been obtained. No one can be ignorant that water from a ſlow flowing river, from the rapid ſhaded torrent, from an expoſed ciſtern, or from the well or ſpring, differs very greatly in temperature ; and upon the principle, which ſhould not be loſt ſight of, of hardening the ſyſtem by degrees, the parent will not begin with water at the loweſt temperature, or near it, but go on gradually through different ſtages of temperature, carefully obſerving the effects of each, and varying from it accordingly. No preciſe rules probably can be laid down for this purpoſe ; but what has been already ſaid may ſerve for principles to guide the judicious.

The difficulty of domeſtic bathing, except for the very young, has often probably prevented the employment of it. We are fully ſatisfied that the ſhower-bath, which every one may have in ſome form or other judiciouſly employed, will not only anſwer the leading objects as well as immerſion, but in ſeveral reſpects better. The principal cautions in the uſe of it, reſpecting the temperature, &c. of the body and of the water, are the ſame as thoſe for bathing in its more common form. In addition to theſe, we recommend that the child ſtand upon woollen, at leaſt not upon the metallic lining of the drawer, or the wet boards ; that the height from which the water comes be not very great, in general caſes perhaps a few inches is beſt ; that it is ſo contrived that the water ſhall come freely and rapidly, when once the courſe is begun ; and that the quantity be not very great. We perceive no advantage, in common caſes, for more than a complete affuſion. We are ſo fully impreſſed with the importance of this method of bathing, that we ſhall juſt give a plan for the moſt convenient kind of ſhower-bath. The height may be as great as the room will allow, for the purpoſe of filling, (ſay 6½ or 7 feet.) The frame ſhould conſiſt of four ſtout pieces of wood, (ſay 3 inches by 1½,) ſo connected that their outſide edges may ſtand about 32 inches from each other at the floor, and 20 inches at the top. From about 10 or 12 inches from the floor, the bottom of the bath ſhould begin to ſlope downward from each of the four ſides, ſo as to form a ſquare funnel, to convey the water into a broad, but ſhallow tub below. The funnel muſt of courſe terminate ſufficiently far from the ground, to admit of the tub being eaſily removed. About two or three inches from the top of the funnel, ſome bars of wood ſhould be placed acroſs, on which a ſmall board may be faſtened for the bather to ſtand. The ſides and door may be wood or canvas. The former is decidedly preferable ; and a clever workman, in making it, will take care to have as few obſtacles as poſſible to the wet draining into the funnel, and that the joints are well made. We know of no better contrivance than the common top, a tin cylinder moving in a box, pierced with large holes at the bottom, about half an inch in diameter : this, however, need not be nearly ſo large as it is ſometimes made. If the cylinder hold three gallons, it muſt in general be abundantly ſufficient. A grown-up perſon can ſcarcely require more than two gallons, and a child of ſeven or eight not above two or three quarts. But the principal point is, that this top ſhould be ſo contrived as to riſe and fall within the caſe, for the purpoſe of adapting it to the height of the bather, and alſo for the convenience of filling it. Our experience leads us to conclude, that the uſe of ſhower bathing is much prevented by the difficulty of filling it, the want of care in its conſtruction, the injudicious uſe of it, as to quantity, temperature, &c. and the damp chillineſs of the place where it is uſually kept ; and we regret it, becauſe, where the advantages of an immerſing bath cannot be obtained, the ſhower-bath can ſeldom fail to be a moſt uſeful ſubſtitute, and often is decidedly preferable.

As to the comparative effects of freſh and ſalt water at the ſame temperature, we ſee reaſon to believe that the former operates ſimply by calling into action the animal powers of evolving heat, and by invigorating the ſurface : the latter has a decidedly ſtimulating effect, by its influence on the external vaſcular ſyſtem. Sea-bathing has been often found to have a debilitating effect, where freſh water, at leaſt in the ſhower-bath, has proved very bracing. Where the conſtitution is ſtrong, there needs little attention to this difference ; but among weakly children, ſea-bathing ſhould be regarded more than it is, – in the light of a medicine.

We have enlarged upon this point far beyond our intentions ; but it appears to us of very great importance ; and conſtitutes a very eſſential part of phyſical education. Some of the other diviſions will admit of much greater brevity.

III. *Clothing.*—In our variable climate, conſiderable attention muſt be paid to the nature and degree of clothing, till a ſufficient degree of hardineſs has been acquired to render ſuch care almoſt unneceſſary ; it never can be altogether unneceſſary, as long as the preſent habits of ſocial intercourſe are preſerved, and as long as perſons are ſubject to the debilitating influence of cloſe heated rooms. But our obſervations chiefly reſpect the previous ſtate, in which the ſyſtem is going through the invigorating proceſs, and among thoſe claſſes of ſociety where conſtant exertion in the open air is not employed. Exerciſe in the open air is undoubtedly the beſt means of producing animal heat, and next to that active employment within doors : but as this cannot be conſtantly going forwards, and continued, frequent, or great chillineſs ſhould be cautiouſly avoided, the clothing ſhould be ſo contrived, particularly about the lower extremities, as to prevent the internal heat from paſſing off to the colder air. Preſerving the internal heat by non-conducting clothing, ſuch eſpecially as woollen ſubſtances, is a much better preſervative from chill, than the application of external heat. The temperature of the room in which children ſpend their time, ſhould, if poſſible, ſeldom exceed 50° or 55°. It ſhould be airy, dry, eaſily ventilated, eſpecially at the top, but free from currents of air, and in order to procure warmth in cold or damp weather, ſedentary employments ſhould be continually mixed with exerciſe in which the extremities are employed. As it really is more difficult to provide exerciſe for the feet, and they are leſs employed in the uſual occupations of education, it is deſirable that they ſhould not only be dry but well clothed ; and except in ſummer, we can ſee no reaſon why warm worſted or even woollen ſtockings ſhould not be uſed inſtead of the cotton clothing too frequently prevalent. If the feet are kept warm, the body will be uſually found to take care of itſelf. Of courſe this and every other remark muſt be employed with judgment; but we are ſatisfied from obſervation and experience that it is the grand point. There can be little doubt that the general prevalence of ſlight dreſſes in winter, together with the abſurd changes which are too often practiſed from warm garments in the morning to ſlight clothing in the evening and heated apartments, conſtitute one grand cauſe of the unhealthineſs of that claſs of the female ſex, who, unhappily for themſelves, live in the walks of faſhion. The general principle ſhould be, to accommodate the dreſs ſomewhat to the ſeaſon. Hardineſs ſhould be ſought, rather by exerciſe, air, general attention to temperature, &c. than by ſparing clothing. When it is acquired let experiments be tried; till then, parents will do well to give their children ſuch clothing as, without being heavy, cumberſome, or heating, may prevent chillineſs, both when engaged in domeſtic and even ſedentary occupations, and when expoſed to a cold atmoſphere without. As to the employment of flannel under the linen, we think it of great ſervice where there is a conſiderable tendency to chillineſs and even to perſpiration, provided it does not increaſe that tendency. But it ſhould be as thin as poſſible; it ſhould be frequently changed, and accompanied with a conſtant attention to the invigorating ſyſtems. And certainly it is not ſo deſirable to begin a habit ſo difficult to break without judicious medical advice. Whatever additional clothing is employed for winter ſhould be left off with caution, and not till the mild weather of ſpring, (if ſuch there be in our climate,) is fairly ſet in. A real ſpring day has often tempted to leave off the winter clothing, and the piercing chill of the next day has cauſed ſerious injury. One further caution appears neceſſary; after great perſpiration, unleſs the conſtitution is very ſtrong, the damp clothing neareſt the ſkin ſhould be removed, and the ſkin well rubbed with dry flannel or rough linen.

From the firſt period of infancy the limbs ſhould be allowed full play; and no excuſe can juſtify the parents who, from a regard to the ſhape of their children, employ tight clothes, either about the body or the extremities. Modern faſhion here, however, ſo much coincides with the ſound dictates of phyſical education, that we need not enlarge upon it. There has ſcarcely been any improvement in dreſs more important than the uſe of looſe trowſers and ſuſpenders, by which the weight of the lower parts of the dreſs is ſuſtained by the ſhoulders, inſtead of throwing it, as we recollect it to have been, upon the hips, aſſiſted by a tight bandage round the waiſt. Tight ſhoes and tight garters (which, if employed at all, ſhould always be below the knee,) impede the circulation, and are followed by conſiderable injury to the lower extremities. In fact, the rule ſhould be, to have every part of the dreſs not ſo looſe as to be cumberſome, but perfectly eaſy: and whenever children complain of uneaſineſs from their clothes, they ſhould at once be rectified. No trouble or expence will in ſuch caſes be thrown away: there is nothing pays better in the long run than early care in the department of phyſical education. If half the pains and expence were employed in making dreſs convenient and healthy, that are now given to appearance, it would anſwer every purpoſe.—We need ſcarcely add, that in the female dreſs the ſame principle ſhould be obſerved; and except in caſes where, from medical advice, a different plan may be thought neceſſary, nothing ſhould induce a mother to allow her daughters any article of clothing whatever, which does not give full and free play to the exerciſe of their muſcles, or of the internal functions of the ſyſtem. In the eye of reaſon that parent has much to anſwer for, who permits her daughters to uſe any article of dreſs cauſing compreſſion about the waiſt; much in reſpect to the health of the individual; much, too, as it reſpects the health of her children, if ſhe ſhould be a mother, and her capacity to bring them into the world.

Attention to neatneſs and ſimplicity of dreſs ſhould be produced, in the firſt inſtance, by parental care; and afterwards enforced by parental example and inſtructions. This is one of the external habits, which contribute greatly to the moral and even to the mental health.

IV. *Beds, Sleep.*—In the earlieſt periods of infancy it may probably, in many caſes, be neceſſary to employ warm ſoft beds, at leaſt during the winter ſeaſon; but the ſooner they can be diſpenſed with the better. There cannot be a doubt that ſoft beds have a very enervating effect upon the ſyſtem: and that ſo far from contributing to the proper growth of the ſpine and limbs, they have a great tendency, by yielding conſiderably in parts, to produce diſtortion. The mattraſſes on which they lie ſhould not, however, be ſo hard as not to yield at all. If hair mattraſſes, (which muſt be the beſt,) are not eaſily procured, they may be filled with wool or cotton flocks; the head ſhould not be much raiſed; the child ſhould be induced to lie ſometimes on one ſide, ſometimes on the other, and as little as poſſible we apprehend on the back. A moderate curvature of the body ſeems preferable to abſolute ſtraightneſs.

It does not appear undeſirable to protect the *head* of the bed, eſpecially if there be any danger of a current of air round the room; but nothing more than this. The habit of drawing the curtains cloſe round the bed is highly prejudicial in confining the impure air, and producing an injurious degree of warmth. Proper proviſion ſhould be made for moderate warmth, but care muſt be taken not to exceed it. "When young people," ſays Dr. Beddoes, "complain of unrefreſhing ſleep they ſhould be examined in the night, and waked without compunction if found too warm. The bed clothes ſhould then be thrown off, or if the dry heat be conſiderable it will be beſt to walk up and down the room in a dreſs which ſhould be contrived for guarding the hands and feet from chill, while it ſuffered the trunk of the body to be freely ventilated." This may appear a precaution of ſome danger, as well as difficulty; and referring to an unhealthy ſtate of the ſyſtem, ſhould not perhaps be adopted without medical advice; but on the following there can be no difference of opinion: "Whenever a perſon of feeble habit feels heated in a morning let him riſe without a moment's delay." The heat of the bed is often increaſed conſiderably above that ſalutary point which at once imparts refreſhment and vigour, and then produces fever, languor, and inactivity.

We have already ſtated in Div. I. that the bed ſhould be raiſed from the ground, ſay 18 or 20 inches. As to the quantity of ſleep, it muſt vary greatly with peculiarities of conſtitution. During the period of growth, if the temperature be not too great, and the room too confined, it is probable that eight or nine hours cannot be too much. Children under the age of eight or nine require an hour or two more. In the ſummer, however, leſs will be deſirable; for the cool of the evening affords a valuable time for exerciſe, and the early morning air ſhould not be loſt. The middle of the day will then be found the beſt for reſt, in circumſtances which will not produce too much heat.

"There is an intemperance in ſleep very neceſſary to be guarded againſt, becauſe extremely apt to creep upon young people, eſpecially in this cold climate, where it gives a ſmart pain to jump out of a warm bed into the winter air; therefore, this is a piece of hardineſs which cannot be inculcated too early by all the means conducive thereto, whether advice, injunction, or ſhame. While under the eye of parents or maſters, they may be kept conſtantly to a certain hour, which will make it the eaſier for them to perſevere afterwards, when gotten from under that controul; if no diſorder or accident intervene, they will need no more than one nap, which cuſtom will have brought to terminate of itſelf juſt at the uſual hour; and then if they turn upon the other ear to take a ſecond, they ſhould be taught to look upon it as an intemperance, not at all redounding to their credit. But this ſecond nap is not ſo bad as lying awake, than which nothing tends more to foul the blood, to ſharpen the juices, to exhauſt the ſpirits, to unbrace the ſolids, to heat the blood, to ſtupify the underſtanding, to deſtroy hardineſs, and to produce other inconveniences of very miſchievous conſequence. Let them ſeek their amuſements elſewhere, but reſerve the bed as a place appropriated to ſleep and ſickneſs; for if it were poſſible to live without either of thoſe ſuſpenſions of the enjoyments of life, nobody would ever think of making a bed a part of his furniture." To make early riſing pleaſant and habitual, the firſt employments of the morning ſhould be pleaſant in themſelves or their conſequences.

The practice ſhould be early begun, and afterwards adhered to as conſtantly as circumſtances will permit, of ſleeping ſingly. Separate beds are of no ſmall ſervice to the phyſical health; they are of eſſential importance to the moral health. To prevent departures from this plan, the beds of children and youth ſhould be made as narrow as their comfort will allow, that they may not be uſed by two, without real inconvenience. If to this ſeparation can be added that of rooms, no doubt the cauſe of morality muſt be greatly promoted; and this ſhould be done wherever practicable, unleſs parents have full confidence in the delicacy of their children.

It may be worth while adding here, that ſuddenly awaking young children has often a very injurious mental and moral effect. Their firſt ſenſations ſhould be pleaſant, and we admire the principle upon which that mother proceeded, who always awoke her children with a ſong. Montaigne tells us, that his father always had him awakened by the ſound of a muſical inſtrument.

V. *Care of the Shape.*—The reſt of bed is peculiarly neceſſary for children and growing youth, in order to afford a due degree of relaxation to the bodily ſyſtem; and till the age of nine or ten, (and afterwards, if there be any marks of debility from ill health or too rapid growth,) children ſhould be encouraged to lie down once or twice in the day, on the carpet or on pallets, in ſuch a poſture as may afford the greateſt degree of relief to the muſcles and joints. "When the leaſt tendency to become awry is obſerved, they ſhould be adviſed to lie down on a bed or ſofa, for an hour, in the middle of the day for many months; which generally prevents the increaſe of this deformity by taking off for a time the preſſure of the head, neck, and ſhoulders on the ſpine of the back; and it at the ſame time tends to make them grow taller. Young perſons, when nicely meaſured, are found to be half an inch higher in the morning than at night; as is well known to thoſe who enliſt very young men for ſoldiers. This is owing to the cartilages between the bones of the back becoming compreſſed by the weight of the head and ſhoulders on them during the day. It is the ſame preſſure which produces curvatures and diſtortions of the ſpine in growing children, where the bones are ſofter than uſual." Darwin on Female Education, p. 76.

Some remarks which might be applicable here will be found in Div. III., reſpecting the freedom which ſhould uniformly be an object in dreſs; and we ſhall not therefore quote ſome good obſervations to that purpoſe, which we obſerve in Darwin, but muſt add his laſt ſentence. "A wiſe faſhion of wearing no ſtiff ſtays, which adds ſo much to the beauty of young ladies, has commenced ſince the above was written; and long may it continue." We are grieved to hear that this excellent cuſtom is now (1814) very much laid aſide; and that our faſhionable young ladies have returned to the follies of their grandmothers, increaſing the injuriouſneſs of their method, by making the preſſure more partial. Report ſays, that even gentlemen now wear ſtiff ſtays. To them the injury is leſs, but not trifling. But this folly can only extend among thoſe whom nothing but experience can cure of folly.

"All other methods of confining or directing the growth of young people ſhould be uſed with great ſkill, ſuch as back-boards, or bandages; and their application ſhould not be continued too long at a time; leſt worſe conſequences ſhould enſue than the deformity they are deſigned to remove. Of theſe the ſtocks for the feet of children, for the purpoſe of making them turn their toes quite out, and the frame for preſſing in their knees, as they ſtand erect, at the ſame time, I ſuſpect, when carried to exceſs, to be particularly injurious, and to have cauſed an irrecoverable lameneſs in the hip-joint. Theſe, therefore, ſhould be uſed with proper caution, ſo as to give no pain or uneaſy feels, or not uſed at all." (Darwin, p. 78.) "Inſtead of ſtocks, (ſays the editor of Parent's Friend, p. 56.) I would adviſe, that a ſtraight line be drawn on the floor of the ſchoolroom, from one end to the other, and that ſloping lines be drawn alternately on each ſide of it at equal diſtances. Theſe lines ſhould form angles of about 30 degrees (we ſhould ſay 40° or 45°) with the centre line, and the children be daily accuſtomed to walk on it, placing their feet behind the ſloping lines, ſo that the inſide edge of the foot may exactly coincide with them. This would teach them to turn out both feet equally in walking, which they ſeldom do, and would give a regularity and ſteadineſs to their gait, without which no one can be ſaid to walk well.

"By confinement in a ſchool room for many ſucceſſive hours, and that without being ſuffered to vary their poſture, ſome of the more active and lively children are liable to gain tricks of involuntary actions, as twitchings of the face, reſtleſs geſticulations of the limbs, biting their nails, &c. which are generally at firſt occaſioned by the want of ſufficient bodily exerciſe to expend the ſuperfluous animal power, like the jumping of a ſquirrel in a cage; but are alſo liable to be caught by imitation of each other. To prevent this kind of deformity, children ſhould be ſuffered to change their attitudes and ſituations more frequently, or to walk about as they get their leſſons." (Darwin, p. 100.) The reader will find ſome uſeful obſervations on this ſubject in the chapter on Attention in Edgeworth's Practical Education.

VI. *Diet*, &c.—Under this head we ſhall not find it neceſſary to enter much into particulars. The food of children and youth ſhould be nouriſhing but not ſtimulating; and as plain as can be. If their appetite be not pampered, or laid under unnatural reſtraint, it will generally be their ſafeſt guide as to quantity. We agree with Buchan, that the error of pinching children in their food, is more hurtful than the other extreme. The diſorders of repletion are leſs injurious in their conſequences than the diſeaſes ariſing from the want of ſufficient nouriſhment. Nature has many ways of relieving itſelf when overcharged; but long faſting is extremely hurtful to young people; and a child who is often pinched with hunger ſtands little chance of becoming a ſtrong man. "The ſtomach (ſays Dr. Ruſh) is like an idle ſchool-boy, when it has nothing elſe to do, it is always doing miſchief." When children riſe an hour and half or two hours before breakfaſt, we think it very deſirable that they ſhould be allowed a piece of bread and a draught of milk or water ſoon after riſing; we have perceived conſiderable injury ariſing in the weakly ſtomach by early faſting. When they have gained ſome degree of robuſtneſs, this may be eaſily given up. It is highly deſirable that the ſtomach be brought to the capacity of enduring great irregularity in the time of taking food; but in the early periods of invigoration, conſiderable if not minute regularity in the principal meals is very beneficial. When children faſt too long they often do not know how to eat. In ſuch circumſtances, a ſmall quantity of warm liquid will reſtore the diſpoſition to eat, better than dry food. The principal meal ſhould be ſufficiently early in the day to allow of their taking out-of-door exerciſe after it. Perhaps it will generally be found, that about one o'clock is the beſt time for this; but it does not appear that a nearer approach to the common hour of dinner can be attended with any ſerious inconvenience, if the previous time be properly arranged for it. Though children ſhould not get the habit of lounging at their meals, any more than at other things, yet they ſhould not be hurried at them; but ſhould be induced to eat their food ſlowly in order that they may maſticate it properly.

We fully agree with Dr. Beddoes on the great deſirableneſs of employing animal food in early childhood and ever after. Some ſpeculatiſts have indeed attributed the prevalence of conſumptive complaints, as well as ſuicide, in our iſland, to our free uſe of animal food; but it appears probable, in the firſt place, that much more animal food is eaten in countries where this fatal malady occurs leſs frequently than with us; and, in the next place, that a free uſe of animal food, inſtead of being objectionable, is highly advantageous as a ſecurity againſt its attacks. The ſalutary agency of animal diet in preventing the developement of ſcrofula is now generally known; and the miſtakes of thoſe parents, who imagined that, by confining their children to a vegetable diet, they were purifying their blood, while in reality they were ſtarving them into ſcrofula, are now generally recognized and avoided. (Stock's Life of Beddoes, p. 168.) Caſes may occur, when animal food may be injurious; and theſe may require at leaſt a temporary ſuſpenſion of it; but much more injury is done by a ſpare or poor diet, than by a reaſonably full meal of plain nouriſhing food. Once a day cannot be too often for a meal in which meat ſhould form a chief ingredient; and we need ſcarcely ſay, that its proper nouriſhing effects will be moſt experienced, where it is full-grown and not over-dreſſed. With plenty of air and exerciſe, warm clothing, and moderate temperature, there is little room to be apprehenſive of injury from plenty of milk and meat. On the contrary, the beſt effects on the health and vigour of the ſyſtem may be expected.

Profeſſor Hufeland tells us, that thoſe parents who accuſtom their children to drink water only, render them a ſervice, the value and importance of which will be ſenſibly felt through life; and we fully agree with him. No beverage can be more wholeſome, and we will even venture to ſay on the whole more nutritious, than good ſpring water. Thoſe who have any acquaintance with animal and vegetable phyſiology, will not be ſurpriſed at the laſt part of this aſſertion. But if we leave out of view its nutritious qualities, and conſider it merely as a beverage free from the noxious qualities which forcibly preſent themſelves to the minds of thoſe who connect the future periods of life with the preſent, and which muſt induce them to ſhun the early employment of ſtimulating liquors of any kind, it is invaluable. It would amply repay the parent to give up the uſe of every ſtimulating beverage with his meals, for the ſake of example to his children, and with a view to produce that habit of early temperance which cannot be too ſoon acquired. We have known the ſips of wine and of ale, which many would think mere trifling indulgences, produce a propenſity to the uſe of ſtrong liquors, which has been attended, even at eight or nine years of age, with intoxication. And it ſhocks us to ſee parents ſo regardleſs of the bodily, as well as the moral health of their children, as to give them, when very young, (perhaps when three or four years of age, or even leſs,) a glaſs of unmixed wine, and even urge them to drink it. Theſe ſame perſons would be themſelves averſe to give their child half the wine glaſs of brandy, and yet the quantity of alcohol differs little in the two caſes. Wine ſhould be reſerved for a medicine; and there may be times, even in childhood, in which, when diluted, it may thus be uſefully employed. But in ſuch caſes, with a view to the future, no pains ſhould be taken to render it palatable. The true way to prevent an early taſte for ſtimulating liquors of any kind, is not to make them the ſubject of direct prohibition, but to keep children out of the way of them, and to accuſtom them to ſimple food and drink. Where the ſtomach of a child is not unnaturally excited, there will be little diſpoſition to the uſe of fermented liquors. But if drinking them be made the ſubject of boaſting, or even of expreſſions of lively pleaſure, in the preſence of children, our precautions may be eaſily rendered ineffectual. If a parent finds it neceſſary to introduce to his table viſitors who will be thus careleſs of the moral welfare of the young about them, let his children take their meals in a ſeparate room, till he has acquired ſuch power over their minds as to prevent the mental poiſon from operating. Then it may be beſt for him to let them be expoſed to it. They muſt eventually; and it is better that this ſhould be done before the mind is likely to be ſo much influenced by it, as it would be at the more advanced periods of youth, when the antidote will not be at hand. But before that period, if wine is to be introduced at meals, and the bottle to be circulated freely afterwards, and made the ſubject of converſation, at leaſt let not children be expoſed to the impreſſions of the ſcene. Thoſe who have known boys, under twelve or fourteen, habitually fond of intoxicating liquors, and taking various underhand methods to procure them, and even experiencing intoxication thus early,—who have known, too, a habit thus early begun, continued through all its ſtages, till life has been prematurely cut off by its poiſonous effects, when the age of manhood had ſcarcely been reached,—will think no inſtance of ſelf-denial or of prudential caution unreaſonable, to prevent the poſſibility of ſuch evils in their own families. Whether we conſider it in its preſent and future beneficial effects on the bodily organs, (the digeſtive, biliary and nervous ſyſtems,) or in its great tendency to promote the culture of ſelf-controul as it reſpects the corporeal deſires, the habit of temperance cannot be too early begun or too ſteadily purſued. Its phyſical, mental, and moral influence, its influence on health and happineſs, entitle it to a high rank among the virtues of life. At firſt it will be a mere habit, formed only by parental care and influence; but as the child advances towards maturity of underſtanding, every judicious means ſhould be employed, to give it the obvious and impreſſive ſanctions of prudence and of religious duty (for ſuch it has in every point of view that it can be conſidered); and theſe repreſentations will be eaſily underſtood. The proper time for introducing them, is when any ſtriking inſtances of the injurious effects of intemperance will render them impreſſive; and a few ſhort *home* ſtatements on the ſubject may then be of incalculable importance and efficacy.

With a view to ſuch ſtatements, we recommend to the judicious parent, (at leaſt if not liable to exceſſive nervous excitement,) the ſtudy of Dr. Beddoes's eighth Eſſay, on the preſervation of the phyſical power of enjoyment, including ſome remarks on food and digeſtion. They will find there "a deſcription of the ſtomach and of its various ſtates of diſtention and emptineſs, with the correſponding ſenſations by which theſe ſtates are accompanied. The progreſs of digeſtion is deſcribed in a manner ſtrikingly clear and intelligible; and this is followed by an inquiry into the principal agents by which this proceſs is impaired, and the digeſtive organs injured." The young often injure themſelves for want of proper information on the ſubject of the bodily functions; and the parent may, from ſuch ſources, derive thoſe which will enable them to render their children moſt eſſential ſervice. Dr. B. appears to us ſometimes to colour too highly; but the moſt important parts of his Hygeia we cannot doubt to be fully borne out by correct obſervation and experience. For the purpoſes of health, it appears that to take ſpirituous liquors, (whether in the form of wine or what are commonly called ſpirits,) after a meal, is of all periods the moſt improper. Proper food taken in proper quantity is exciting enough for the ſtrong, and without caution is apt to be over-exciting for the weak. Fermented liquors act with peculiar ſeverity on the tender conſtitutions of children. They ſtint their growth and impair their appetite. Numerous experiments prove this fact; and the indigent claſſes have, in ſome inſtances, availed themſelves of a knowledge of it to ſtill the cravings of that hunger which they had not the power of appeaſing by a ſufficient quantity of wholeſome food. Theſe facts ought to operate as a ſerious warning to the imprudent parent, who indulges his children in ſuch a fatal gratification. They want no ſource of artificial exhilaration to beguile their time; however it may be ſought, for thoſe purpoſes, by thoſe of more mature age, too little remembering that the pleaſurable feelings of exiſtence which ariſe from the products of vinous fermentation can only be momentary, and muſt be ſucceeded by a proportionate degree of depreſſion and at laſt of gloom. (Stock's Life of Beddoes, p. 236, &c.) The following remark of Dr. Currie (which ſhould have been introduced in Div. II.) deſerves great attention: "Though *ſpirituous liquors* may fortify the body againſt the effects of heat, combined with moiſture, and may perhaps ſupport it for a ſhort time under great fatigue, *they are, I believe, uniformly hurtful when taken under ſevere and continued cold.*"

We are not apprehenſive that we ſhall be conſidered as digreſſing on this point. That education, which, while it gives health and vigour in the early part of life, ſecures ſtrict temperance and moderation in every kind of animal gratification, is rendering a moſt eſſential ſervice to the mind and the body. The work of mental and moral culture may then be not only begun but purſued with ſteadineſs and ſucceſs; and that invaluable bleſſing, *mens ſana in corpore ſano*, will make the parent for ever recollected with the moſt lively feelings of affectionate gratitude.

We muſt revert a little more to the ſubject of *water*. To have its proper effect it muſt be *pure*. Two precautions, therefore, are to be attended to reſpecting the water which is conſtantly employed in food. The firſt is, that it be free from the oxyd (or ruſt) of lead; the other, that it do not contain too great a degree of earthy matter.

"Pure water has no action on lead; but it takes up a ſmall proportion of the oxyd of that metal. When left in contact with water, with the acceſs of atmoſpherical air, lead ſoon becomes oxydized and diſſolved, eſpecially if agitation be uſed. Hence the danger of leaden pipes and veſſels for containing water which is intended to be drank. Water appears alſo to act more readily on lead, when impregnated with the neutral ſalts that are occaſionally preſent in ſpring water." (See Henry's Chemiſtry, vol. ii. p. 89.) Vats of lead have been uſed in ſome cider countries which have produced incalculable miſchief. What is called the Devonſhire colic is occaſioned by this practice; and is identified, by its effects on the ſyſtem, with the colic of the plumbers, the painters, and the white lead makers. "Lead in its metallic ſtate, like all other metals, is probably inert; but it is ſo eaſily acted upon by the weakeſt acids and alkalies, that it cannot be taken without the moſt imminent danger." Johnſtone on Poiſons, p. 113. (See Parkes's Chemical Catechiſm.) The preſence of any quantity of lead ſufficient to produce injurious effects on the ſyſtem, may be diſcovered by an addition of the ſulphuret of ammonia or potaſh. (See Henry's Chemiſtry, vol. ii. p. 394, &c. in the chapter on the method of detecting poiſons; where alſo will be found ſome valuable remarks on this and other connected topics.) The other point is, that the water in conſtant uſe ſhall not contain too large a proportion of earthy ſubſtances. (See Parkes, p. 243.) If the water is perceived to be particularly *hard* in waſhing with ſoap, or, if in boiling it, there is a great depoſition of earthy matter on the internal ſurface of the veſſel, it is, probably, likely to have injurious effects. Boiling it would deprive it, in a great meaſure, of its earthy mixture, but it will alſo deprive it of its briſkneſs. Whether paſſing it through a filtering ſtone would take away the earthy ſubſtance we do not know; but we have known this proceſs to give rain water (by its paſſing in ſmall quantities through the air) that briſkneſs which makes water a real luxury to thoſe who habitually employ it. Probably the trouble, and certainly the expence, attending the procuring of good water from a ſpring, even at ſome diſtance, would, in general, be very much leſs than that ariſing from the employment of fermented liquors: and there would be the ſatisfaction attending the former, that it was certainly for the purpoſes of health.

It is neceſſary to ſay a few words on the ſubject of *tea*. We agree with Beddoes (ſee his third Eſſay) in almoſt every particular reſpecting it; and in this we are influenced by conſiderable experience and obſervation. We are not averſe to the uſe of it in a moderate degree and of a moderate ſtrength, eſpecially among *young men*. The habit of afternoon tea-drinking has often a cloſe connection with domeſtic diſpoſitions, and tends to ſociety at leaſt leſs injurious than that of the bottle companion. It appears alſo to furniſh, when thus limited, only a ſalutary refreſhment after fatigue of body and mind. As long, however, as the ſtomach will bear a milk breakfaſt, (which might be diverſified by uſing it in various forms,) ſo much the better. When tea is employed for breakfaſt, it ſhould be weak, cool, (little, if at all, exceeding blood heat for inſtance,) with a large proportion of milk, and as much ſugar as will render it palatable without ſickening the ſtomach, and accompanied with plenty of toaſted bread or thinly ſpread bread and butter, (in other words there ſhould be as little tea as poſſible in the whole,) and we imagine that then no direct injury can reſult from it. The afternoon tea ſhould be prepared in the ſame manner. If it is uſed in any form in which its ſtimulating effects are experienced it muſt be prejudicial to the young: and the tendency of the preſent employment of weak and well prepared tea, to lead to the injurious uſe of it hereafter, renders it deſirable to keep clear of it as long as may be. Green tea poſſeſſes a power over the nervous ſyſtem, which ſhould completely prevent the general employment of it by any one. Like other ſtrong ſtimulants it ſhould be reſerved for the period when it is requiſite as a medicine, if there be ſuch a one. Black tea is certainly leſs injurious: but even this (at leaſt without ſuch precautions as above ſtated) muſt affect the irritable habits of children too violently, to juſtify the uſe of it as a part of their daily diet. We recollect obſerving the effect of tea upon a boy of about nine or ten, (the ſame referred to under the head of *Bathing*,) having taken ſome ſtrong green tea, with little milk and bread, and no ſugar, he began about an hour and a half after to manifeſt exceſſive depreſſion, accompanied with weeping, for a conſiderable time. He was, in ſome meaſure, reſtored to his uſual tone by a comfortable ſupper; it is probable that as the ſtimulus had thus exhibited its genuine effects afterwards it had done ſo in the firſt inſtance by producing a temporary exhilaration.

One point connected with this head we do not wiſh to omit, becauſe we deem it really important, though we doubt whether even the authority of Locke will appear broad enough to ſhelter us completely. The philoſopher devotes five ſections to the ſubject in his Thoughts on Education; we ſhall take the abridgment of them, which we find in the Parent's Friend, vol. i. p. 5.—"One thing more there is which has a great influence upon the health, which is coſtiveneſs. The contrary extreme is always attended to, and can ſooner be remedied; but coſtiveneſs is harder to be dealt with by phyſic, as purging medicines rather increaſe the evil. I believe the beſt remedy is, for people always to ſolicit nature immediately after their firſt eating of a morning; and by this conſtant application they might bring it into a habit, whether they are at firſt called or not: and they ſhould never let any human affairs prevent this neceſſary attention to their health. Children ſhould be early accuſtomed to this, and ſhould not be let go to play till they have been effectually at ſtool, as there is reaſon to ſuppoſe that many children neglect the gentle calls of nature, when they are very intent on their play."

VII. *Muſcular Exerciſe.*—Healthy children will exerciſe themſelves ſufficiently if they are allowed: and they ſhould be allowed, during the period when the body is the firſt concern, almoſt as much as they pleaſe; and, after that period, as much as is neceſſary for the vigour of the body, if it were only with a view to the vigour of the mind. They ſhould be *encouraged* to ſuch bodily exertions as will call into play the muſcular ſyſtem generally; ſeldom exceſſive or violent, but active and vigorous; proportioned in fact to the degree of ſtrength actually poſſeſſed; and ſo contrived that, while it benefits the preſent health, and ſuits and excites the lively ſpirits of youth, it may alſo lay in no ſtore of injury for the future. The laſt principle excludes thoſe violent ſports, which, before unuſual vigour has been acquired, can ſcarcely fail to over-excite the ſyſtem, and produce laſting injury to it. So far, indeed, from wiſhing to ſee boys and girls ſhrinking from exertion, or the apprehenſion of pain, we would have their education ſo conducted, that they ſhall be at all times ready to engage in any exerciſe which is not beyond their ſtrength, and ready to undergo *any* pain that will have only an *immediate* and *temporary* effect. Thoſe which *really* and conſiderably endanger the limbs, or the ſenſes, the health, or even the lives, are what we term dangerous ſports; and the danger ſhould be early and repeatedly pointed out to children, and ſuch ſports prohibited: but all that are active, that exerciſe the bodily or the mental vigour and ingenuity, ſhould be encouraged, and ſometimes aſſiſted by advice, or by the parent's taking a leading ſhare in them. We ſay ſometimes, becauſe as much as poſſible ſhould be left for children themſelves to do. Parents ſhould ſometimes lead, but only in order to teach them to go alone: and except when this is the object, the parent will be of moſt ſervice, by taking only an ordinary play-fellow's ſhare in his children's amuſements.

When children are healthy, and have been accuſtomed to a few ſimple ſources of amuſement, to ſuch playthings as they can uſe freely, and as will call their minds into exerciſe, they will invent for themſelves; and all that is neceſſary is, to give them a dry airy room in doors, and a dry airy ſpot out of doors, where they can play freely and actively, and to furniſh them with a few implements for amuſement ſuited to their age, ſuch as the recollections of an active childhood will readily ſuggeſt. The reſt they will generally do for themſelves. A little indirect aid may ſometimes be of ſervice to give a right direction to the ſtimulus of their own minds; but the leſs direct interference the better.

We hear a great deal of boys loving play too well; and there are, doubtleſs, inſtances in which a real love of play has been attended with little or no marks of mental activity; but we ſee every reaſon to ſuppoſe, that if a boy play *well*, (with activity, ſpirit, and ingenuity,) it only wants proper management to make him work well. Of ſuch a one, at leaſt, we ſhould ourſelves never deſpair. If children are indolent at play, it muſt be from a want of ſufficient animal health and ſpirits, and proper means ſhould be employed to reſtore them to that ſtate. A child in thoroughly good health, will, at times, be as playful, and full of anticks, as a young kitten; and without indulging that boiſterous rudeneſs, which is inconſiſtent with domeſtic comfort, and with the neceſſary degrees of order and propriety, and even with the health and comfort of the children themſelves, every poſſible indulgence ſhould be given to their lively ſpirits, and to their cheerful noiſes.

At the period when the habit of *hardy* application is to be begun, we do not wiſh to ſee work treated as play: and, on the other hand, play ſhould never be made work. Children may often be *led* to do, that which they have no direct inclination to begin; and a little ſkill in bringing about this beginning is often of real advantage. But exerciſe will be of the greateſt uſe, (it will moſt call into exertion the phyſical powers, and contribute moſt to the health,) when it is indulged involuntarily and with ſpirit. Thoſe exerciſes which are *expreſsly taught* with a view to form the limbs, and give young perſons a proper command over them, muſt, we apprehend, be excepted (we refer to dancing, drilling, fencing, &c.); and it may ſometimes be neceſſary, for a time, to make them compulſory; but by proper care and perſeverance, they will become pleaſant enough. We think highly of all theſe exerciſes. Dancing is often abuſed; often made the ſource of vanity, and ſometimes even of ſenſuality. Exhibition-balls for children and youth we deprecate; and are ſatisfied that the evils attending them are many and great. The private cheerful dance, where conducted

ducted with propriety, and not carried to exceſs, (by over-heating or over-exerting the ſyſtem, or by encroaching upon the part of the night which health requires to be ſpent in bed, an hour or two before midnight,) we think a ſalutary amuſement, good for the body and for the mind. If it have the effect the next day of producing languor and inaptitude for the common employments of life, then it has been carried to exceſs.

It has been propoſed to make *gymnaſtics* a part of the regular buſineſs of education. A tame ſpiritleſs exertion of the body is worth little. Some good may be done by it; but what ſhould be the object of the parent, is voluntary active exerciſe, in which the whole ſoul is for the time engaged. The formal walk, even in the fields or on the ſeaſhore, however much it may pleaſe, by contraſt from ſedentary amuſement, and which it will do only in proportion as that amuſement has been kept within its due limits, cannot have nearly the ſame beneficial influence on the body, or on the mind, as the lively ſportive exerciſe which healthy children will take of themſelves. A troop of boys or girls, turned into a field to find amuſement for themſelves, and left at full liberty, except that of tranſgreſſing the bounds which mental or bodily health preſcribes, will do for themſelves, that which no one elſe can do for them; they will be gaining life and vigour, muſcular activity, and, what often is intimately connected with it, mental activity. Still we are diſpoſed to allow, that regular attention to gymnaſtics ſhould make a part of the ſyſtem of education; but then the regularity of the managment of it ſhould be kept out of ſight as much as poſſible. The parent or the tutor may plan and lead to the execution, but the execution, and, as much as poſſible, the plan, ſhould originate in, or at leaſt excite the ingenuity, the dexterity, the exertions, &c. of the child or youth. If children are not early allowed full employment for their bodies they may require to be taught to play; but the art employed to teach them ſhould not be brought into view. In fact children teach themſelves beſt; and the inſpecting, controling, directing power of the older friend ſhould ſeldom be the direct object of obſervation. He may notice in ſilence, and give hints from what he has ſeen, which will do every thing that is neceſſary. Conſtraint deſtroys the very life and ſoul of play. From what we have ſeen of an octavo volume, entitled "Gymnaſtics for Youth," tranſlated from the German, we think that the parent, (under which general appellation we uſually include the tutor or parental friend,) may derive ſome uſeful hints to aid him in the great and important object of bringing the muſcular ſyſtem into full vigour and activity. We muſt by no means omit the valuable chapters on Toys and Machines, in Edgeworth's Practical Education, which every reader of this article probably has acceſs to. And from extracts which we have ſeen from Parkinſon's Dangerous Sports, we expect that valuable cautions may be derived from it, deſerving the attention of the judicious parent.

We would not have the prohibition of dangerous ſports carried too far. Thoſe whoſe conſequences may be, and eſpecially thoſe whoſe conſequences will probably be, fatal, or the injury irremediable, ſhould be abſolutely prohibited, and the diſpoſition to avoid them produced by conſiderations of prudence and benevolence. Forced exertions beyond the ſtrength, blows on the head, ſtomach, &c. injury in the eyes from any cauſe,—theſe, and all others coming under the above deſcription, ſhould be the ſubject of frequent caution. But in real life occaſions continually occur, in which pain muſt be borne, or in which ſome degree of riſk muſt be run; and that education muſt be radically defective, which does not ſow the ſeeds of fortitude and preſence of mind. Nothing will teach theſe qualities but expoſure to pain and ſome degree of danger. We do not mean a voluntary direct expoſure; but we would check that exceſſive caution on the part of the parent, which ſhuns preſent ſuffering at the expence of future ſtrength of mind. The benumbing influence of fear injures beyond calculation; and though we have no wiſh to ſee foolhardineſs, which is bold becauſe it is unacquainted with the real extent of the dangers it runs into, we do always rejoice to ſee in a lad firm endurance of pain, and active boldneſs, under the guidance of ſome little prudence and ingenuity in extricating himſelf from riſk, without paying more attention to the danger than is neceſſary to eſcape from it. Cowardice is ſo often, we might ſay ſo conſtantly, the ſource of meanneſs, and all its accompanying vices, and (even where the moral education has checked theſe) is ſo often a bar to valuable exertions for the good of others, that every indication of it ſhould lead to proper methods to eradicate it. Some may ſuppoſe that all that is neceſſary is to give ſtrength and health. So far from fortitude being a neceſſary attendant upon theſe, we have ſeen reaſon to conſider it as a more conſtant companion of activity of mind, united with leſs robuſtneſs of body. Activity is the grand point; this will lead a boy into riſks, (we do not mean of fatal accidents, but of ſuch as for the time may be painful,) and the ſame activity will often ſuggeſt expedients to eſcape from them; and the more this is done in early life, the more ſelf-command and preſence of mind will be practicable, when neceſſarily expoſed to great and imminent danger. Preſence of mind, as Miſs Edgeworth has well obſerved, is, in reality, abſence of mind, as far as the danger is concerned: on that it does not dwell, but upon the expedients of eſcaping it. And it muſt require uncommon mental culture in the later period of life to acquire this invaluable quality, where fear has been the habit of the earlier.

The little accidents of childhood and youth ſhould not receive too much ſympathy. All that is neceſſary for their relief ſhould be done, at leaſt in the earlieſt ſtages of education; but the little mind ſhould be excited to bear its pain, by pleaſantry, or even raillery, by appeal to ſhame, by turning the attention from it, in ſhort by any and by various methods, thoſe being ſelected which experience has ſhewn to be moſt effectual for the individual. After the firſt period of childhood, their accidents ſhould receive very little direct attention; the parent will obſerve, but the obſervation need not be made to excite their notice. He ſhould be ready to ſtep in where neceſſary, but in common caſes leave them to act for themſelves. Indeed this is one grand object in education, to enable the individual to act for himſelf, when the great buſineſs of life depends upon his own wiſdom and exertions.

When the dread of pain (even where the mind is unſupported by ſympathy, or not ſtimulated by the dread of ſhame) is in a conſiderable degree ſubdued, or made inactive, (in other words, when fortitude has been acquired,) there is only one thing more requiſite for effectual preſence of mind, and that is a knowledge of the beſt methods of eſcaping danger, a readineſs of invention, and the adoption of means to ends. Theſe are more intimately connected with the culture of the imagination and the underſtanding. To produce them, the young ſhould often be led to conſider what is beſt to be done in accidents of different kinds. "What would you do if your clothes were on fire?" we would aſk a girl old enough to underſtand and to act. "What would you do if your brother fell into the water, or fell down and broke his arm?" are queſtions which would lead to uſeful converſations with a boy. When occurrences of this nature are mentioned, the mind of an intelligent youth may be ſet to conſider what ſhould have been done, and then compare it with what was done. Where this turn is given to the inventive powers, highly uſeful reſults might be expected, not only when in actual danger, but in providing againſt the accidents of human life for others. Newton Boſworth's little book, entitled Accidents of Human Life, will furniſh ſome uſeful hints; and it would be well to keep a common-place book for this expreſs object, which might be ſtored with facts of actual occurrence, and with ſuggeſtions as to probable caſes in future. An acquaintance with the ſtructure and functions of the body, with chemiſtry, and with mechanical philoſophy, cannot fail to be of great uſe for this object, and attention to them with this object in view, will be of ſervice in others. Our readers will find ſome hints which may be of ſervice in INTELLECTUAL *Education*, Div. V; and ſtill more towards the cloſe of Miſs Edgeworth's chapter on Attention. The excellent little dialogue in Evenings at Home, called Preſence of Mind, well deſerves the peruſal of parents as well as children.

To any one who fairly conſiders the way in which the bodily and mental faculties are developed, it will appear abundantly clear, that exerciſe is as much required for the one as for the other; and as the mental progreſs ſo much depends upon the health of the body, even if that be to be regarded as the primary object, this muſt on no account be neglected. "Exerciſe is neceſſary for health, bodily and mental," ſhould be the fundamental maxim of every ſyſtem of education private or public. It is a law of our natures, againſt which no one can offend with impunity; and ſuch arrangements ſhould be adopted in every ſchool, and in every domeſtic plan, that it may be fully and effectually obeyed. Sedentary employments ſhould be frequently relieved by active muſcular exertion. It is a bad thing for the mind to be kept on the ſtretch too long; and, therefore, ſedentary amuſements are often neceſſary; but ſedentary amuſements ſhould only be reſorted to where active ſports cannot be had. Bodily activity is almoſt an eſſential requiſite for mental activity, and indiſputably for the full enjoyment of health. If from any circumſtance the ſchool hours exceed two or at moſt three hours at one time, let a break be made at ſome convenient place for "a good batch of play." Little will be loſt by it for the time; much will be gained for the future. Exerciſe out of doors, where dry good air can be had, is, in every point, greatly to be preferred; but where the rain and chills of our climate will not permit, ſtill let it be had within.

When children have been ſitting ſo long, that they feel indiſpoſed to bodily exertion, there is no doubt they have ſat too long.—"Like every other organ, the palate and the ſtomach, when left inactive and unirritated, loſe their original faculties. Repeated faſting is fatal both to appetite and to digeſtion. Sedentary occupations," we would ſay too long continued, and diſproportioned to the age and degree of muſcular maturity, "gradually deſtroy the deſire, and impair the power, to exert the muſcles, more particularly while they are forming."—"To debar children from giving looſe to theſe inclinations, by indulging which, they knit their ſinews, ſwell their muſcles, and harden the whole againſt the viciſſitudes of air, is a kind of ſeverity neither indifferent to them or to thoſe about them, for the preſent or for the time to come."

It really appears ſomewhat unneceſſary to dwell upon this ſubject as we have done; and yet it is difficult to meet with any plan of education into which it enters as it ought. In making the above quotations from Beddoes (Eſſ. iii.) we obſerve, that in his plan for a girl's ſchool, which we think in many points very judicious, (though clearly formed more with a view to *weakly* children, than could in general be deſirable for girls and ſtill leſs for boys,) he lays down the following precept: "under twelve years of age it ſhould be an invariable rule, that the hours of application ſhould never exceed thoſe of amuſement and exerciſe." The principle is a good one; and it ſhould not much be departed from, till the period when application becomes voluntary and pleaſant; and then ſome portion of the hours for *amuſement*, we do not include thoſe of *active exerciſe*, may be added to thoſe of application. We are inclined to think that, in general, for boys between ten or eleven and fourteen, nine hours ſleep, eight hours work, and ſeven for meals, exerciſe, and amuſement, is a good diviſion. Thoſe, who ſee reaſon to adopt our views in INTELLECTUAL *Education*, eſpecially under the heads of *Attention* and *Memory*, will be of opinion, that Dr. Beddoes' plan is in theſe points radically defective. It affords uſeful hints, but it cannot be followed, we apprehend, and at the ſame time mental *vigour* be obtained.

But while we ſay this, we muſt add, that we deprecate, as he does, exceſſive mental exertion in children. The phyſical ſyſtem muſt be the firſt object. If the order of nature be reverſed, the mind will eventually ſuffer for it, as well as the body. It would often be eaſy for the ſkilful parent to make a child a prodigy; but the judicious parent never will attempt it. Premature and luxuriant growth of mind will ſeldom, if ever, be found to ſpring from a vigorous root. It will be viewed by thoſe, who know the laws of human nature, as a diſeaſe; and ſuch it will generally prove, even in the eſtimation of the mere ſuperficial obſerver. We do not doubt, that many have ſunk into an early grave, through the unnaturally rapid developement of their faculties, and the exceſſive excitement of mental and phyſical ſenſibility, which is uſually the cauſe or effect of it: and ſtill more have had the progreſs of their bodily health and ſtrength impaired; their minds have ſunk into a ſtate of ſtagnant liſtleſſneſs; and the promiſe of early genius has been completely diſappointed, and followed by a train of phyſical and mental and moral evils, which ſhould ſerve as a beacon to the vain or the unwary.

Though this article is expanding beyond our wiſhes, we cannot forbear preſenting our readers with another extract from Search. The Light of Nature may not be acceſſible to many; and this paſſage is truly important, and deſerves to be carefully weighed by every parent.—"Nor is it enough to reſtrain ſleep within due bounds, if the waking hours be ſuffered to dream away in a torpid indolence not much different from ſleep. It is of great ſervice, even to the health, to cultivate a ſpirit of activity, continually exerting itſelf in ſome exerciſe either of body or mind. The former is more neceſſary for the animal machine, and for that reaſon deſerves to be particularly regarded for ſuch as are deſtined to follow ſome ſedentary profeſſion, that they may be inured by early cuſtom never to ſit ſtill with their hands before them in the intervals of buſineſs, but to move briſkly in their common actions, and daily to practiſe ſuch recreations as may keep the circulation to its proper flow, and prevent ill humours from gathering in the blood.

"Yet an activity of mind, too, is not uſeleſs to the body; there being ſuch an intimate connection between the groſſer and finer organiſations, that irregularities in the one, will not fail to produce their like in the other. There are ſome who love to ſit in a corner, building caſtles in the air, muſing upon improbabilities ſoothing to their fancy, and wiſhes of what can never happen, or perhaps upon ſomething that has vexed them, or the imaginary dread of miſchiefs never likely to befall them; though this may ſeem an intenſeneſs of thought when the mind is rather too buſy than too remiſs, it is in reality not an activity, but paſſiveneſs bound down to an object riſing mechanically in the imagination. Tempers of this caſt have a perpetual liſtleſſneſs and dilatorineſs, they apply to nothing readily, they do nothing currently, but want to put off every thing another minute, even their meals, their diverſions, and their beloved nightly repoſe. Such ſtagnation of thought, become habitual, muſt inevitably introduce a like ſtagnation of the vital juices, fret and waſte the ſpirits, generate fearfulneſs and melancholy, and impair the health more than will be eaſily imagined.

“ This miſchief then deſerves an early attention to obviate, the more becauſe difficult to be diſcovered in its beginnings; for we cannot penetrate into the thoughts to ſee what paſſes there: but before grown inveterate, it will ſhew itſelf in the actions, or rather in the inertneſs of diſpoſition; and then no time ſhould be loſt to cure it, nor any means omitted that can be deviſed to teach children to find an iſſue for their thoughts by running them in current trains, and to take pleaſure in making good diſpatch of every thing, as well in their taſks as their amuſements.

“ Nevertheleſs it muſt not be forgotten, that there is a contrary-extreme, which urges to make more haſte than good ſpeed; a continual hurry and agitation, never ſatisfied but when in motion; an impatience to do things before the proper time, and eagerneſs to diſpatch them at once by a violent exertion; an over-ſolicitude for the ſucceſs of meaſures, and a vexation upon any rub happening to fall in their way. This temper likewiſe is unfavourable to the health; for miſchief will enſue upon precipitating the circulation of blood and animal ſpirits, as well as upon retarding it. A calm and ſteady alertneſs, flowing in one uniform tenour, always briſk and lively, never anxious nor trepidating, is the deſirable point to be purſued: therefore, we muſt ſo labour to cure one evil, as not to incur another; and keep an eye upon Scylla, while we endeavour to ſteer clear of Charybdis. I know it is a difficult matter, perhaps impoſſible, to hit exactly the golden mean; but we ſhall come the nearer, by being appriſed of dangers on either hand: though I think the former is the greater, the more frequently fallen into, and harder to be cured. The beſt that can be done muſt be by diligence in watching the approaches of either, and applying the proper remedy as ſoon as they are perceived.”

In what we have ſaid, we wiſh to be underſtood as referring, unleſs otherwiſe expreſſed, to girls as well as to boys. We are fully ſatisfied that there is a conſtitutional difference in the ſexes, which is perceptible even from infancy; and that the parent, who ſhould train up her daughters to all the moſt robuſt exerciſes of boys, would find that ſhe had carried the matter too far. But we are alſo ſatisfied, that this conſtitutional difference is unneceſſarily and moſt injuriouſly carried beyond all the bounds of nature, in the common modes of educating girls. We recommend to mothers, eſpecially, ſome remarks on this ſubject in Reflections on the preſent Condition of the Female Sex, by Priſcilla Wakefield; a writer who has contributed well to ſtore the children's library with works containing really uſeful information. “ How often,” ſhe ſays, (we quote from Parent's Friend,) “ has our anxiety for the delicacy of the complexion, or the apprehenſion of her becoming a romp, reſtrained a girl from the indulgence of enjoying either air or exerciſe, in a ſufficient degree, to ſecure her from that feeble, ſickly, languid ſtate, which frequently renders her not only capricious, but helpleſs through the whole courſe of her life. There is no reaſon for maintaining any ſexual diſtinctions in the bodily exerciſe of children. If it is right to give both ſexes all the corporeal advantages which nature has given to enjoy, let them both partake of the ſame rational means of obtaining a flow of health and animal ſpirits, to enable them to perform the functions of life.”—“ Employment ſhould be contrived, on purpoſe to induce them to paſs a large portion of their time in the air; nor ſhould they ever be permitted to ſit within long at a time. A mere walk ſcarcely ſupplies ſufficient exerciſe to produce a quick circulation; ſomething, therefore, more active ſhould be adopted. Running races, trundling a hoop, ſkipping with a rope, battledore and ſhuttlecock, ball, jumping, dumb bells, ſwinging, and many other amuſements of the like nature, are ſuitable for the purpoſe, and may with equal propriety be practiſed by both ſexes, being by no means incompatible with delicacy of perſon and manners. Let it never be forgotten, that true delicacy conſiſts in a purity of ſentiment, and is as much ſuperior to its ſubſtitute, external manners, as a real gem to one that is artificial.”

VIII. *Exerciſe of the Senſes.*—It is certainly poſſible to have eyes, and yet not ſee; and to have ears, and yet not hear. This, however, is in general more owing to the ſluggiſhneſs or inattention of the mind, than to the imperfection of the external organs of ſenſe. Impreſſions on the organs of ſenſe, which, if the attention of the mind were actively directed to them, would convey clear, vigorous, and well-defined ſenſations, may either excite a mere partial or fleeting notice, or paſs away without any ſenſation whatever. See *Mental* PHILOSOPHY, Div. I.; and in connection with other topics of this diviſion, the reader will probably find ſome advantage in conſulting Div. II. alſo.

In INTELLECTUAL *Education* we have endeavoured to mark the diſtinction, which is too ſeldom obſerved, between *ſenſations* and *perceptions*; and we ſhall not enter upon the ſubject again. The reader will find the firſt four diviſions of that article bear cloſely upon what may well be termed the mental proceſſes of perception, and we beg leave to refer him to them for this purpoſe. Dr. Reid, in his Eſſays on the Intellectual Powers, has a diſtinct chapter on the improvement of the ſenſes (Eſſay II. chap. 21.); but from the views which that philoſopher took of the nature of perception, it might be expected, and it is accordingly the fact, that he ſays but little on the improvement of the *ſenſes* properly ſo called: it is principally on the improvement of the perceptive power. The philoſophical reader may, however, find it worth while to conſult that chapter; and the judicious, but inexperienced mother will alſo derive much uſeful information from the ſecond and third letters in Miſs Hamilton's ſecond volume.

That the perceptive power is ſuſceptible of very great improvement, by proper exerciſe and culture, there can be no doubt; but ſome may doubt whether this is the caſe with reſpect to the bodily organs of ſenſation. When it is conſidered, however, that improvement, as the conſequence of due exerciſe, is the grand law of our phyſical and intellectual powers, it might be inferred that the external organs are, by the ſame means, ſuſceptible of improvement, in furniſhing correct and vivid ſenſations. And when it is conſidered that even well-formed healthy infants indicate little ſenſibility of ſight and hearing for many days; that there are manifeſt and great differences in the animal tribe, in the powers of ſenſation; that even where there is the power of vigorous attention, children greatly differ in the correctneſs and vividneſs of their ſenſations; that thoſe who are accuſtomed to obſerve objects of a certain claſs, not only have much more ready and accurate perceptions, but even can at once diſcern, where ſenſation only is concerned, what very cloſe attention will ſcarcely enable another to ſee; that thoſe who are deprived of one of the three organs of intellectual ſenſation, acquire a peculiar ſuſceptibility, not only of perception, but of ſenſation from the others; and that at the period of natural decay, and even earlier, there is a great diminution of the power of ſenſation; it appears to us ſcarcely to be doubted, that the bodily organs of ſenſation are ſuſceptible of great variation and improvement in the ſame individual.

Even if this ſhould ſtill be regarded as matter of theory, it is obvious that no effort in endeavouring to improve the ſenſes can be loſt: for by the ſame means we ſhall be effectually improving the faculty of perception. And, on the other hand, whatever means are taken to exerciſe the perceptive power, theſe will, upon the above principle, cultivate alſo the organs of ſenſation. The exerciſe of the bodily organs, and accurate attention to the impreſſions upon them, are, in fact, the only direct means by which this laſt object can be effected. The indirect means are of indiſpenſible importance, and will do much towards rendering the direct means of real efficacy: we refer to thoſe means by which the bodily health, vigour, and activity, are to be obtained. The exerciſe of bodily vigour, and eſpecially of bodily activity, not only has the effect of ſtrengthening the nervous ſyſtem generally, and of giving it a *healthy* ſenſibility, but it furniſhes conſtant exerciſe for the organs of ſenſation. The uſeful playthings of childhood and youth, and their employment out of doors, are continually calling theſe organs into activity; and that agility in muſcular movements, with which health and activity are ſo often attended among the young, and which contributes ſo much to give bodily dexterity, is peculiarly ſerviceable in calling into play the power of ſenſation alſo. Dexterity does of courſe imply the quick and vigorous ſenſation, and accurate attention to it, and the ready aſſociation with it of the appropriate muſcular movement; and where it is exerciſed, there the organs of ſenſation muſt alſo be exerciſed. In ſhort, wherever and however the attention is directed to the objects of perception, whether in the way of ſimple obſervation, or of compariſon and diſcrimination, the correſponding organ of ſenſation is undergoing a proper culture.

Hence a great deal may ſafely be left to the mere influence of external objects, provided the attention is pretty ſteadily and frequently led, directly or indirectly, to the perceptions. A child who obſerves much, muſt acquire quickneſs of perception; a child who obſerves accurately, muſt acquire accuracy of perception, and conſequently muſt acquire quickneſs and accuracy of ſenſation. But there are few caſes in a judicious education, in which all will be left to this indirect exerciſe. During the plays and employments of childhood and youth, various means may be deviſed of calling the ſenſes into activity, and directing the attention to them. In the book which we before referred to, "Gymnaſtics for Youth," there are ſome uſeful ſuggeſtions reſpecting the method of artificially exerciſing the ſenſes, which we think may be ſerviceable to ſome of our readers, and which we ſhall give in the form in which we find them in the "Parent's Friend."

"Beſides the natural exerciſe of the ſenſes, I think it might be poſſible, by artificial means, to increaſe the power of each ſenſe, in the ſame manner as hundreds of deaf and blind perſons, who ſupply, to an aſtoniſhing degree, the loſs of one ſenſe by the zealous cultivation of another. Accordingly, in exerciſes of this kind, ſometimes the eyes ſhould be covered, ſometimes the ears prevented as much as poſſible from hearing, ſometimes the reſt of the ſenſes kept as free as may be from impreſſions. When children have acquired conſiderable readineſs by the natural exerciſe of the ſenſes, in their eighth or tenth year perhaps, I conſider it as a very pleaſing and uſeful occupation to exerciſe them artificially in the following manner." Though the author ſpeaks of the age of ſeven or nine as a proper time for the artificial exerciſe of the ſenſes, it is obvious that it may be begun with advantage at a much earlier period. In fact, it can ſcarcely be begun too early. But, throughout, it ſhould be conducted as little as poſſible in the way of a formal buſineſs. The exerciſe of the muſcles, and the exerciſe of the ſenſes, ſhould be made as intereſting as poſſible, and ſeldom employed except in the way of amuſement.

(1) "*Exerciſe of the Touch.*—The much greater promptitude of the ſight and hearing, evidently leads us to neglect the ſenſe of feeling; whence I am induced to think, that this deſerves our greateſt attention. The eyes are to be previouſly covered, and then let the perſon ſo blindfolded diſcover perſons by feeling their faces or hands; diſtinguiſh coins; tell what a perſon writes in the palm of the hand with a pencil or point of a ſkewer; diſtinguiſh the leaves of all kinds of trees and plants with which he is acquainted; eſtimate the degree of heat, air, and water according to the thermometer; diſtinguiſh plates of poliſhed metal, of ſimilar figures, by their ſpecific heat; eſtimate the weight of various ſubſtances in pounds, ounces, and the ſmaller weights; tell all kinds of wood, and the different productions of the loom; eſtimate the number of leaves in a book and tell the pages; among a number of leaves of the ſame kind of paper, ſeparate the blank, written, and printed; write; eſtimate the length of various ſticks in feet and inches, the ſuperficies of a table, the ſolid contents of ſubſtances of regular figures, and the capacities of different veſſels; mould eaſy figures, mathematical for example, in clay or wax, paying attention to the ſize as well as the form; make pens, and cut out various objects; diſtinguiſh all kinds of ſubſtances put into his hand, as chalk, ſealing-wax, &c.: let him endeavour to feel inſcriptions in relievo, as upon large coins.

(2) "*Exerciſe of the Sight.*—Let him eſtimate every relation of magnitude as it exiſts in nature; length, breadth, height, depth, ſuperficies, ſolidity, and diſtance: both in the great, as yards, furlongs, miles; and in ſmaller dimenſions, as feet, inches, lines. The conjecture ſhould always be compared with actual meaſurement. This will at the ſame time afford a pleaſing mode of practically acquiring the art of menſuration. On ſultry days, for which more violent gymnaſtic exerciſes are not ſo well adapted, I have often had recourſe to theſe, and found that young perſons very ſoon acquire a conſiderable readineſs in them. It is above all things neceſſary to imprint as deeply as poſſible on their minds accurate ideas of the different meaſures. When this is done, they will ſoon learn the art of applying them in all directions, and thus meaſure with the eye. Let him draw all kinds of mathematical figures without compaſſes or ruler, divide lines into a given number of parts, cut meaſures of feet, inches, and lines upon ſticks, copy mathematical figures in perſpective from models, draw ſchemes for them, cut them in paper, and put them together. All this muſt afterwards be examined by mathematical inſtruments, and the errors corrected. Let him take for a pattern a picture, on which are many different ſhades of colour; compound every ſhade in it from the ſeven primary colours, and lay them all down upon paper; or let him merely declare of what colours each ſhade is compoſed. Let him eſtimate the weights of

various bodies by looking at them. Let him ſtop his ears with his fingers, and hold a converſation by obſerving the motion of the lips.

(3) "*Exerciſe of the Hearing.*—The youthful company, in which the fewer there are the leſs noiſe is to be apprehended, being all blindfolded, their maſter will do various things, and they muſt tell what he is about ; in other words, he will occaſion ſome noiſe in different ways, and they muſt explain whence the noiſe ariſes. This admits of great variety. All common actions, ſuch as walking, writing, making pens, and the like, are eaſily diſcovered ; accordingly the maſter will proceed to ſuch as are more unuſual, for inſtance ſtepping upon a chair, or ſitting down on the ground. When theſe are diſcovered, with tolerable facility he will go farther. He will bid them gueſs the figure, ſize, and ſubſtance of things by the ear. For example, whence proceeds that ſound? from a glaſs, a baſon, a bell, a piece of iron, ſteel, copper, ſilver, wood, the table, or the bureau? Of what ſize, and of what ſhape it is?

(4) "*Exerciſe of the Smell and Taſte.*—A perſon blindfolded may diſtinguiſh flowers, various articles of food, many metals, leaves of trees, freſh, and in many caſes dry pieces of wood, and ſeveral other ſubſtances, by the ſmell alone, without touching them, and moſt of them by the taſte."

IX. *Senſibility.*—The ſenſe of touch deſerves to be regarded as diſtinct from the general ſenſe of *feeling*, which, with the exception of thoſe of ſight, hearing, ſmelling, and taſte, refers to every ſenſation experienced in any part of the body, either from internal or external impreſſions, and upon which principally the phyſical ſenſibility depends. We do not mean that when the nervous ſenſibility in general is great, there will often be found deficiency in the organs of ſight, hearing, &c. ; but that what is well termed *ſenſibility*, both phyſical and mental, depends principally upon the organs of feeling. Now the great object with reſpect to theſe is, not to rouſe them to irritability, by direct or exceſſive excitement ; or to produce that irritability by methods which cannot be unattended with eſſential injury to the bodily health, ſuch as over-exertion of mind, want of air and exerciſe, exceſſive warmth, &c. ; but, on the contrary, to bring the ſyſtem into, and to preſerve it in, that ſtate in which the ſimple natural pleaſures of feeling (the pleaſures of health, of activity, &c.) are enjoyed, and in which there ſhall be no unnatural tendency to the pains of this ſenſe. How great a ſhare theſe have in producing the mental pains, may be underſtood by the remarks on this ſenſe in *Mental* PHILOSOPHY, Div. II. And on the ſubject of this ſection, we wiſh to refer the reader to *Moral* EDUCATION III. 10. 11. 12.

The general law of the *ſenſible* pleaſures and pains is, that by ſimple repetition they loſe their vividneſs, and their effect upon the mind : and the ſame is the caſe with the mere paſſive *mental* feelings. Yet it is of great importance to be borne in mind, in early education, and in the individual's ſelf-culture, that where any part of the ſyſtem of feeling is unduly called into exerciſe, it increaſes the irritability of the whole ; that the phyſical powerfully acts upon the mental ſenſibility, and this in turn upon the phyſical ſenſibility ; that whatever increaſes the pleaſures of ſenſation beyond their natural ſtate, muſt alſo increaſe the ſuſceptibility of the ſenſible pains ; and that the influence of theſe upon the happineſs, (where they ariſe from, or are accompanied by, an exceſſive irritability of the nervous ſyſtem,) far exceeds that of the ſenſible pleaſures ariſing from ſuch exceſſive excitement of body or of mind.

One grand object of the early period of education ſhould be, to bring the phyſical ſyſtem into its due ſtate of health, vigour, and activity. If this be ſucceſsfully purſued, all is done which is requiſite for the proper regulation of the phyſical ſenſibility. All the means which we have heretofore ſuggeſted, if employed judiciouſly and ſteadily, have the direct tendency to give the nervous ſyſtem its due tone ; to make ſenſations have their proper influence in the intellectual ſyſtem, and to keep them from having too great influence in the ſyſtem of internal feeling. On the one hand, theſe means will tend to correct that extreme nervous irritability which might indeed be employed ſucceſsfully to produce a rapid and premature developement of the faculties and affections, but which cannot be called much into play without ſapping the foundation of the health of body and of mind ; and, on the other, they will ſupply the beſt phyſical prevention of the formation of that morbid ſenſibility which ſo continually fixes the mind upon its own feelings, which implants ſelfiſhneſs in its moſt refined, perhaps, but moſt ruinous forms ; and which ſeeks for gratification, or at leaſt relief, in that unnatural excitement which only feeds the corroding irritability of the ſyſtem, and muſt by degrees deſtroy the capacity of enjoyment, and plunge in perhaps irretrievable calamities. The early and external means for the cure or prevention of exceſſive ſenſibility, muſt however be ſupported by internal aids. A diſpoſition to active exertion,—a love of order and regularity, (which we deem of incalculable importance,)—a taſte for mental employment not exciting to the mind, but engaging its attention, and calling into play and ſtrengthening its various powers, in their due meaſure and degrees,—a diſpoſition which will turn the ſenſibility which exiſts into the channel of benevolence and piety,—fortitude with reſpect to perſonal pains,—patience with reſpect to perſonal privations,—and the habit of ſelf-controul early checking or preventing that wild hankering after mere pleaſure which never yet did any thing but harm, afterwards called into exerciſe, and ſupported by reaſon and religion, to prevent every ſenſual gratification which prudence and duty forbid, —theſe cannot fail of being attended with the moſt beneficial effects on the health and happineſs : they will conduct the youth to the maturity and vigour of his bodily powers, and of intellect and affection : they will enable him and prompt him to act well his part in life with uſefulneſs to others, and with honour and comfort to himſelf : and we need not ſay that they will ſerve as a noble foundation for religious excellence.

The following paſſage contains a picture of "that morbid ſenſibility which renders exiſtence in many inſtances an almoſt uninterrupted ſeries of painful ſenſations," which ſhould make thoſe concerned in education do what they can to prevent ſuch dreadful evils. It is true it is an extreme caſe ; but thoſe who have had occaſion to obſerve the appearances of morbid ſenſibility in leſs extreme and too common ſtates, will perceive, that, in their degree, the features of the picture belong alſo to them. "That the dropping of a hair-pin on the floor ſhould make a perſon ſtart from her ſeat, and fix her in a preternatural poſture, by occaſioning preternatural fixed contractions of the muſcles, or agitate her by contractions and relaxations equally preternatural, till ſhe ſinks into inſenſibility, from which ſhe awakes into vehement delirium, is hardly credible to thoſe who are converſant only with the healthy, and the ſorts of ſickneſs to which the robuſt are ſubject. On comparing an individual liable to theſe ſad varieties of being, to the engineer who ſtands unmoved amid the thunder of a battery ; to the ſeaman who maintains his footing upon the deck, or ropes of his veſſel reeling under the ſhock of the elements ; or to the Indian who exhibits the ſigns, and probably feels the throb, of intenſe delight, while the flames are preying upon his fleſh ; how aſtoniſhing do we find the range in human ſuſceptibility to the effect of the powers by which we are ſurrounded ! how important is it to conſider the cauſes of the difference, if on the one hand we ſhould have as much reaſon to ſuſpect that reſiſtance to pain may be united in the higheſt degree to capability of pleaſure, as we have, on the other, to be perſuaded that thoſe who have become in ſo high a degree ſenſitive, are nearly loſt to all but painful emotions ; and that if their organs are like wax in being impreſſed by external appulſes, they too often reſemble adamant in retaining what impreſſions they may receive." Beddoes, as quoted by Stock, p. 252.

Inſanity, melancholy, epilepſy, palſy, and a whole train of evils, are the attendants upon an undue, exceſſive, and long continued excitement of the nervous ſenſibility ; and it ſhould be one leading object of education, among females in particular, ſo to direct their employments, their amuſements, their diet and temperature, their waking and their ſleeping hours, that their conſtitution may be hardened, their bodies and minds invigorated, and the beſt chance given them for meeting the unavoidable evils of life, ſo that theſe may promote their moral improvement, without inflicting upon them unneceſſary ſufferings, or deſtroying their powers of uſefulneſs. With this view, it may be laid down as a maxim in education, that whatever ſtrongly excites the ſenſibility, without connecting it with active exertion, whatever, in ſhort, increaſes the diſpoſition to paſſive pleaſure, is, and muſt be, injurious,—injurious to the health of the mind, and alike injurious to the health of the body. To make ſuch ſickly ſenſibility the ſubject of approbation is folly in the extreme.

How the ſenſibility, in its natural ſtate, ſhould be turned into the channel of benevolence, we have endeavoured to ſhew in MORAL *Education ;* and the reader will find ſome judicious obſervations on the ſame topic in Miſs More's Strictures. With reſpect to girls, what in general is moſt wanting is, to check their ſenſibility, or at leaſt to give it its proper direction. With reſpect to boys, it may ſometimes be neceſſary to excite their *mental* ſenſibility ; but in general, where proper pains have been taken early in life, the benevolent affections will have ſufficient vividneſs and vigour : and at any rate they ſhould never be enlivened by ſtimulating the ſenſibility of the nervous ſyſtem. A boy ſhould, if poſſible, be kept from the feeling that he has nerves ; if we find his affections and intellect ſtrong and vigorous, that is all we can wiſh for.

X. *Purity.*—The work of education has, indeed, an extenſive ſcope ; and no department of it can be neglected without injury to the reſt. Phyſical education is of the firſt importance in the earlieſt periods ; but if it be even then made an excluſive object, the conſequences muſt be highly injurious. An unreſtrained mind in a vigorous body, as we have already obſerved, will be the moſt likely to ſink into the loweſt moral depravity, and eventually to deſtroy, by this means, the object to which ſo much care and exertion had been devoted. Without attaching any importance to the number *ſeven,* as pretending to ſet limits, which, in a great variety of inſtances, muſt be merely arbitrary, the interval between birth and manhood may be conveniently divided into three periods, of ſeven years in each. During the firſt (unleſs the imagination of a child has been allowed to gain an exceſſive preponderance, and the elements of deſire have riſen to an enormous height) there muſt be uncommon impurity in the language or actions of thoſe around them, if the conceptions or deſires have, in any degree, a ſexual complexion. But during the ſecond, (more eſpecially if children aſſociate much with others *older* than themſelves, who are not under the reſtraints either of delicacy or decency,) it is an unhappy fact, that long before there can, in the order of nature, be any proper ſexual deſires, there is not unfrequently a degree of indecency in language and manners, againſt which the parent, who is anxious for the moral welfare of his children, ſhould moſt ſedulouſly guard. We have known this to be the caſe, even where boys have been brought up at home, having been allowed, however, to mix with thoſe who themſelves had little moral controul ; and we ſee reaſon to think it particularly the caſe at thoſe ſchools where boys of the ſecond period are allowed a free intercourſe with thoſe of the third. Hence we admire the plan which appears to be gaining ground, of ſchools for boys from ſix to twelve. If they are thoroughly well regulated, under the ſuperintendance of able perſons, and they give eſpecial care to the prevention of impurity in language, &c., the moſt beneficial ends may be anſwered. Perhaps even a progreſs in the languages might, upon an average, be made in ſuch ſeminaries as ſatisfactory as at ſchools upon the uſual plan ; the rudiments of other valuable branches of knowledge would be gained more effectually ; and, above all, the moral culture of the mind might be carried on with much greater ſucceſs. As far as our experience goes, it is more difficult to reſtrain the impure language of young boys, whoſe minds have received an early taint, than of older ones, unleſs, indeed, the diſeaſe has taken a deep and alarming root. In the former caſe it is extremely difficult to inſtil that ſenſe of impropriety, which, where there is any moral feeling, may be produced in this connection, ſoon after the age of puberty. Some may think that great care on this ſubject is a refinement of ſqueamiſh delicacy, and not a neceſſary precaution of moral purity ; we are however ſatisfied that ſuch will not be the opinion of thoſe who have ſtudied the laws of the human mind, or who have obſerved the power of words over the conceptions of the imagination and the excitement and the direction of the deſires. That power is beyond all calculation, and often beyond all controul. The caſual imagery of the fancy will paſs away, and unleſs the mind intentionally dwells upon it, cheriſhes it, and endeavours to recall it, it may even leave no veſtige to bring it back again into view ; the mere corporal feeling, unleſs unhappily inflamed by external ſources of impurity, may eaſily be brought into ſubjection. But when words have been much or long aſſociated with ſuch trains of conceptions or feelings, they will, in various ways, contribute to excite and to ſtrengthen them, and the conſequence will often be that purity will be loſt, and that the moral, mental, and phyſical ſyſtem, will ſuſtain ſhocks from which they cannot recover.

It is one moſt injurious effect of that exceſſive reſerve which parents often think neceſſary on theſe ſubjects, that their children are left without any definite knowledge of the miſchief which the language of indecency will inevitably produce. Let the parent acquire his child's full confidence, and let him, with no other end in view, than his moral welfare, early give him judicious warning, and repeat this as often as he may think neceſſary to revive the impreſſion, and the beſt effect will follow.

We preſume not to offer much advice on this ſubject to *mothers.* A mother poſſeſſed of genuine delicacy of mind will not need it ; and to others we could be of no ſervice. A daughter grows up ſo much more under her mother's eye,

eye, than a ſon can do, and there is, we doubt not, among all but the moſt abandoned of the female ſex, ſo much more of that "decent *perſonal reſerve* which is the foundation of true delicacy of character," that we hope it can require but common judgment and common care to preſerve her purity of mind. A mother who knows, however, the moral dangers of the female ſex, even where the general laws of chaſtity are not violated, will be on her guard in obſerving every poſſibility of expoſure to them; ſhe will guard the plant of modeſty with aſſiduous care, and will be watchful to preſerve it from the noxious influence of the indelicacy of rude ignorance or of impurity. We have reaſon to think that mothers ſometimes allow their daughters a more unreſtrained intercourſe with ſervants, or with companions of ſuſpicious delicacy, than prudence can authorize. They never ſhould be expoſed to circumſtances which may lead them to offend againſt "decent perſonal reſerve." How much the preſent too common modes of dreſs will leſſen that feeling, every conſiderate mother muſt perceive. What thoſe moral dangers are to which we referred, beyond thoſe of impure language, and how fatally they have been experienced, we think a father anxious for the welfare of his daughter, will take proper means of acquainting her to whoſe foſtering care they are to owe their ſafety. Beyond what we have ſuggeſted, we can merely add, that the books which lie in the way of girls of the ſecond period, not only ſhould not be of that kind which muſt cheriſh a ſickly ſenſibility, but ſhould be free from every thing at which genuine modeſty would bluſh. And if a viſitor ſhould, in their preſence, bring forward ſuch ideas, however clothed in the language of elegance, or refined double entendre, he ought to be excluded from their ſociety. That a father ſhould ever do ſo ſeems impoſſible: we wiſh it were.

But the delicacy we wiſh to ſee, "is ſomething nobler than innocence." It is not the delicacy of ignorance, but the purity of imagination and deſire. And we are ſatisfied that this is, in ſome inſtances, beſt preſerved by a knowledge of the ſimple truth. "The ridiculous falſities which are told to children from miſtaken notions of modeſty, tend very much to inflame their imaginations, and ſet their little minds to work reſpecting ſubjects which Nature never intended they ſhould think of, till the body arrived at ſome degree of maturity. Children very early ſee cats with kittens, birds with their young, &c. Why then are they not to be told, that their mothers carry and nouriſh them in the ſame way? As there would then be no appearance of myſtery, they would never think of the ſubject more. Truth may always be told to children, if it be told gravely; but it is the immodeſty of affected modeſty that does all the miſchief; and this ſmoke heats the imagination by vainly endeavouring to obſcure certain objects." Parent's Friend, vol. i.

Thus far we preſume to ſuppoſe we have not offended againſt our own principle. We have hitherto written for parents indiſcriminately; but what follows is deſigned for the eye of the father; and we muſt here be allowed a little more minuteneſs.

We do not doubt that the due regulation of the ſexual deſires is, on the whole, the greateſt difficulty in education. The danger of doing too much is, in ſome caſes, almoſt as great as the danger of doing too little. But the circumſtances of the times, including ſocial intercourſe, newſpaper communications, &c. are ſuch, that nothing, we think, but the blindneſs of ignorance, or the careleſſneſs of vice, or the exceſſive caution of unenlightened or indolent timidity, can heſitate in endeavouring to communicate ſuch impreſſions reſpecting the nature and conſequences of an illicit or unnatural indulgence of thoſe deſires, as may operate altogether to prevent, or moſt materially to check them.

How early ſuch communications ſhould be made, is a matter of extreme difficulty. We recollect hearing a father ſay, that he had ſucceeded in producing in the mind of his ſon, before the age of puberty, ſuch a deteſtation of the vice we have more particularly in view, that he felt a full confidence as to his moral reſtraint. In that proceſs we have as yet had no experience; but we are inclined to ſuppoſe, that more will be effectually done by giving only general, though perfectly diſtinct, cautions, reſpecting language and actions connected with this ſubject, and by leaving the more impreſſive repreſentations till the period when the deſires will ſtand moſt in need of reſtraint.

Before the age of twelve, a father will often be able to perceive, in a well-educated boy, the indications of decided moral principle; by which we underſtand the real and actuating deſire to do right, and to avoid every thing wrong. When beſides this he has reaſon to have confidence in his ſon's purity of mind, (we ſtill mean of imagination and deſire,) and alſo in his prudence, we think a ſimple judicious communication reſpecting the delicate ſtructure, and the object of the male organs, would be attended with important advantages. This would lead to a few plain, but impreſſive ſtatements, reſpecting the highly injurious and often fatal conſequences of the abuſe of them; and the neceſſity of ſtrictly avoiding every thing, in word or action, which might lead to ſuch abuſe. With theſe repreſentations, the father who has ſucceſsfully cultivated the principles of religion in his ſon's mind, would add ſuch as would connect with every kind and degree of impurity, the idea of its offending his omniſcient heavenly parent. If it have previouſly been his object to communicate intereſting information reſpecting the ſtructure and functions of the human frame, ſuch a communication as we have mentioned will have no appearance of formality; and it may be introduced by a natural digreſſion from ſome other connected topic. Some ſuggeſtions as to the mode of accompliſhing it may be obtained from Dr. Beddoes's fourth Eſſay; but we would make it a much more ſimple buſineſs. It will require no more knowledge of anatomy, than what any judicious well-informed father may eaſily gain from different articles of this work, or the common works on the ſubject; though if he had an injection of the veſſels preparing and conveying the ſeminal fluid, this aided by plates ſhewing the *internal* ſtructure of the urinary and ſeminal organs, could not fail to produce a ſalutary fear of injuring that which ſimple inſpection would prove to be ſo complex and ſo delicate.

We need not ſay, that whatever determination he adopt on this difficult point, he muſt do his beſt to keep off from his ſon thoſe impreſſions, (from books, pictures, converſation, &c.) which may tend to give a premature excitement to his deſires, or to feed them when they ſpring up in the courſe of nature; and as he cannot altogether ſucceed in this, he will endeavour to render them powerleſs, by ſuch repreſentations as may make them rather ſhunned than foſtered. A parent with any juſt ſenſe of duty, cannot fail to avoid himſelf communicating ſuch impreſſions, or permitting them to be made under his own eye; "Nil dictu fœdum viſuque hæc limina tangat Intra quæ puer eſt," ſhould be inſcribed in his memory, and made his invariable principle. It is indeed a noble one; and alike important.

With the ſame object in view, he will ſedulouſly (yet without any formal precepts,) endeavour to prevent all breaches of that decent perſonal reſerve of which we have ſpoken; for inſtance, at the times of bathing, waſhing, attending to the calls of nature, &c. We do not want to ſee affected ſqueamiſhneſs, often hiding real indecency; but genuine delicacy and purity. And he will alſo obſerve, (with this ſpecific object in view, *viz.* to keep the ſexual deſires as near as poſſible within the limits of nature reſpecting time and ſtrength,) thoſe rules which common prudence and experience ſuggeſt, reſpecting ſimple diet, active exerciſe, early riſing, &c.

But we will ſuppoſe a caſe in no degree uncommon; that no communication has been made to a youth reſpecting the evil we have already alluded to, and that his father, or a parental friend, ſee reaſon to believe, that all his *indirect* caution has been ineffectual, and that the deleterious practice has been begun which will gradually impair his bodily and mental powers; and, if not prevented in time, will plunge him into irretrievable evils. Can there be any heſitation what courſe to purſue? Can there, then, be a doubt as to the neceſſity of opening his eyes to his ſituation? It muſt be done with prudence; but we know it may be done with ſucceſs; and we know, too, that the reſult may be earneſt affectionate gratitude for the communication, and heartfelt ſatisfaction at having been the means of preſerving a fellow creature from the moſt ſerious calamities.

Whether the communication ſhould be in converſation or by letter, muſt be decided by the circumſtances of the caſe; we have known each tried. On the whole we ſhould prefer opening the ſubject by converſation. It will then be more eaſy to perceive whether the caution had been neceſſary, and to what degree. After ſome interval, a paper might be put into the hands of the youth, containing a brief, but diſtinct, and impreſſive ſtatement of the dreadful conſequences of the practice; and ſome ſimple cautions to aid in checking the tendencies of the mind to it. If this produced its proper effect, it would ſcarcely be neceſſary, for a conſiderable interval, to revert to the ſubject; but then it might, at leaſt, be expedient. It is, however, by no means deſirable to bring it frequently forwards; for though it may be treated as a moral diſeaſe, yet there muſt be a feeling of delicacy (or perhaps we ſhould ſay of ſhame) attending it, which could not be worn off without ſerious injury; add to which, the efficacy of the repreſentations made would leſſen by too much repetition. Thoſe external indications which furniſhed the firſt ground for apprehenſion, muſt, however, be the guide in determining the ſubſequent ſteps. The difficulty is in the commencement. And we ſhould add, that in the firſt converſation every means ſhould be employed, to prevent all converſation on the ſubject with others; it ſhould be abſolutely confined to the individual and his friend.

The parent or tutor may take every preventive caution, (excluſive of direct communication,) may do every thing that enlightened prudence would ſuggeſt to preſerve ſtrict perſonal reſerve, and keep off the contagion of evil example; and all this completely, and in itſelf conſidered ſucceſsfully; and yet without preventing the evil. Many inſtances have been known of its commencement without any communication with others, and by circumſtances in ſome ſenſe accidental. We are fully ſatisfied, taking every thing into account, that it would be beſt to *forewarn* every boy who poſſeſſed a tolerable ſhare of good ſenſe and moral ſuſceptibility. Numerous inſtances have occurred, in which this practice has been begun and perſevered in, till the miſchief was almoſt, if not altogether, irretrievable, without the individual's having been fully ſenſible of the criminality, and but little of the moſt injurious conſequences, of "this ſpecies of ſlow ſuicide."

For the mode of commencing the ſubject after there were decided grounds of apprehenſion, we can give no ſpecific directions. We can only ſay, that it muſt be done at a ſuitable time; when the mind ſeems open; when nothing has occurred to excite ſuſpicion as to the motives; and with that cautious reſerve which may give an inſight into the real ſtate of the caſe. Then is a time to give a faithful repreſentation of conſequences, &c. A paper for the purpoſe already ſuggeſted, might be of ſome ſuch nature as the following, which may aſſiſt in the firſt ſtages alſo.

We would begin by mentioning, (without of courſe the ſlighteſt perſonal alluſion,) ſuch caſes as had occurred to our own knowledge, where loſs of ſight, total loſs of mental and bodily health, and premature death, had followed the continuance of it; and where extremely debilitating involuntary emiſſions had ſucceeded the habitual practice of it, even where it had been abandoned. We would then ſelect ſuch compreſſed ſtatements from books of authority, (and we have ſeen Tiſſot often referred to, and in Dr. Beddoes's fourth Eſſay will be found a ſtriking caſe, which will urge every conſiderate parent to early communication,) reſpecting the common effects of this waſte of a fluid deſigned to anſwer ſuch important ends in the animal economy, and the early and exceſſive loſs of which muſt weaken the whole nervous and digeſtive ſyſtem, impair the faculties of the mind, and ſurrender the wretched victim of ſenſuality to the miſeries, infirmities, and decrepitude, of extreme yet infirm old age. We would inform him that it would ſubject him to convulſions, epileptic fits, palſy, inſanity, impotency, tabes dorſalis, corporal emaciation and decay, and partial or even total blindneſs or deafneſs; and that where the progreſs to theſe calamities had been checked in time, the mental and bodily faculties are uſually ſo injured by any long continuance of it, as to become incapable of any valuable exertion. We would farther tell him, that the bare ſtatement of the natural and neceſſary effect of this deſtructive practice, was ſufficient to ſhew the will of God reſpecting it, even if it do not appear to be expreſsly forbidden in the ſcriptures. That it is included in ſtrong expreſſions of a more general nature, (ſuch as Rom. xiii. 12—14. 1 Cor. iii. 16, 17. 2 Cor. vii. 1. Gal. v. 19—21. 1 Pet. ii. 11., and eſpecially 1 Cor. vi. 9—10.) there can be no doubt; and at any rate that God has forbidden it by the uſual courſe of providence. That its moral effects in deſtroying the purity of the mind, in ſwallowing up its beſt affections, and perverting its ſenſibilities into this depraved channel, are among its moſt injurious conſequences; and that they are what render it ſo peculiarly difficult to eradicate the evil. That in proportion as the habit ſtrengthens, the difficulty of breaking it of courſe increaſes; and that while the tendency of the feelings to this point increaſes, the vigour of the mind to effect the conqueſt of the habit gradually leſſens. We would tell him, what we remember a medical profeſſor ſaid, that whatever might be ſaid in newſpapers reſpecting the power of medicine in ſuch caſes, nothing could be done without abſolute ſelf-controul, and that no medicines whatever could retrieve the miſchiefs which the want of it had cauſed. And that the longer the practice was continued, the greater would be the bodily and mental evils it would inevitably occaſion. We would then adviſe him to avoid all ſituations in which he found his propenſities excited, and eſpecially, as far as poſſible, all in which they had been gratified; to check the thoughts and images which excited them; to ſhun thoſe aſſociates, or at leaſt that converſation, and thoſe books, which have the ſame effect; to avoid all ſtimulating food and liquor; to ſleep cool on a hard bed; to riſe early, and at once; and to go to bed when likely to fall aſleep at once; to let his mind be conſtantly occupied, though not exerted to exceſs; and to let his bodily powers be actively employed, every day, to a degree which will make a hard bed the place of ſound repoſe. Above all, we would urge him to impreſs his mind, (at times when the mere thought of it would not do him harm,) with a feeling of horror at the practice; to dwell upon its ſinfulneſs and moſt injurious effects; and to cultivate, by every poſſible means, an habitual ſenſe of the conſtant preſence of a holy and heart-ſearching God, and a lively conviction of the awful effects of his diſpleaſure.

When entering into the world, where temptations of a different nature will neceſſarily occur, we would, before his leaving the roof of the parent, then enter into other branches of moral reſtraint. On this point, however, we have had an opportunity of ſaying enough already; ſee *Moral* PHILOSOPHY, II. 1. 2. 3. to which we refer the reader.

At the cloſe of MORAL *Education*, after a reference to the ſuggeſtions we have now brought forwards, we expreſſed our intention to introduce in this article "a comparative view of the advantages and diſadvantages of public and private education." Since this ſeries was commenced, we have, at different times, paid ſome attention to the ſubject; but ſtill without the ability to draw up ſuch a view as would prove ſatisfactory to the reader or to ourſelves. We ſhall once more defer it, and hope to offer it under the head of SCHOOLS.

Since the former part of this article was ſent to the preſs, we have had an opportunity of hearing Syer's Treatiſe on the Management of Infants ſtrongly recommended by a profeſſional man, as a truly excellent work; and we think it our duty to mention it for the benefit of our readers. On the ſubject of this laſt diviſion, ſome ſtriking obſervations will be found in a ſingular work, entitled "The firſt Lines of a Syſtem of Education, according to Philoſophical Principles."

PHYSICIAN, a perſon who profeſſes the art of preventing and curing diſeaſes. At preſent the appellation is uſually limited to perſons who poſſeſs the degree of doctor, or bachelor of medicine, and who do not practiſe chirurgical operations; ſince cuſtom has introduced this diviſion into medical practice.

The profeſſion of curing diſeaſes, however, is very far from being confined to theſe two claſſes, phyſicians and ſurgeons: for, in modern times, both theſe claſſes are greatly outnumbered by the apothecaries, or diſpenſers of medicines, who have, in the courſe of years, gradually become medical adviſers, and have undertaken both the counſel and management of the ſick, and the manipulation of remedies. Or perhaps the diviſion may have originated by an oppoſite progreſſion, in proportion as men of liberal education and enlarged views took up the inveſtigation of the human conſtitution, and by carrying the principles of ſcience to the mere art, at once augmented the utility of the profeſſion, and gave dignity to the purſuit. The acquirements which are neceſſary to form the accompliſhed phyſician, are, indeed, not compriſed within a ſmall compaſs, and are therefore only to be attained by a careful cultivation of the underſtanding for a ſeries of years; for without the preparatory and collateral information, the mere medicinal knowledge will, in general, lead but to a blind routine in the ſteps of the maſter, and to a limited and often erroneous application of a few unvarying precepts. A curſory view of the qualifications of the medical character may perhaps, therefore, not be out of place here; the hiſtory of the progreſs of medical opinions and improvements having been already detailed. See MEDICINE, *Hiſtory of.*

All the works of nature are ſo intimately connected, that no one part of them can be well underſtood, by conſidering and ſtudying it ſeparately. In order, therefore, to be qualified for the practice of phyſic, a variety of branches of knowledge, ſeemingly little connected, are nevertheleſs neceſſary. The early ſtudies of an individual deſtined to the profeſſion, ſhould be of that liberal nature which tend to enlarge the views, and to cultivate the reaſoning faculty, and a talent for obſervation; for that quickneſs of perception and readineſs of reſource ſo neceſſary in the emergencies which often preſent themſelves in practice, can only be perfected by a clear and methodical arrangement of ideas and an extenſive knowledge.

Independently of the improvement of the faculties and the refinement of taſte, which are derived from the ſtudy of the ancient languages, the ſources of a phyſician's information muſt be very limited, if he is not maſter at leaſt of the Latin tongue, which has been the univerſal language of the learned in Europe for ſo many ages, and ſerves as the medium of communication between all nations on the ſubjects of ſcience. The labours of the ableſt medical philoſophers of Italy, Germany, and France, can only be participated through the medium of that language. The ſame actual neceſſity may not exiſt for a knowledge of the Greek language: but an acquaintance with that copious, expreſſive, and harmonious tongue, in which ſome of the oldeſt, and ſome of our beſt authors have written, particularly Hippocrates, the father and founder of medicine, could ſcarcely be diſpenſed with, even if almoſt all the medical terms of art were not derived from it. Ignorance of this language muſt therefore impede the progreſs of the medical inquirer; nor can it be deemed becoming a phyſician to be in the daily uſe of terms, to the original of which he is a ſtranger. The progreſs of medicine and the collateral ſciences in France, which during the laſt half century has been recorded in the vernacular language, renders a knowledge of that tongue now indiſpenſible; and an acquaintance with the German is daily becoming the key to much valuable knowledge.

Thus prepared with the means and inſtruments for acquiring information, the phyſician muſt deem a knowledge of the following ſciences eſſential to his profeſſion. The neceſſity of a previous knowledge of *anatomy*, or of the ſtructure of the human frame, to the practitioner of medicine is obvious. That very minute acquaintance, however, with the ramifications of every arterial branch, and with the courſe and inſertion of every muſcle, ſo neceſſary to the ſurgeon, who is employed to divide and remove different parts by the knife, is ſcarcely requiſite to be retained in the recollection of the phyſician. To him a correct knowledge of the ſituation, appearance, ſtructure, and connection of the more important organs is, however, not to be diſpenſed with. The beſt anatomiſts, like the beſt mechaniſts of watches and other machines, will be beſt able to replace or remove what is morbid or deranged, *i. e.* will be neceſſarily the beſt *operating ſurgeons;* but it is obvious that the perſon beſt acquainted with the ſtructure of parts, not to be approached by mechanical means, is not neceſſarily the greateſt adept in aſcertaining their diſeaſes, which are learnt from a knowledge of *ſymptoms* only, nor of curing them by the indirect operation of medicines.

For the purpoſe of aſcertaining the ſeat and nature of the diſeaſes of parts not under the view of the eye, nor within the reach of the hand, the two branches *phyſiology* and *pathology* are requiſite: and theſe, eſpecially the firſt, comprehend various other branches of knowledge which might appear unconnected with them.

Phyſiology compriſes the doctrine of all the functions of the animal body in its healthy ſtate; as well as of the nature and compoſition of the fluids, their production, uſes, and diſcharges. For the proper comprehenſion of theſe matters, the whole range of *natural philoſophy* is indiſpenſibly neceſſary. "When you inquire into this ſubject," ſays Dr. Gregory, "you find the human body a machine, conſtructed upon the moſt exact mechanical principles; in order, then, to underſtand its movements, you muſt be well acquainted with the principles of *mechanics*. Conſidering the human body in another view, you find fluids of different kinds circulating through tubes of various diameters; the laws of their motions, therefore, cannot be underſtood without a knowledge of *hydraulics*. The eye appears to be an admirable optical machine; and of courſe the phenomena of viſion cannot be explained without a knowledge of the principles of *optics*. As the human body is ſurrounded with an elaſtic fluid, the air, ſubject to various changes in reſpect of gravity, heat, moiſture, and other qualities which have great influence on the conſtitution, it is proper to be acquainted with the nature and properties of this fluid, the knowledge of which conſtitues the ſcience of *pneumatics*. It were eaſy to bring many more examples to ſhew how neceſſary a knowledge of the various branches of natural philoſophy is to the right underſtanding of the animal economy." See Dr. John Gregory's Lectures on the Duties and Qualification of a Phyſician, p. 73.

But there are many other phenomena of the animal economy, which are not explicable on the principles of mechanical philoſophy. Various changes are induced upon the fluids, which chemical ſcience can alone explain. The production of different fluids from one ſource, their qualities and nature, are not indeed as yet fully aſcertained; but chemical analyſis affords the only ſource of inveſtigation. It is, therefore, neceſſary to be acquainted with the chemical hiſtory of our fluids; and ſtill more requiſite to know the chemical qualities of numerous ſubſtances which are taken into the human body as food, drink, medicine, and poiſon. The neceſſity of a knowledge of *chemiſtry*, therefore, previous to the ſtudy of the practice of phyſic, is obvious.

Yet the moſt accurate knowledge of anatomy, of mechanical philoſophy and chemiſtry combined, will be inſufficient to explain all the phenomena of the animal economy. The animal machine differs in many important circumſtances from an inanimate one. An internal principle directs and influences moſt of the operations of the body, by a ſet of laws totally diſtinct from, and independent of, any principles of mechanics or chemiſtry hitherto known. It poſſeſſes the power of motion within itſelf, and even of modifying and reſiſting the operation of ordinary chemical agents: it has likewiſe the power of removing its own diſorders, and of rectifying many deviations from its natural ſtate; as in the caſe of fractured bones, of the incarnation of wounds, of the enlargement of one organ when another is deſtroyed, &c. It muſt be obvious, therefore, notwithſtanding the many attempts that have been made to explain the phenomena of the animal body upon mechanical and chemical principles alone, that ſuch a doctrine muſt be altogether imperfect.

A new and intereſting inveſtigation, therefore, preſents itſelf to the phyſiologiſt, and one of the moſt intricate and difficult purſuit; namely, an inquiry into the laws of the *nervous ſyſtem*, or of that faculty of living beings which has been called the *vital principle*, *ſenſorial power*, *nervous energy*, *&c.* (See EXCITABILITY, and LIFE.) On this power depend all the faculties of ſenſation and motion; the phenomena of the circulation of the blood from the moving powers of the heart and arteries; thoſe of reſpiration, and the changes which that function produces on the blood, on the brain and organs of ſenſe, and on the temperature of the body; and, conſequently, the phenomena of digeſtion, abſorption, nutrition, ſecretion, (as of bile, ſaliva, tears, urine, &c.), and excretion (as of the inteſtinal fæces, of perſpiration, mucus, &c.), which are the reſult of the circulation of the blood. In order to illuſtrate the nature of theſe functions of the human body, a knowledge of the *comparative anatomy* of other animals is requiſite. Many important diſcoveries in the animal economy have originated in experiments firſt made upon brutes, which could not have been made upon the human ſubject; for example, the experiments relating to the circulation of the blood, reſpiration, muſcular motion, the ſenſibility and irritability of different parts of the body, and the effects of various medicines.

It belongs, moreover, to phyſiology to trace the diverſity of the human conſtitution in different individuals, circumſtances, and climates, ariſing from age, ſex, manner of living, and original temperaments or habits of body; inaſmuch as diſeaſes are much influenced, as well as the operation of remedies, by theſe varieties. For the ſame reaſon, it is alſo requiſite to inquire into the laws relating to the mutual influence of the mind and body upon each other. This leads to an extenſive and intereſting ſubject, the hiſtory of the faculties of the human mind; which, if we are not on our guard, is apt to carry us inſenſibly into a labyrinth of metaphyſics. How important, however, the ſtudy of theſe laws is to the phyſician, may be demonſtrated in conſidering the power of habit, the effects of enthuſiaſm, the force of the imagination, and the influence of the principle of imitation, on the functions and diſeaſes of the body. See HABIT; IMAGINATION, *Influence of, on the Corporeal Frame*; and IMITATION, *Principle of*, in *Medicine*.

All theſe branches of knowledge, however, may be conſidered as preliminary to the great object of the phyſician, which is the diſcrimination and cure of diſeaſes. When he is well acquainted with the nature and functions of the living body in its healthy ſtate, he will be prepared to inveſtigate them in a ſtate of diſeaſe. *Pathology*, which delivers the general doctrine of the cauſes, ſymptoms, and effects of diſeaſes, is obviouſly built upon *phyſiology*. The mode in which the ſeat and nature of diſeaſes are to be aſcertained from their ſymptoms and progreſs, and the indications to be deduced from them, have been detailed at length under the proper head. (See DISEASE.) The general doctrines to be obſerved in the cure of diſeaſes, and the general nature of the remedies to be employed, conſtitute the *therapeia*, or *therapeutics*; which compriſes a knowledge of the *Materia Medica*, or of the ſubſtances, natural and factitious, that are adminiſtered to the ſick, and of their qualities and effects. In this branch of medicine, the neceſſity of a knowledge of *chemiſtry* is again apparent, ſince many of the moſt active and valuable agents are the products of this art; and the ſcience of *botany*, ſo far as it facilitates the knowledge of the plants which are uſed in diet or medicine, is likewiſe ſubſervient to therapeutics.

Thus copiouſly ſtored with all the information above alluded to, the phyſician is prepared to acquire experience, by obſerving the various ſymptoms of diſeaſes, and the operations of medicines, during his attendance on the ſick: and let it be remembered, that it is only upon ſuch a foundation that real *experience* can be built. Experience does not conſiſt in *ſeeing* a great number of diſeaſes: for if it were ſo, the beſt phyſician in the world would be an old nurſe in a large hoſpital, who ſees the daily and hourly progreſs of every ſpecies of malady. Yet how contracted the views, how limited the reſources of ſuch a perſon! how mechanical and unvarying are the few rules of practice which are thus acquired! Yet ſuch is, in fact, the ſum of the *experience* which a whole life of practice affords to thoſe who preſume to enter the profeſſion of medicine, without that preliminary education, which alone fits the mind for *obſervation*, the only foundation of true experience. A perſon may be taught many of the practical arts of life, to a certain extent, without any knowledge of their principles. He may learn to navigate a ſhip, in a certain courſe, with little knowledge of the principles of navigation; or he may make a dial without any acquaintance with aſtronomy, or ſpherical trigonometry: ſo he may be taught, behind the counter of an apothecary's ſhop, half a dozen apozems for the cure of a cough or a diarrhœa. But order ſuch a navigator to ſteer a new courſe, or ſuch a dialliſt to take a new aſpect; and from a total deficiency in the *firſt principles* of their reſpective arts, they are altogether unable to ſucceed. Still more difficult is it to be ſucceſsful in the cure of diſeaſes, without a knowledge of firſt principles; becauſe the circumſtances of diſeaſes are perpetually varying; and the ſame ſymptom, a cough or diarrhœa for inſtance, are indicative of very different ſtates of diſeaſe, and will be materially injured in one inſtance by the very remedy which proved curative in another. (See COUGH.) Throughout the practice of medicine, indeed, a reſort to general principles is perpetually neceſſary, ſince no two caſes of diſeaſe are exactly ſimilar. Many diſeaſes, it is true, are obvious in their cauſes, appearances, and treatment, and, if not actually miſmanaged, have a natural tendency to terminate in health; but on the other hand, many ſerious maladies aſſume at firſt a common form, and it requires no little ſagacity to trace them in the bud, and no little knowledge to obviate their fatal conſequences.

It is not, however, enough to poſſeſs knowledge; but the mind ſhould be able at once to bring in review the knowledge which it retains, and ſhould be ready and active in its application. It is often neceſſary to adopt at once a plan, and to purſue it with active deciſion: it is neceſſary to weigh contending difficulties, and at once to ſeize the path where the feweſt or leaſt important appear, or where the inconveniencies are counterbalanced by the advantages. It is not always eaſy for the obſervers to eſtimate the value of ſuch deciſion in the phyſician; for this rapidity is often equally the offspring of ignorance: becauſe no difficulty can be experienced by thoſe who are not able to anticipate conſequences; and doubt, the conſequence of different reſources contending for ſuperior eligibility, can ſcarcely be felt by thoſe who have no plan at all. Phyſicians are called on, in general, to act with this prompt deciſion; and to heſitate is uſually accounted a mark of ignorance. A man muſt have merited the confidence of the world before he can claim time for conſideration, and his reputation muſt be firmly eſtabliſhed, before he can own himſelf at a loſs. This neceſſary readineſs of reſource is partly owing to habit and experience, but principally to a methodical arrangement and clear diſtinct views of the knowledge treaſured in the mind. The able and experienced phyſician, who can at once comprehend the object to be attained, will, at the ſame moment, perceive the various methods by which it can be effected, and he has only to chuſe the moſt convenient and the beſt adapted to the habit or idioſyncraſy of his patient. In his progreſs new views will probably open, and the ſoundeſt judgment is ſhewn in ſteering between the oppoſite extremes, of varying the plan according to the variety of ſymptoms, or obſtinately perſiſting in it, notwithſtanding every change of appearances. The firſt is pleaſing to common obſervers, as it ſhews a diligent attention; but it is a proof of weakneſs and indeciſion. The laſt, perhaps the moſt venial error, is the effect of too great confidence; and, unleſs accompanied with extenſive knowledge which dictated the firſt opinion, and an acute ſagacity in diſcerning the effects of medicines, is ſcarcely leſs injurious.

It ſeems obvious, then, that a complicated art, like that of medicine, can only be acquired by the union of extenſive information, with diligent obſervation, and that much evil is likely to enſue where it is practiſed without theſe qualifications. Abſurd as is the notion of univerſal remedies, or of any given remedy for any one diſeaſe nominally the ſame, the extent of quackery ſeems, however, to be increaſing, partly from the revenue which government derives from it, but very much alſo from the acknowledged imperfection of the medical art in the hands of ſo many half-qualified practitioners. To conclude, however, in the words of that able and eſtimable phyſician before quoted; "On the whole, it will appear, that a phyſician, who underſtands the principles of his profeſſion, who has an extenſive acquaintance with every branch of natural knowledge connected with it, who properly applies his knowledge, and who has genius and attention equal to others, muſt have a great advantage, as a practical phyſician, over one who is ignorant of the principles of medicine, and of the ſciences connected with it. Genius and ſenſe are, indeed, the peculiar gift of heaven, and cannot be acquired by the moſt extenſive learning, or the greateſt efforts of induſtry. But with theſe aſſiſtances, genius and ſenſe are capable of the higheſt improvements." Gregory's Lectures, before quoted, p. 87. See alſo Parr's London Medical Dictionary, art. *Medicine;* and Percival's Medical Ethics.

PHYSICIANS, *Dogmatical*, called alſo *rational*, among the ancients, were thoſe who endeavoured to reduce their knowledge of diſeaſes to certain principles. The *dogmatic* phyſicians were in oppoſition to the *empirics*. See EMPIRIC.

PHYSICIANS, *Empirical*, properly ſignify thoſe who rely upon experience, and are directed by it in practice. An ancient ſect of this appellation was oppoſed to the *dogmatic* or rational ſect; and the principles of both are admirably detailed and criticiſed by the elegant Celſus. De Medicinâ, Præf. See EMPIRIC.

PHYSICIANS, *Methodical*, a ſect of phyſicians of Rome, who refuſed to adopt the doctrines either of the dogmatic or empiric ſect. See METHODISTS, in *Medical Hiſtory*.

PHYSICIANS, *Galenical*, a diſtinction aſſumed by thoſe phyſicians after the revival of learning, who preſcribed only vegetable medicines, and their preparations. They ſtood in oppoſition to the *chemical* or *ſpagirical* phyſicians, who employed the preparations of metals and minerals procured by chemiſtry. See GALENICAL.

PHYSICO-MATHEMATICS, includes thoſe branches of phyſic, which, uniting obſervation and experiment to mathemathical calculation, undertake to explain the phenomena of nature. See *Mixed* MATHEMATICS.

PHYSICS, PHYSICA, φυσικη, derived from φυσις, *nature*, ſometimes alſo called *phyſiology*, and *natural philoſophy*, is the doctrine of natural bodies, their phenomena, cauſes, and effects, with their various affections, motions, operations, &c.

Mr. Locke would likewiſe have God, angels, and ſpirits, comprehended under phyſics; but theſe are more uſually referred to metaphyſics.

The immediate and proper objects of phyſics, are body, ſpace, and motion.

The origin of phyſics is referred by the Greeks to the Barbarians, *viz.* the Brachmans, Magi, and the Hebrew and Egyptian prieſts.

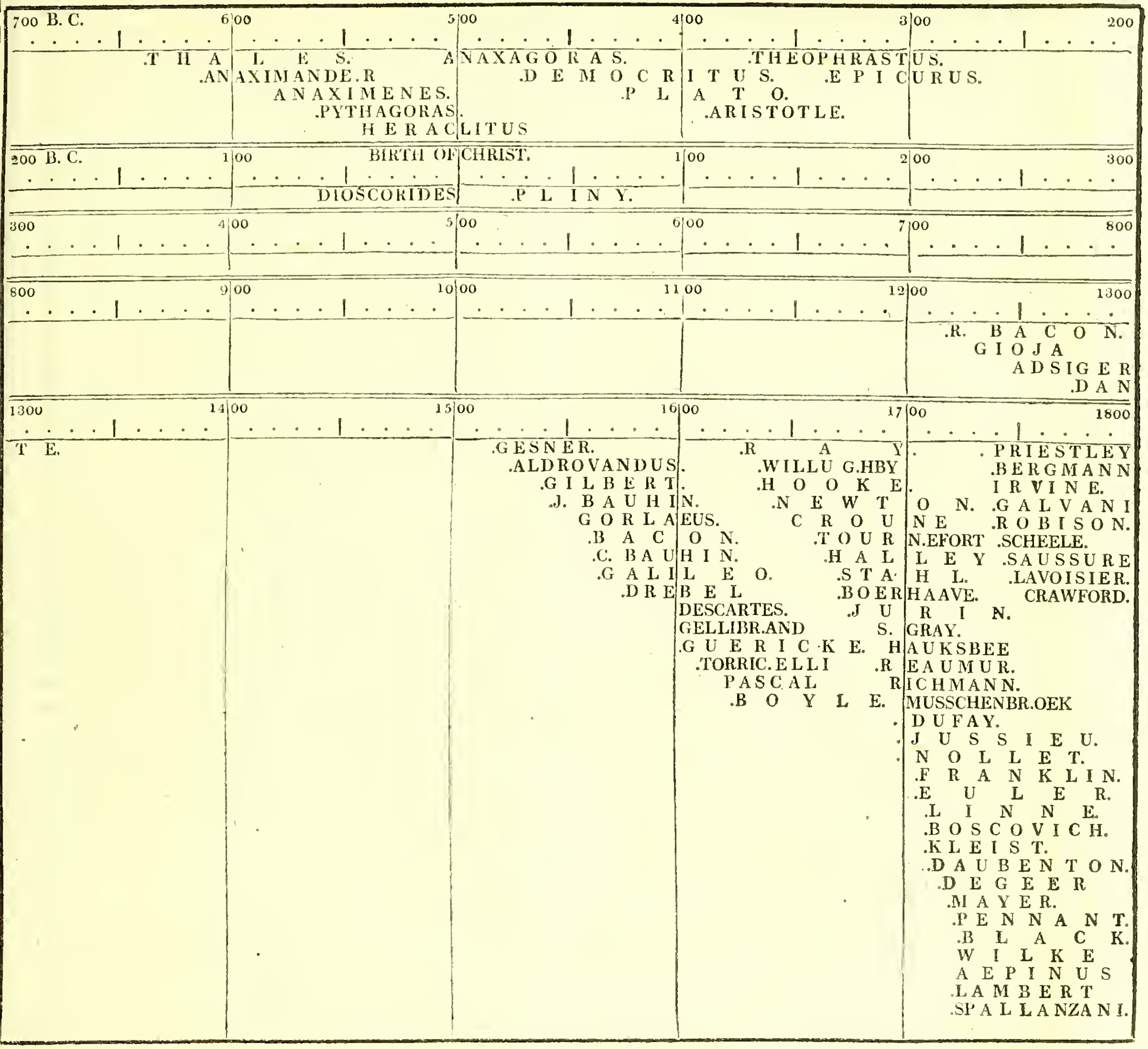
From theſe it was derived to the Greek ſages or ſophi, particularly to Thales, who is ſaid to have firſt profeſſed the ſtudy of the phenomena of nature in Greece. He ſuppoſed water to be the general principle from which all material things are formed, and into which they are reſolved: he particularly noticed the properties of the magnet, which had been before obſerved to attract iron, as well as the effect of friction in exciting the electricity of amber; and to both of theſe ſubſtances he attributed a certain degree of animation, which he conſidered as the only original ſource of any kind of motion. (See Thales.) Anaximander (ſee his biographical article) appears to have directed ſome attention to meteorology; he derived the winds from the rarefaction of the air produced by the operation of heat; and he attributed thunder and lightning to the violent exploſion or burſting of the clouds, which he ſeems to have conſidered as bags, filled with a mixture of wind and water. The ſame erroneous notion was entertained by Anaximenes (ſee Anaximenes), who compared the light attending the exploſion, to that which is often exhibited by the ſea, when ſtruck with an oar. Pythagoras is ſaid to have reaſoned on phyſical effects in a manner too mathematical and viſionary to entitle him to be ranked among thoſe who have inveſtigated the minute operations of nature. (See Pythagoras.) For the opinions of Anaxagoras and Democritus, ſee their reſpective articles. Thales had ſuppoſed water to be the firſt principle of all things, and Anaximenes air. Heraclitus fixed on fire as the baſis of his ſyſtem, attributing to it the property of conſtant motion, and deriving all kinds of groſſer matter from its condenſation in different degrees. (See Heraclitism.) It is obſerved by Bacon, in his eſſay on the opinions of Parmenides, that the moſt ancient philoſophers, Empedocles, Anaxagoras, Anaximenes, Heraclitus, and Democritus, ſubmitted their minds to things as they found them; but Plato made the world ſubject to ideas, which he ſuppoſed to exiſt independently of the human mind, and of the external world, and to compoſe beings of different kinds, by their union with an imperfect matter. Ariſtotle made even ideas, as well as other things, ſubſervient to words; the minds of men beginning, in thoſe times, to be occupied with idle diſcuſſions and verbal diſputations, and the correct inveſtigation of nature being wholly neglected. Plato, however, entertained ſome correct notions concerning the diſtinction of denſer from rarer matter by its greater inertia; and it would be unjuſt to detract from the extraordinary merit of Ariſtotle's experimental reſearches, in various parts of natural philoſophy, and more eſpecially from the information contained in his works on natural hiſtory. Ariſtotle attributed to fire abſolute levity, and to the earth gravity, conſidering air and water as of an intermediate nature. (See Plato and Aristotle.) For an account of the opinions of Epicurus, ſee Epicureans. The works of the ancients, though ſcarcely any one of their opinions and conjectures was ſcientifically eſtabliſhed on ſure foundations, furniſh nevertheleſs a variety of detached facts and obſervations, that have either led to modern experiments and diſcoveries, or that have been confirmed by them. Such eſpecially is the fact recorded by Protagorides of Cyzicum, quoted by Athenæus, who relates, that in the time of king Antiochus, it was uſual, as a luxury, to cool water by evaporation: and alſo the phenomenon noticed by the ancients, that water uſually froze the more readily for having been boiled.

The era of the revival, or perhaps we may juſtly ſay, of the commencement of phyſical diſcoveries, was the 13th century; to which period we may refer the famous Roger Bacon; Hugo Bertius, who is ſaid to have deſcribed the polarity of the magnetic needle, though ſome ſuppoſe that the deſcription of it was contained in verſes attributed to Guyot, a French poet, who lived about the year 1180; Gioja of Amalfi, who firſt employed the compaſs in navigation about the year 1260; Peter Adſiger, who mentions the declination of the needle from the true meridian in a manuſcript bearing date 1269 (ſee Magnet); and the poet Dante, who, about the cloſe of this century, diſtinguiſhed himſelf by his philoſophical, as well as literary works, and who has given an eſſay on the nature of the elements. Amongſt the philoſophers of later date, to whom the ſciences, comprehended under the head of Phyſics, are indebted, we might mention Dr. Gilbert of Colcheſter, who flouriſhed about the cloſe of the 16th century, and to whoſe writings on magnetiſm and electricity we have referred under thoſe articles. The change or variation of the declination of the needle, the diſcovery of which has been commonly aſcribed to Gellibrand, in 1625, muſt have been inferred, ſays Dr. Young, from Gunter's obſervations, made in 1622, if not from thoſe of Mair, or of ſome other perſon as early as 1612; for at this time the declination was conſiderably leſs than Burrows had found it in 1580. In the beginning of the 17th century lord Bacon acquired, by his laudable efforts to explode the incorrect modes of reaſoning which had prevailed in the ſchools, the juſt character of a reformer of philoſophy: but his diſcoveries were neither numerous nor ſtriking. In 1620, he propoſed an opinion, with reſpect to heat, which appears to have been then new, inferring from a variety of obſervations, detailed in his "Novum Organum," that it conſiſted in "an expanſive motion, confined and reflected within a body, ſo as to become alternate and tremulous: having alſo a certain tendency to aſcend." A ſimilar opinion, reſpecting the vibrating nature of heat, was ſuggeſted, about the ſame time, by David Gorlæus, and it was afterwards adopted by Deſcartes, as a part of his hypotheſis, concerning the conſtitution of matter. (See Cartesianism.) In the year 1620 Cornelius Drebel invented a method of meaſuring the degrees of heat by a thermometer, which, in its firſt and imperfect ſtate, was a very important inſtrument; but it was much improved at the cloſe of the century by Dr. Hooke's diſcovery of the permanency of the temperature of boiling water; which afforded a correct and convenient limit to the ſcale on one ſide, as the melting of ſnow ſerved for fixing a ſimilar point on the other. The true courſe of the circulation of the blood was diſcovered by Dr. Harvey in 1628. (See Circulation *of the Blood.*) In the middle of the 17th century the barometer was invented by Torricelli; the variation of the atmoſpheric preſſure was diſcovered by Deſcartes; and Paſcal made ſeveral experiments which led to the method of determining heights by barometrical obſervations. (See Air, Atmosphere, and Barometer.) We paſs over the obſervations of Geſner and Aldrovandus with reſpect to the animal kingdom, and thoſe a century later of the Bauhins, on the vegetable kingdom: and alſo of Ray and Willughby, Tournefort and Reaumur; and proceed to mention, that the latter half of the 17th century was rendered a very intereſting period in the hiſtory of natural knowledge by the eſtabliſhment of the philoſophical ſocieties of Europe ; ſuch were the Royal Society of London, in which Boyle, Hooke, Halley, and Newton, diſtinguiſhed themſelves ; and the Academy of Sciences at Paris ; and alſo, though of leſs extent and ſhorter duration, the Florentine Academy del Cimento. (See ACADEMY and SOCIETY.) In the middle of the 18th century the ſcience of electricity was diligently cultivated by Stephen Gray, Haukſbee, Dufay, Winkler, Nollet, Muſchenbroek, Franklin, Wilſon, Canton, Henly, &c. &c. (See ELECTRICITY.) The celebrated Linnæus, in his ſyſtem of botany and zoology, has contributed in a very eminent degree towards bringing near to perfection the logic and phraſeology of natural hiſtory ; nor has he wholly neglected the philoſophy of the ſcience. His ſucceſſors have acquired diſtinguiſhed merit in theſe departments of ſcience ; but it would be almoſt endleſs to recount the names even of thoſe who have moſt excelled : among whom we may reckon Buffon, Spallanzani, Daubenton, Geoffroy, Pennant, the Juſſieus, Lacepede, Haüy, Bergmann, Kirwan, Werner, Shaw, Smith, &c. &c.

The abſorption of heat, during the converſion of ice into water, appears to have been ſeparately obſerved by De Luc, Black, and Wilke, about the year 1755. On this experiment Dr. Black principally founded his doctrine of latent heat, ſuppoſed to be retained in chemical combination by the particles of fluids. Dr. Irvine and Dr. Crawford explained the circumſtances ſomewhat differently, by the theory of a change of capacity for heat only. Bergmann, Lavoiſier, Seguin, Kirwan, Laplace, and many other philoſophers, have illuſtrated, by experiments and calculations, the various opinions which have been entertained on this ſubject ; and few chemiſts, from the times of Boerhaave, Stahl, and Scheele, to thoſe of Prieſtley and other later authors, have left the properties of heat wholly unnoticed. For an account of the elegant hypotheſis of Aepinus reſpecting magnetiſm and electricity, founded in a great meaſure on the theory of Franklin, and advanced in 1759, we refer to MAGNETISM and ELECTRICITY. The electrophorus of Wilke, and the condenſer of Volta, are among the earlieſt fruits of the cultivation of a rational ſyſtem of electricity. (See ELECTROPHORUS and CONDENSER.) Mr. Cavendiſh's inveſtigation of the properties of the torpedo may ſerve as a model of accuracy and preciſion in the conduct of experimental reſearches. (See TORPEDO.) The ſpeculations of Boſcovich reſpecting the fundamental properties of matter, and the general laws of the mutual action of bodies on each other, (ſee MATTER,) have been conſidered by ſome candid judges as deſerving the higheſt commendation : they remain, however, ſays Dr. Young, almoſt in all caſes ſpeculations only ; and ſome of the moſt intricate of them, being calculated for the explanation of ſome facts which have perhaps been much miſunderſtood, muſt conſequently be both inaccurate and ſuperfluous. The attention of ſeveral experienced philoſophers, now living, has been devoted, with much perſeverance, to the difficult ſubject of hygrometry : ſuch are De Luc, Sauſſure, Pictet, and Dalton. For ſome years paſt, the diſcoveries of Galvani, Volta, and others, have commanded particular attention ; for an account of which, ſee *Galvanic* BATTERY, GALVANISM, and VOLTAISM. Count Rumford has not only contributed to the extenſion of phyſical ſcience by his own experiments and obſervations relating to light and heat, and alſo other ſubjects, but by his eſtabliſhment of a prize medal to be given at the interval of every three years by the Royal Society to the author of the moſt valuable diſcovery concerning heat or light. Profeſſor Leſlie entitled himſelf to one of theſe medals by his intereſting diſcovery of the different properties poſſeſſed by ſurfaces of different kinds, with regard to the emiſſion or reception of radiant heat. Perhaps, however, ſays Dr. Young, none of the modern improvements in ſpeculative ſcience deſerve a higher rank than Dr. Herſchel's diſcovery of the ſeparation of heat from light by refraction. M. Prévoſt has made ſome juſt remarks on the experiments of other philoſophers reſpecting heat ; and his own theory of radiant heat, and his original inveſtigations on the effects of the ſolar heat on the earth, have tended materially to illuſtrate the ſubject of his reſearches. The general laws of the aſcent and deſcent of fluids in capillary tubes, and between plates of different kinds, had been long ago eſtabliſhed by the experiments of Haukſbee, Jurin, and Muſchenbroek (ſee ASCENT of *Fluids*, and CAPILLARY *Tubes*) : many other circumſtances, depending on the ſame principles, had been examined by Taylor, Achard, and Guyton ; and ſome advances towards a theory of the forms aſſumed by the ſurfaces of liquids, had been made by Clairaut, Segner, and Monge. Dr. Young, in an eſſay on the coheſion of fluids, read before the Royal Society in the year 1804, has reduced all effects of this nature to the joint operation of a coheſive and repulſive force, which balance each other ; aſſuming only that the repulſion is more augmented by the approach of the particles to each other than the coheſion : and he has thus diſcovered a perfect correſpondence between many facts, which had not been ſuppoſed to have the ſlighteſt connection with each other. About a year after the publication of this paper, M. Laplace read to the National Inſtitute at Paris a memoir on capillary tubes, in which, as far as he has purſued the ſubject, he has preciſely confirmed the moſt obvious of Dr. Young's concluſions, although his mode of calculation appears, in our author's judgment, to be by no means unexceptionable, as it does not include the conſideration of the effects of repulſion.

Dr. Young, of whoſe hiſtory of Terreſtrial Phyſics in the firſt volume of his “ Courſe of Lectures on Natural Philoſophy and the Mechanical Arts,” we have availed ourſelves in the compilation of this article, cloſes his hiſtory with the following obſervations. “ When we reflect on the ſtate of the ſciences in general, at the beginning of the 17th century, and compare it with the progreſs which has been ſince made in all of them, we ſhall be convinced that the laſt two hundred years have done much more for the promotion of knowledge, than the two thouſand that preceded them : and we ſhall be ſtill more encouraged by the conſideration, that perhaps the greater part of theſe acquiſitions has been made within fifty or ſixty years only. We have therefore the ſatisfaction of viewing the knowledge of nature not only in a ſtate of advancement, but even advancing with increaſing rapidity ; and the univerſal diffuſion of a taſte for ſcience appears to promiſe, that, as the number of its cultivators increaſes, new facts will be continually diſcovered, and thoſe, which are already known, will be better underſtood, and more beneficially applied. The Royal Inſtitution, with other ſocieties of a ſimilar nature, will have the merit of aſſiſting in the diſſemination of knowledge, and in the cultivation of a taſte for its purſuit ; and the advantages ariſing from the general introduction of philoſophical ſtudies, and from the adoption of the practical improvements depending on them, will amply repay the labours of thoſe, who have been active in the eſtabliſhment and ſupport of aſſociations ſo truly laudable.”

Chronology of Phyſical Authors.



Phyſics may be divided, with regard to the manner in which it has been treated, and the perſons by whom, into

Physics, *Symbolical*, or ſuch as was couched in ſymbols: ſuch was that of the old Egyptians, Pythagoreans, and Platoniſts, who delivered the properties of natural bodies under arithmetical and geometrical characters, and hieroglyphics.

Peripatetical, or that of the Ariſtotelians, who explained the nature of things by matter, form, and privation, elementary and occult qualities, ſympathies, antipathies, attractions, &c. See Aristotelian and Peripatetics.

Experimental, which inquires into the reaſons and natures of things from experiments, ſuch as thoſe in chemiſtry, hydroſtatics, pneumatics, optics, &c. See Experimental *Philoſophy*.

And finally, *mechanical*, or *corpuſcular*, which explains the appearances of nature from the matter, motion, ſtructure, and figure of bodies, and their parts: all according to the ſettled laws of nature and mechanics. See Mechanical and Corpuscular *Philoſophy*.

PHYSIOGNOMICS, a term uſed by ſome phyſicians and naturaliſts, for ſuch ſigns as are taken from the countenance to judge of the ſtate, diſpoſition, &c. of the body and mind.

PHYSIOGNOMY, Φυσιογνωμια, formed from φυσις, *nature*, and γινωσκω, *I know*, the art of knowing the humour, temperament, or diſpoſition of a perſon, from obſervation of the lines of his face, and the characters of its members or features ; or of deſignating the powers and diſpoſitions of the mind by a peculiar combination of the features.

Baptiſta Porta and Robert Fludd, to whom we may add in later times, Gall, Camper, Lavater, and Blumenbach, are the beſt modern authors on phyſiognomy. The ancient ones are the ſophiſts Adamantius and Ariſtotle : the phyſiognomy of which laſt we have tranſlated into Latin by de Lacuna.

With reſpect to phyſiognomy, this at leaſt may be ſaid, that of all the fanciful arts of the ancients, diſuſed for a conſiderable time, but lately revived among the moderns, there is none has ſo much foundation in nature as this.

There is an apparent correſpondence between the face and the mind : the features and lineaments of the one are directed by the motions and affections of the other ; there is even a peculiar arrangement of the members of the face, and a peculiar diſpoſition of the countenance, correſponding to each particular affection of the mind.

In effect, the language of the face, phyſiognomy, as the zealous advocates of this art pretend, is as copious, nay, perhaps, as diſtinct and intelligible, as that of the tongue, ſpeech. In other words, it is plain to the moſt inattentive obſerver, that each individual of the human race poſſeſſes a ſet of diſtinctive marks in the form of the head, and the outlines of the countenance : in proof of which we refer to the articles CRANIOLOGY, CRANIUM, and MAN. It is alſo well known and univerſally allowed, that theſe marks inſenſibly lead us to form concluſions as to the nature and inclinations of perſons at the firſt ſight, or on the ſlighteſt acquaintance with them ; which notions are ſometimes juſt, but often erroneous.

The foundation of phyſiognomy, as ſome have ſtated it, is this : the different objects that preſent themſelves to the ſenſes, nay, the different ideas that ariſe in the mind, do each make ſome impreſſion on the ſpirits ; and each an impreſſion correſpondent or adequate to its cauſe : therefore each makes a different impreſſion.

If it be aſked, how ſuch an impreſſion ſhould be effected, it is eaſy to anſwer, that it follows from the economy of the Creator, who has fixed ſuch a relation between the ſeveral parts of the creation, to the end that we may be apprized of the approach or receſs of things uſeful or hurtful to us.

The animal ſpirits, ſay the Carteſians, moved in the organ by an object, continue their motion to the brain : whence that motion is propagated to this or that particular part of the body, as is moſt ſuitable to the deſign of nature ; having firſt made a proper alteration in the face, by means of its nerves, eſpecially the pathetici, and oculorum motorii.

The face, here, does the office of a dial-plate ; and the wheels and ſprings, withinſide the machine, actuating its muſcles, ſhew what is next to be expected from the ſtriking part.

Now if, by repeated acts, or the frequent entertaining of a favourite paſſion, or vice, which natural temperament was hurried, or cuſtom dragged one to, the face is often put in that poſture which attends ſuch acts; the animal ſpirits will make ſuch patent paſſages through the nerves (in which the eſſence of an habit conſiſts), that the face is ſometimes unalterably ſet in that poſture (as the Indian religious are by a long continued ſitting in ſtrange poſtures in their pagods); or, at leaſt, it falls, inſenſibly and mechanically, into that poſture, unleſs ſome preſent object diſtort it therefrom, or ſome diſſimulation hide it ; and this reaſoning, it has been ſaid, is confirmed by obſervation ; which, by being a little more accurate and minute, would ſerve to diſtinguiſh not only habits and tempers, but even profeſſions. After all, this is a kind of ſcience which muſt be very precarious and deluſive. (See LAVATER.) It ſhould therefore be exerciſed with great judgment and diſcretion ; otherwiſe we may deduce from it concluſions that are equally unfounded and injurious. To the obſervations on the theory of this ſcience already introduced under the articles to which we have above referred, we ſhall here ſubjoin an account of the ſyſtem of Lavater, which not long ago excited the public curioſity, though it is now almoſt forgotten.

Lavater aſſerts, that " each creature is indiſpenſable in the vaſt compaſs of creation ; but each individual," he adds, " is not alike informed of the truth of this fact, as man only is conſcious that his own place cannot be ſupplied by another." The idea thus conceived, he thinks one of the beſt conſequences of phyſiognomy, and he exults, that the moſt deformed and wicked perſons are ſtill ſuperior to the moſt perfect and beautiful animal, becauſe they always have it in their power to amend, and in ſome degree to reſtore themſelves to the place aſſigned them in creation ; and however their features may be diſtorted by the indulgence of their paſſions, ſtill the image of the Creator remains, from which ſin only is to be expelled, to render the likeneſs nearer perfection. In pointing out the diſtinguiſhing traits that diſcriminate the natives of different regions, Lavater obſerves, that the placing of ſeveral perſons together, ſelected from nations remotely ſituated from each other, gives at one glance their ſurpriſing varieties of viſage ; and yet he acknowledges that to point out thoſe variations is a taſk of conſiderable difficulty, and his aſſertion, that this may be done with more facility from an individual than the maſs of population, ſeems extremely probable. The French, he thinks, do not poſſeſs equally commanding traits with the Engliſh, nor are they ſo minute as thoſe of the Germans, and it is to the peculiarities of their teeth, and manner of laughing, that he attributed his power of deciding on their origin. The Italians he appropriated by the form of their noſes, their diminutive eyes, and projecting chins. The eye-brows and foreheads are the criterion by which to judge of the natives of England. The Dutch poſſeſs a particular rotundity of the head, and have weak, thin hair : the Germans, numerous angles and wrinkles about the eyes and in the cheeks ; and the Ruſſians are remarkable for black and light coloured hair, and flat noſes.

It muſt be extremely grateful to the natives of England to reflect, that Lavater conſiders them, in the aggregate, the moſt favoured upon the earth with reſpect to perſonal beauty ; he ſays, they have the ſhorteſt and beſt arched foreheads, and that only upwards, and towards the eye-brows, ſometimes gradually declining, and in other caſes are rectilinear, with full, medullary noſes, frequently round, but very ſeldom pointed, and lips equally large, well defined, curved, and beautiful, with the addition of full round chins. Still greater perfections are attributed to the eyes of Engliſhmen, which are ſaid to poſſeſs the expreſſion of manly ſteadineſs, generoſity, liberality, and frankneſs, to which the eye-brows greatly contribute. With complexions infinitely fairer than thoſe of the Germans, they have the advantage of eſcaping the numerous wrinkles found in the faces of the latter, and their general *contour* is noble and commanding.

Judging from the ladies he had ſeen of our country, and from numerous portraits of others, Lavater was led to ſay, they appeared to him wholly compoſed of nerve and marrow, tall and ſlender in their forms, gentle, and as diſtant from coarſeneſs and harſhneſs as earth from heaven. His own countrymen he found to have many characteriſtic varieties: thoſe of Zurich are generally meagre, and of the middle ſize, and either corpulent or very thin.

To purſue this ſubject ſomething further, it will be found, that the people of Lapland, and parts of Tartary, are of very diminutive ſtature, and of extremely ſavage countenances, formed by flat faces, broad noſes, high cheek-bones, large mouths, thick lips, peaked chins, and their eyes are of a yellow brown, almoſt black, with the lids retiring towards the temples; nor are the females of this diſagreeable race more favoured by nature; and each ſex is diſtinguiſhed by the groſſeſt manners, and minds ſtupid beyond credibility; but of all the varieties of the human ſpecies, the inhabitants of the coaſt of New Holland ſeem the moſt debaſed and miſerable; thoſe are tall and ſlender, and to add to the deformity of thick lips, large noſes, and wide mouths, they are taught from their infancy to keep their eyes nearly cloſed, to avoid the inſects which ſwarm around them.

Turning to the more favourable ſide of this picture of national phyſiognomy, we ſhall find the people of Cachemire, the Georgians, the Circaſſians, and Mingrelians, erect, noble, and formed for admiration, particularly the females, whoſe charms of face and perſon are proverbial.

There are too many local and phyſical cauſes for this difference in the external appearance of the inhabitants of the different parts of the world, for enumeration and explanation in ſo confined a ſpace as that to which we are limited. Profeſſor Kant, of Konigſberg, in an eſſay on this ſubject, divides the human race into four principal claſſes, into which the intermediate gradations may readily be reſolved: thoſe are the Whites, the Negroes, the Huns, (Monguls or Calmucs,) and the Hindoos, or people of Hindooſtan. Circumſtances purely external may be the accidental, but cannot be the original cauſes of what is aſſimilated or inherited: as well could chance produce a body completely organized. "Man," ſays the profeſſor, "was undoubtedly intended to be the inhabitant of all climates and all ſoils. Hence the ſeeds of many internal propenſities muſt be latent in him, which ſhall remain inactive, or be put in motion according to his ſituation on the earth: ſo that in progreſſive generation, he ſhall appear as if born for that particular ſoil in which he ſeems planted."

In the opinion of this gentleman, the air and the ſun are the two cauſes which moſt powerfully influence the operations of propagation, and give a laſting developement of germ and propenſities, or in other words, the above powers may be the origin of a new race.

Food may produce ſome ſlight variations; theſe, however, muſt ſoon diſappear after emigration, and it is evident, that whatever affects the propagating powers, does not act upon the ſupport of life; but upon the original principle, the very ſource of animal conformation and motion. It has been obſerved, that man degenerates in ſtature and faculties the nearer he is ſituated to the frigid zone: this ſeems a neceſſary conſequence of that ſituation, for this obvious reaſon; were men of the common ſtature in thoſe regions of extreme cold, the impelling power of the heart muſt be increaſed, to force the blood through the extremities, which would otherwiſe chill, and become totally uſeleſs; but as the Creator did not think it uſeful to adopt this mode of preſerving the limbs, they have been ſhortened, for the purpoſe of confining the circulating fluid to the trunk, where the natural heat accumulating, the whole body has a greater proportion of that comfortable ſenſation than ſtrangers feel when viſiting thoſe northern countries.

The propenſity to flatneſs, obſervable in the prominent parts of the countenance of the perſons under conſideration, expoſed to the effects of cold, is accounted for by that very circumſtance; and it appears probable, that their high cheek-bones, and ſmall, imperfect eyes are ſo contrived, to preſerve the latter from the piercing effects of the wind, and the offenſive brilliancy of the almoſt eternal ſnows. The abbé Winkelman attributes the enormous and diſguſting lips of the Negroes to the heat of the climate they inhabit; others account for the blackneſs of their ſkin by ſuppoſing "the ſurplus of the ferruginous, or iron particles, which have lately been diſcovered to exiſt in the blood of man, and which, by the evaporation of the phoſphoric acidities, of which all Negroes ſmell ſo ſtrong, being caſt upon the retiform membrane, occaſions the blackneſs which appears through the cuticle, and this ſtrong retention of the ferruginous particles ſeems to be neceſſary, in order to prevent the general relaxation of the parts."

In pointing out the diſtinguiſhing traits that diſcriminate the natives of different regions, Lavater obſerves, that a perſon deeply enamoured of another, and thinking intenſely on the form and poſition of their features, might aſſume a reſemblance of the admired object, though miles of ſpace intervened between them; and purſuing his mental dream, he adds, that it is equally probable an individual meditating revenge in ſecret, may compoſe his countenance into a likeneſs of him who was to be its victim. The incorrectneſs of the latter fancy may be expoſed by merely obſerving that the perſon under the influence of the paſſion of revenge, muſt bear in his countenance the lines expreſſive of that reſtleſs affection; now as the object intended to be injured is unconſcious of the ſecret machinations againſt him, he may at the inſtant be engaged in ſome benevolent purſuit, or may feel ſome internal joy which moulds his features into an expreſſion directly oppoſite to that of his adverſary, who may have generally ſeen him thus; for revenge is often aimed by the wicked at the beſt of men: conſequently, the countenance of a fiend grinning with malice cannot at the ſame time beam with a complacency ariſing from a ſet of features entirely unruffled.

Before we enter upon a deſcription of the marks which, according to Lavater, point out the character of the poſſeſſor, it may be proper to give one or two inſtances of the fallacy, and of the truth, of the concluſions drawn from them, in order that our readers may form their own concluſions, as to the folly or propriety of entertaining a propenſity to form a judgment of mankind from the ſhapes of their noſes, eyes, foreheads, and chins.

M. Sturtz declared to Lavater, that he "once happened to ſee a criminal condemned to the wheel, who, with ſatanic wickedneſs, had murdered his benefactor, and who yet had the benevolent and open countenance of an angel of Guido. It is not impoſſible, adds this gentleman, to diſcover the head of a Regulus among guilty criminals, or of a veſtal in the houſe of correction." Lavater admits this aſſertion in its fulleſt extent, but his reaſoning to reconcile it to his ſyſtem is by no means concluſive.

When we hear of any atrocious act, the natural abhorrence of vice and cruelty implanted in us, leads the imagination to form a portrait of the perpetrator, ſuited to the deformity of the mind capable of committing it; without reflecting, that had ſuch an index exiſted in the countenance of the abhorred object, it is moſt probable, his murderous and horrible exterior would have placed mankind ſo far on their guard as to detect his intentions. Upon viewing the culprit, we are perhaps ſurpriſed to find that there is nothing particularly indicative of cruelty in the outlines of his face, and we induſtriouſly endeavour to force each into the immediate form of our preconceived portrait; this occaſions us to read lurking villainy in his eyes, and converts the wrinkles

kles of diſeaſe, or approaching age, into the frown of a dæmon ; and we depart exclaiming againſt the ſtriking contour of the miſerable wretch, when, perhaps, many of our friends, and even relatives, would ſuffer by a compariſon, and yet had led uniformly innocent lives. On the other hand it muſt be admitted, that vice generally ſtamps her votaries with marks, which may be known at a glance, but this admiſſion applies only to the confirmed enemies of virtue, thoſe whoſe habits of living are ſo uniformly vicious, that very little propriety occurs in their conduct.

The following anecdote, related by Lavater, may ſerve as a partial illuſtration of the aſſertion, that the features are affected by the turn of the mind, or, perhaps, more correctly ſpeaking, the muſcles of the face. An innocent, amiable, and virtuous young lady, of high birth, who had beed educated in the retirement of the country, happened one evening to paſs a mirror, immediately after having attended evening prayers, and with a candle in her hand was depoſiting a bible on a table, when ſhe obſerved her image reflected in the glaſs : affected with a ſenſe of humility, and of extreme modeſty, ſhe averted her eyes and retired. A ſucceeding winter was paſſed in the amuſements and diſſipation of a city, where this lady had the misfortune to forget all her previouſly devout purſuits : but returning to the country, ſhe once more paſſed the glaſs and the bible, and ſaw her features reflected, now deprived of thoſe faſcinating graces which belong alone to the ſerene and happy ſtate of mind ſhe had loſt. Alarmed at the change, ſhe fled from the ſpot, and retiring to a ſofa, ejaculated ſentences of penitence, and formed reſolutions of future amendment.

Lavater begins his remarks on the human face with the forehead. According to this obſerver, the general form, proportion, the arch obliquity, and poſition of the ſkull of the forehead, denote the degree of thought, the ſenſibility, the mental vigour, and the propenſities of man ; and at the ſame time the ſkin of this part of the head explains, by its hue, tenſion, or wrinkles, the ſtate of the mind at the moment of obſervation, and the paſſions which influence it, the bones affording the internal quantity, and the covering the application of power : however the latter may be affected, it is well known that the bones muſt remain unaltered, and yet they regulate the wrinkles by their variation of component form. Wrinkles are produced by a certain degree of flatneſs ; others ariſe from arching, and theſe conſidered ſeparately will give the form of the arch, and *vice verſâ*. Some foreheads are furniſhed with wrinkles that are confined to horizontal, perpendicular, curved, and others confuſed and mixed lines ; thoſe leaſt perplexed when in action are uſually obſerved in foreheads without angles.

Lavater appears to have been the firſt who attended to the peculiar turns of the poſition and outline of the forehead, which he conſidered the moſt important part preſented for the ſtudy of the phyſiognomiſt. This he divides into three claſſes, and thoſe he termed the perpendicular, the projecting, and the retreating, each poſſeſſing a number of variations : the principal, however, are rectilinear, “ half round, half rectilinear, flowing into each other ; half round, half rectilinear, interrupted ; curve-lined, ſimple ; the curve lined double and triple.”

A long forehead denotes much capacity of comprehenſion, and leſs activity ; a compreſſed, ſhort, and firm forehead, more compreſſion, ſtability, and little volatility ; ſeverity and pertinacity belong to the rectilinear ; and the more curved than angular portends flexibility and tenderneſs of character : deficiency of underſtanding is diſcoverable in thoſe whoſe foreheads are perpendicular from the hair to the eye-brows ; but the perfectly perpendicular, gently arched at the top, ſignifies that the poſſeſſor thinks coolly and profoundly. The projecting forehead indicates ſtupidity and mental weakneſs ; the retreating, exactly the reverſe ; the circular, and prominent above, with ſtraight lines below, and nearly perpendicular, ſhews ſenſibility, ardour, and good underſtanding ; the rectilinear oblique forehead has the ſame properties ; arched foreheads are conſidered as feminine ; an union of curved and ſtraight lines, happily diſpoſed, with a ſimilar poſition of the forehead, gives the character of conſummate wiſdom. “ Right lines, conſidered as ſuch, and curves, conſidered as ſuch, are relaxed, as power and weakneſs, obſtinacy and flexibility, underſtanding and ſenſation.” When the bones ſurrounding the eye project, and are ſharp, the perſon thus formed poſſeſſes a powerful ſtimulus to exerciſe a ſtrong mental energy, which is productive of excellent and well digeſted plans, and yet this doth not ſeem a peculiar mark of wiſdom, as many wiſe men have been known without it : thoſe thus circumſtanced have more firmneſs, when the forehead reſts perpendicularly upon horizontal eye-brows, and is conſiderably rounded towards the temples. Perpendicular foreheads, which, however, project ſo as not to reſt on the noſe, and which are ſhort, ſmall, ſhine, and are full of wrinkles, give undoubted indications of a weakneſs of the thinking faculties ; perſeverance and oppreſſive violent activity, united with vigour and harſhneſs, belong to the forehead compoſed of various confuſed protuberances ; and on the other hand, when the profile of this part of the head affords two well proportioned arches, the loweſt projecting, it is a certain ſign of a good temperament and a ſound underſtanding. All great and excellent men have been found to have their eye-bones firmly arched, and well defined ; and circumſpection, followed by ſtability, attends ſquare foreheads, with ſpacious temples, and eye-bones of the above deſcription ; when perpendicular natural wrinkles appear, they expreſs power of mind and application ; but horizontal, interrupted in the middle, or broken at the extremities, betray, in general, negligence, if not want of ability.

Deep indenting in the bones of the forehead ſituated between the eye-brows, and extending in a perpendicular direction, mark the happy few who poſſeſs generous and noble minds, connected with excellence of underſtanding ; beſides, a blue vena frontalis, in the form of a Y, ſituated in an arched ſmooth forehead, is an indication of ſimilar advantages. Lavater having given the above hints, deſcribes the following characteriſtics, which he aſſerts, give “ the indubitable ſigns of an excellent, a perfectly beautiful and ſignificant, intelligent, and noble forehead.” Such muſt be one-third of the face in length, or that of the noſe, and from the noſe to the chin ; the upper part muſt be oval, in the manner of the great men of England, or nearly ſquare ; the ſkin muſt be ſmooth, and wrinkled only when the mind is rouſed to juſt indignation, or deeply immerſed in thought, and during the paroxyſm of pain ; the upper part muſt recede, and the lower project ; the eye-bones muſt be horizontal, and preſent a perfect curve upon being obſerved from above ; an interſecting cavity ſhould divide the forehead into four diſtinct parts, but with that ſlight effect as to be only viſible with a clear deſcending light : and all the outlines ſhould be compoſed of ſuch, that if the ſection of one-third only is obſerved, it would be difficult to decide whether they were circular or ſtraight ; to conclude this portrait of a tranſcendant forehead, the ſkin muſt be more tranſparent, and of a finer tint than the remainder of the face. Should an infant, a relative, or a friend, who poſſeſſes a forehead reſembling the above deſcription, ſeriouſly err, the good enthuſiaſt intreats, that the corrector may not deſpair of ſucceſs,

ceſs, as in all human probability the latent ſeeds of virtue may be rouſed into growth by perſeverance, and finally produce the deſired fruit.

The eyes of mankind are compoſed of various ſhades of colour, the moſt common of which are grey mixed with white, grey tinged with blue, and ſhades of green, orange, and yellow. According to Buffon, the orange and blue are moſt predominant, and thoſe colours often meet in the ſame eye ; thoſe generally ſuppoſed to be black are not really ſo, and may be found, on attentive examination, and with a proper diſpoſition of the light, to conſiſt of yellow, a deep orange, or brown, which being violently oppoſed to the clear white of the ball, aſſumes a darkneſs miſtaken for black. The ſame naturaliſt obſerves, that ſhades of yellow, orange, blue and grey, are viſible in the ſame eye ; and when blue, even of the lighteſt tint, appears, it is invariably the predominant colour, and may be found in rays diſperſed throughout the iris : the orange is differently diſpoſed, at a trifling diſtance from the pupil, is in flakes, and round ; but the blue ſo far overpowers it, that the eye aſſumes the appearance of being wholly of that colour. The fire and vivacity emitted by the eye cannot be ſo powerful in thoſe of the lighter tints ; it is therefore in the dark ones alone that we look for the emotions of the ſoul ; quiet and mildneſs, and a certain degree of archneſs, are the characteriſtics of the blue. Some eyes are remarkable for the abſence of colour ; the iris is faintly ſhaded with blue or grey, and the tints of orange are ſo light, that they are hardly obſervable : in eyes thus conſtituted, the black of the pupil appears too conſpicuous, and it may be ſaid, that portion is alone viſible at a little diſtance, which circumſtance gives the perſon a ghaſtly and ſpiritleſs appearance.

There are eyes whoſe iris may be ſaid to be almoſt green ; but theſe are very uncommon. It would require the pen of an inſpired writer to deſcribe the aſtoniſhing variety of expreſſion of which the eyes are capable : being ſituated near the ſuppoſed ſeat of the ſoul, every ſenſation of that inviſible ſpirit appears to ruſh in full vigour from thoſe intelligent organs : all the paſſions may be ſeen in them ; we ſhrink from their indications of anger, we find pleaſure with all her train of joys dancing in them, we feel their force in love, and melt into tears upon obſerving them ſuffuſed with the moiſture of grief ; in ſhort, their language is far more powerful than that of the tongue. The tranſitions are ſo rapid in the expreſſion of the eyes, that it requires very cloſe and attentive examination to catch and deſcribe the emotions of the mind viſible in them ; admitting this fact, it will appear that the phyſiognomiſt is liable to numerous and egregious errors in drawing his concluſion of propenſities from them. Paracelſus, a man of ſtrong genius, and, like Lavater, miſguided in many inſtances by enthuſiaſm, and a kind of ſuperſtition allied to the ſtudy of this art or ſcience, pronounced that thoſe eyes generally termed black frequently denoted health, firmneſs, courage, and honour ; but the grey, deceit and inſtability. Thus far probability at leaſt accompanies his remarks. It is, however, impoſſible to ſubſcribe to his aſſertion, that ſhort-ſighted perſons are deceitful and crafty, or that thoſe who ſquint have ſimilar propenſities to evil, as it is evident both the peculiarities alluded to are the conſequences of injury, and are never found in people whoſe organs of viſion are perfect : indeed many inſtances might be cited of the actual and known cauſe of ſquinting and near ſight, which frequently occur in adults from extreme anxiety and diſeaſe.

Small eyes ſituated deep in the ſockets are ſaid, by Paracelſus, to indicate active wickedneſs, with a mind calculated to oppoſe with vigour, and ſuffer with perſeverance ; and their oppoſites, or very large prominent eyes, he conceived, explained the avaricious, covetous, propenſities of their poſſeſſor ; thoſe in conſtant motion denote fear and care ; winking is the mark of foreſight, of an amorous diſpoſition, and quickneſs in projecting ; and the eye fearful of looking directly forward, decides upon innate modeſty.

Lavater thought blue eyes, in general, ſignified effeminacy and weakneſs, and yet he acknowledged that many eminent men have had blue eyes ; ſtill he was convinced that ſtrength and manhood more particularly belong to the brown : in oppoſition to this opinion, the Chineſe, who are known to be an imbecile people, rarely have blue eyes ; theſe contradictions, it muſt be confeſſed, weaken the reliance we are inclined to place on appearances during the quieſcent ſtate of the eyes, and the indications of their colour. Men intemperate in anger, and eaſily irritated, may be found with eyes of all the uſual colours ; when they incline to green, ardour, ſpirit, and courage, are conſtant attendants. People of a phlegmatic habit, but who may be rouſed to activity, have clear blue eyes, which never belong to thoſe inclined to melancholy, and they rarely belong to the choleric. Benevolence, tenderneſs, timidity, and weakneſs, are exhibited by the perfectly ſemi-circular arch formed by the under part of the upper eye-lid ; perſons of acute and ſolid underſtandings have a generous open eye, compoſing a long and acute angle with the noſe ; and when the eye-lid forms a horizontal line over the pupil, it is a ſtrong indication that he who poſſeſſes it is ſubtle, able, and penetrating. Widely opening lids, ſhewing the white of the ball under the other colours, may be obſerved in the phlegmatic and timid, as well as in the courageous and raſh ; but upon comparing theſe marks in the different characters juſt mentioned, a very perceptible difference is diſcovered in the characteriſtics of the eyes ; the latter are leſs oblique, better ſhaped, and more firm.

The eye-brows are eſſential in the expreſſion of the eyes ; in anger they are brought down and contracted ; in all pleaſant ſenſations, and in aſtoniſhment, they aſſume a fine arch ; in youth they are naturally and regularly arched ; the horizontal and rectilinear eye-brows belong to the maſculine bias of the ſoul ; and the above deſignations combined ſhew ſtrength of underſtanding, united with feminine kindneſs ; thoſe that are deranged in their appearance, and the hairs growing in various directions, demonſtrate a wild and perplexed ſtate of mind ; but if the hair is fine and ſoft, they ſignify gentle ardour. The compreſſed firm eye-brow, formed of parallel hairs, is a certain proof of profound wiſdom, true perception, and a manly, firm habit of thought. There are eye-brows which meet acroſs the noſe ; this circumſtance gives the perſon an air of ferocious gloom, which is admired by the Arabs, but the ancients, verſed in phyſiognomy, conceived ſuch to be the characteriſtic of cunning ; Lavater, on the contrary, obſerves, that he had diſcovered them on the moſt worthy and open countenances, admitting at the ſame time that they may denote a heart ill at eaſe. Thoſe who think profoundly, and thoſe equally prudent and firm in their conduct, never have high and weak eye-brows, in ſome meaſure equally dividing the forehead ; they rather betray debility and apathy, and though men of an oppoſite character may be found with them, they invariably ſignify a diminution of the powers of the mind. Thick angular eye-brows, interrupted in their lengths, ſignify ſpirit and activity ; and when they approach the eyes cloſely, the more firm, vigorous, and decided, is the character ; the reverſe ſhews a volatile and leſs enterpriſing diſpoſition ; when the extremes are remote from each other, the ſenſations of the poſſeſſor are ſudden and violent. White eye-brows are demonſtrative of weakneſs, in the ſame degree that the dark brown are of firmneſs.

The good Lavater conſidered the noſe as the abutment, or buttreſs, of the forehead, the ſeat of the brain, without which the whole face would preſent a miſerable appearance ; indeed an ugly or diſagreeable ſet of features is never accompanied by a handſome noſe : but there are thouſands of fine and expreſſive eyes where a perfectly formed noſe is wanting : he deſcribes this portion of the face as requiring the following peculiarities : "Its length ſhould equal the length of the forehead ; at the top ſhould be a gentle indenting ; viewed in front, the back ſhould be broad, and nearly parallel, yet above the centre ſomething broader ; the bottom, or end of the noſe, muſt be neither hard nor fleſhy, and its under outline muſt be remarkably definite, well delineated, neither pointed nor very broad ; the ſides, ſeen in front, muſt be well defined, and the deſcending noſtrils gently ſhortened ; viewed in profile, the bottom of the noſe ſhould not have more than one-third of its length ; the noſtrils above muſt be pointed below, round, and have in general a gentle curve, and be divided into equal parts by the profile of the upper lip ; the ſide, or arch of the noſe, muſt be a kind of oval ; above, it muſt cloſe well with the arch of the eye-bone, and near the eye muſt be at leaſt half an inch in breadth. Such a noſe is of more worth than a kingdom." Numbers of great and excellent men have flouriſhed in all ages of the world, whoſe noſes would ſuffer eſſentially by a compariſon with Lavater's deſcription of a noſe, more valuable to the poſſeſſor than extenſive empire : indeed, he is compelled to acknowledge this indiſputable fact, and obſerves that he has ſeen perſons endowed with purity of mind, noble in their conceptions, and capable of exertion, whoſe noſes were ſmall, and the arches of their profiles inverted ; and yet true to his firſt principles, he diſcovered, or imagined he diſcovered, their worth to conſiſt chiefly in the elegant effuſions of their imaginations, their learning, or fortitude in ſuffering, and this is accompanied with a proviſo that the remainder of their form muſt be correctly organized.

Noſes arched near the forehead belong to thoſe who poſſeſs the energy to command, are capable of ruling, acting, overcoming, and deſtroying ; others, rectilinear, are the medium between the extremes above noticed, and are appropriated by nature to perſons who act and ſuffer with equal power and patience. Socrates, Laireſſe, and Boerhaave, were great men, and had ill-ſhaped noſes, and were diſtinguiſhed for meekneſs and gentleneſs. Were it poſſible to attribute a general prevalence of diſpoſition to a general form of the noſe, individuals of every nation would be found to reſemble the Tartars, who have flat indented noſes, the Negroes who have broad, and the Jews who have high arched noſes, in their propenſities, and it muſt follow that whatever qualities the phyſiognomiſt may apply to thoſe individuals, muſt alſo belong to the whole people whoſe noſes bear a reſemblance to them ; were this particular accurately examined into, it would tend, in a great meaſure, to confirm the correctneſs or incorrectneſs of the ſcience, as it has hitherto been practiſed.

The admirers of this ſtudy attribute great powers to the mouth, in expreſſing the emotions of the mind ; and Lavater expatiates on it with enthuſiaſtic fervour indeed : "Whoever," he exclaims, "internally feels the worth of this member, ſo different from every other member, ſo inſeparable, ſo not to be defined, ſo ſimple, yet ſo various ; whoever, I ſay, knows and feels this worth, will ſpeak and act with divine wiſdom." He then proceeds to call it "the chief ſeat of wiſdom and folly, power and debility, virtue and vice, beauty and deformity, of the human mind ; the ſeat of all love, all hatred, all ſincerity, all falſehood, all humility, all pride, all diſſimulation, and all truth." Granting the benevolent paſtor full aſſent to theſe obſervations on the mouth, it becomes the indiſpenſible duty of all men to notice the phyſiognomy, or indications of that organ ; in making thoſe obſervations, it will be neceſſary to examine the lips ſeparately, and to aſcertain when they are cloſed, during the moments of perfect tranquillity, whether that operation is performed without a forcible exertion of the muſcles, particularly the middle of the upper and under lips, the bottom of the middle line at each end ; and finally, the extending of the middle line on both ſides.

The character of the man is proclaimed in the lips, the more firm the latter the more fixed the former ; the weak and irreſolute man has weak lips, with rapidity in their motion. The vicious, cringing, mean, and bad countenance is never formed with lips well defined, large, and juſtly proportioned to the other parts of the face, and the line of which is equally ſerpentine on each ſide ; ſuch, though they may denote a tendency to ſenſuality, belong excluſively to a character deſerving of admiration in moſt relations of life.

A mouth, the lips of which are ſo thin as to preſent, at firſt view, little more than a line, is ſaid to indicate apathy and quiet, but induſtrious when rouſed. When this deſcription of mouth is raiſed at the extremities, vanity or vain pretenſions, affectation, and probably deliberate malice, diſtinguiſh thoſe ſo formed. The oppoſite of this kind of lips, ſwelled into conſiderable ſize, is a mark of indolence and ſenſuality. The "cut through, ſharp drawn lip," as Lavater terms ſome, has to contend with avarice and anxiety. Lips cloſed accurately, without exertion, and handſome in their outline, belong to the exerciſe of diſcretion and firmneſs. Lips with the latter advantage, and the upper projecting, is generally appropriated to the virtuous and benevolent, though there are, without doubt, numberleſs perſons of excellent character whoſe under lips project, but in Lavater's opinion, the laſt peculiarity implies a well-meaning man, whoſe goodneſs conſiſts rather of cold fidelity than ardent friendſhip. The under lip, hollowed in the middle, denotes a fanciful character. Let the moment be remarked, when the conceit of the jocular man deſcends to the lip, and it will be ſeen to be a litle hollow in the middle.

The mouth remaining naturally cloſed, invariably ſignifies fortitude and courage. When the latter quality is in operation, the mouth cloſes inſenſibly ; the naturally open mouth makes a diſpoſition to complain ; the cloſed, on the contrary, deſignates endurance. "Though phyſiognomiſts," adds Lavater, "have as yet but little noticed, yet much might be ſaid concerning the lips improper, or the fleſhy covering of the upper teeth, on which anatomiſts have not, to my knowledge, yet beſtowed any name, and which may be called the curtain, or pallium, extending from the beginning of the noſe to the red upper lip proper. If the upper lip improper be long, the proper is always ſhort ; if it be ſhort and hollow, the proper will be large and curved : —another certain demonſtration of the conformity of the human countenance. Hollow upper lips are much leſs common than flat and perpendicular ; the character they denote is equally uncommon."

The ancients who ſtudied the phyſiognomy of man, ſuppoſed that diminutive ſhort teeth betrayed the weakneſs of thoſe who poſſeſſed them ; more modern obſervers contradict this ſuppoſition, and declare that men of uncommon ſtrength have ſuch, but they are rarely of that pure white ſo neceſſary to preſerve the general beauty of the countenance. Teeth of unuſual length, and narrow, are ſigns of weakneſs and cowardice ; thoſe juſtly proportioned to each other, white and tranſparent, which appear immediately upon opening of the mouth, though not projecting, and entirely expoſed to view, from the inſertion in the gums to the oppoſite extremities, are ſeldom to be met with in the jaws of perſons who poſſeſs unamiable propenſities ; when teeth of a different deſcription are diſcovered belonging to amiable and worthy characters, enquiry will generally ſatisfy the phyſiognomiſt that his concluſions on this head were juſt, and that the blackneſs and derangement were occaſioned by diſeaſe.

In one way the obſerver and admirer of this art cannot poſſibly be miſtaken, for he that neglects his teeth, ſuffering them to decay through contempt of public opinion and indolence, may be ſafely pronounced an unhappy character, with many evil propenſities.

The chin alone remains to be noticed in this ſlight ſurvey of the human face, as connected with the internal operations of the ſoul or mind. The projecting chin is ſaid to mark ſomething decided, and the receding the reverſe ; and it has been aſſerted that the preſence or abſence of ſtrength is frequently demonſtrated by the form of this part of the countenance ; it has alſo been remarked, that ſudden indentings in the midſt of the chin are peculiar to men of excellent cool underſtandings, unleſs attended by marks of a contrary tendency. When the chin is pointed, thoſe ſo formed are ſuppoſed to be penetrating and cunning, though it ſeems there are people with pointed chins who are different at leaſt in the latter particular ; and here again the chin offers a certain criterion for the phyſiognomiſt, who may ſecurely pronounce a large fat double chin an appendage of gluttony. "Flatneſs of chin ſpeaks the cold and dry ; ſmallneſs, fear ; and roundneſs, with a dimple, benevolence."

"No one," ſays Lavater, "whoſe perſon is not well formed can become a good phyſiognomiſt. Thoſe painters were the beſt whoſe perſons were the handſomeſt. Reubens, Vandyke, and Raphael, poſſeſſing three gradations of beauty, poſſeſſed three gradations of the genius of painting. The phyſiognomiſts of the greateſt ſymmetry are the beſt. As the moſt virtuous can beſt determine on virtue, ſo can the moſt handſome countenances on the goodneſs, beauty, and noble traits of the human countenance, and conſequently on its defects and ignoble properties. The ſcarcity of human beauty is the reaſon why phyſiognomy is ſo much deſired, and finds ſo many opponents. No perſon, therefore, ought to enter the ſanctuary of phyſiognomy, who has a debaſed mind, an ill-formed forehead, a blinking eye, or a diſtorted mouth. "The light of the body is the eye ; if, therefore, thine eye be ſingle, thy whole body ſhall be full of light ! but if thine eye be evil, thy whole body ſhall be full of darkneſs : if therefore the light that is in thee be darkneſs, how great is that darkneſs !"

PHYSIOLOGI, in *Botany*, thoſe authors whoſe writings tend to ſet that ſtudy in its cleareſt light, by explicating and enumerating the various diſpoſitions of the male and female parts in the flowers of plants.

PHYSIOLOGY, Φυσιολογια, formed of φυσις, *nature*, and λογος, *diſcourſe*, or *reaſon*, the doctrine of nature, or natural bodies ; called alſo *phyſics*, and *natural philoſophy*.

Physiology properly denotes only an internal reaſoning, or diſcourſing, which ſtops or terminates in the ſpeculation, or abſtract contemplation of its object, *viz.* natural appearances, their cauſes, &c. and does not direct or preſcribe rules for the making of natural things, *e. gr.* ſtones, plants, &c.

In which view, chemiſtry does not properly belong to phyſiology, but is a kind of counter part thereto, as in many caſes, imitating nature, rather than conſidering and explaining her.

Physiology, according to its etymological import, ſignifies a diſcourſe on nature ; but it is now uſually employed, in a more limited ſenſe, to denote the ſcience which treats of the powers that actuate the component parts of living animal bodies, and of the functions which thoſe bodies execute. It preſuppoſes therefore a knowledge of the ſtructure of the body, which is the object of anatomy ; the latter is converſant with the dead, the former with the living body ; the one may be called the ſcience of organiſation, the other the ſcience of life.

The principal ſource of our phyſiological knowledge of the human body, is an obſervation of its actions in all the various ſtates comprehended under the general terms of health and diſeaſe. The reſults of the latter are very inſtructive : compariſon of the phenomena during life with the ſtate of parts after death, ſhews us the uſes of many organs, which cannot be ſubmitted to direct obſervation in the living ſtate. But the information derived, even from the moſt attentive ſurvey of the living human being in health and diſeaſe, is ſtill very imperfect : it leaves many intereſting ſubjects entirely unexplained : the viſcera are all ſo hidden by their ſituation, that we can hardly have the teſtimony of our ſenſes for any of their functions in man. The phyſiologiſt ſupplies this deficiency by experiments on living animals, in whom he expoſes the various internal organs, and obſerves the conſequences of circumſtances altered and combined at his pleaſure. It is not our buſineſs to conſider here, whether this uſe of ſentient beings is morally juſtifiable ; or whether it may be advantageous to the individual or ſociety, to ſtifle that internal voice which remonſtrates moſt loudly in every mind not accuſtomed to acts of cruelty, againſt the infliction of pain on beings who ſeem to feel it as acutely as ourſelves : we have only to obſerve that theſe proceedings, however afflicting to the humane, are full of phyſiological inſtruction. A compariſon of the ſtructure and functions of animals in all claſſes of the animal kingdom, is another moſt important ſource of phyſiological knowledge. The aid of chemiſtry is indiſpenſible to the phyſiologiſt in the ſubjects of reſpiration, perſpiration, and the ſecretions ; indeed in unfolding the ſtructure of the body in general.

We muſt refer the reader to various articles of this Cyclopædia, for an account of the phyſiology of man. Under Life and Fibre he will find general views of the ſtructure and actions of the body ; and under Function, a claſſification of the functions. The phyſiology of the thoracic organs will be found under Heart, Circulation, Lungs, and Respiration ; of the lymphatic ſyſtem, under Absorbents and Absorption ; of the blood-veſſels, under Heart and Artery ; of the brain, nerves, and muſcles, under Brain, Nervous *Syſtem*, and Muscle ; of the mechanical preparation of the food, and its deſcent into the ſtomach, under Deglutition ; of the changes wrought on it in the alimentary canal, under Digestion. Further remarks on ſubjects connected with this will be found under Liver, Spleen, Pancreas, Stomach, and Intestines. The phyſiology of the urinary apparatus is conſidered under Kidney. The functions of the organs of ſenſe are explained under Integuments, Eye, Ear, Nose, and Tongue ; and thoſe of the generative organs, under Generation and Embryo. Various phyſiological points are conſidered under Gland, Larynx, Membrane, and Death ; alſo under the article Man. We may alſo refer to Bone, Cartilage, Cellular *Subſtance*, Cranium, and other anatomical articles.

The Inſtitutiones Phyſiologicæ of Blumenbach is the beſt compendium of this ſcience: it is executed with brevity and great neatneſs, and is remarkable for the ſmall quantity of objectionable matter it contains. Its well ſelected references will lead the ſtudent to the beſt ſources of more detailed information. The Firſt Lines of Haller, and the Elements of Phyſiology of Richerand, are inferior to the above-mentioned claſſical production of Blumenbach. The Elementa Phyſiologiæ of Haller is a moſt accurate and uſeful repoſitory of all the facts and opinions relating to phyſiological ſcience up to the period of its publication, and ſuperſedes the neceſſity of all works previous to that date. The works of John Hunter and of Bichat (his Anatomie Generale, and Recherches ſur la Vie et la Mort), the Syſtem of Phyſiology of Dumas, the Leçons d'Anatomie comparée of Cuvier, and the Manual of the ſame ſcience of Blumenbach, with various detached papers in the collections of learned ſocieties in this and foreign countries, are the beſt ſources of information ſubſequent to the work of Haller. More particular references will be found in the different articles.

PHYSKIUM, in *Botany*, φυςκιον, *a little bladder*, is a genus of Loureiro's, found in the waters of Cochinchina, which by his characters and deſcription appears to be very near the *Valiſneria octandra*, Roxb. Coromand. v. 2. 34. t. 165, and probably may be the very ſame plant.

PHYSOCELE, from φυσα, *flatus*, and κηλη, *a tumour*, in *Surgery*, a ſwelling occaſioned by air. See Emphysema.

PHYSOMETRA, in *Medicine*, from φυσαω, *to inflate*, and μητρα, *the womb*, a tympany of the womb, occaſioned by air diſtending that organ. This is, at all events, a very rare diſeaſe, and the accounts given of it by the older authors have probably originated in miſtake. Air, however, appears to be occaſionally generated in the internal cavities of the living body, as Mr. John Hunter ſuggeſted, by a ſort of ſecretion from the blood-veſſels. Sauvages mentions two varieties of the diſeaſe. Noſol. Method. Claſs x. Gen. 14.

PHYSOSPERMUM, in *Botany*, from φυσαω, *to inflate*, and σπερμα, *ſeed*, a genus ſo named by Cuſſon, who removed it from Ligusticum, (ſee that article,) principally on account of the double ſkin of the ſeed, the outer coat being ſeparated by a ſmall cavity from the inner. The plant, on which this ſuppoſed genus depends, is no other than the ſo much talked of, and long ſo little known, *L. cornubienſe* of Linnæus and Fl. Brit. the *L. alterum*, Lob. Ic. 786; ſee Juſſ. Gen. 222.

PHYSSOPHORA, in *Natural Hiſtory*, a genus of the claſs and order Vermes Molluſca. The generic character is this; body gelatinous, pendent from an aerial veſicle, with gelatinous ſeſſile members at the ſides, and numerous tentacula beneath. There are three ſpecies. They are all nearly allied to the Meduſæ, and might perhaps without much impropriety be removed to that genus.

Species.

Hydrostatica. Oval; with numerous, lateral, three-lobed veſicles, open outwardly; middle inteſtine and four larger tentacula red. It inhabits the Mediterranean; is about half an inch long, compreſſed, and always ſwims with the tip of the veſicle above the water.

Rosacea. Orbicular, and imbricate with oblong, horizontal, foliaceous membranes affixed to the veſicle. It is found in the Mediterranean. The body is hyaline, an inch in diameter, and reſembles a full blown flower bending downwards. The veſicle is obtuſe, ovate, reddiſh, and covered with flat, obtuſe, foliaceous membranes, curved and thickly laid.

Filiformis. Lateral members oblong, filiform, and pendent. This is found in the Mediterranean. The body is very tender, not thicker than a thread, and a ſpan long, hyaline, with an obtuſe ovate head, about the ſize of a grain of rice.

PHYSTA, in *Ichthyology*, a name given by Geſner, and ſome others, to the fiſh called by the Greeks, and many of the later authors, *ballerus* and *balerus*. Artedi denies its right to any generical name, reducing it to the genus of the cyprini, to which it evidently belongs, and diſtinguiſhing it from the others of that numerous genus by the ſpecific name of the very broad and thin cyprinus, with forty rays in the pinna ani. See Cyprinus.

PHYSTE, in the *Writings of the Ancient Phyſicians*, a word uſed to expreſs a maſs of meal macerated in a cloſe veſſel with wine, but not left to ferment.

PHYTALIA, a word uſed by the ancients in two very different ſenſes; with ſome expreſſing the latter part of the winter ſeaſon, and with others a place where vines are planted, whether in ſtandard vineyards or otherwiſe.

PHYTEUMA, in *Botany*, a name adopted from Dioſcorides, whoſe φυτευμα, whatever it may have been, appears to have received that appellation from φυτευω, *to ſow* or *plant*. Some have ſuppoſed an alluſion to the reputed qualities of the herb as a philter, which Dioſcorides and Pliny mention. We can trace no reaſon for the Linnæan application of the name, except perhaps in the fiſſures or perforations of the fruit of our *Phyteuma*, to which the Greek deſcription ſeems to allude. Linn. Gen. 89. Schreb. 118. Willd. Sp. Pl. v. 1. 919. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 1. 354. Sm. Fl. Brit. 240. Prodr. Fl. Græc. Sibth. v. 1. 143. Juſſ. 165. Lamarck Illuſtr. t. 124. Gærtn. t. 30.—Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Campanaceæ*, Linn. Juſſ.

Gen. Ch. *Cal.* Perianth ſuperior, of one leaf, in five deep, acute, ſomewhat ſpreading ſegments. *Cor.* of one petal, wheel-ſhaped, ſpreading, in five deep, linear, acute, recurved ſegments. *Stam.* Filaments five, ſhorter than the corolla; anthers oblong. *Piſt.* Germen inferior, roundiſh; ſtyle thread-ſhaped, the length of the corolla, recurved; ſtigma in two or three oblong revolute ſegments. *Peric.* Capſule roundiſh, membranous, of two or three cells, opening by a fiſſure at each ſide. *Seeds* very numerous, ſmall, roundiſh, ſmooth.

Eſſ. Ch. Corolla wheel-ſhaped, in five deep linear ſegments. Stigma in two or three ſegments. Capſule inferior, opening laterally, of two or three cells.

A genus of herbaceous, almoſt uniformly perennial, mountain or alpine, European plants, with handſome blue flowers; nearly allied to *Campanula*, but with a differently ſhaped corolla. Willdenow well remarks, that the alpine ſpecies, and indeed all that are the produce of the more northern or middle regions of Europe, bear a denſe oblong ſpike, or roundiſh head; while the oriental ones generally have diſperſed flowers. In ſenſible qualities the genus agrees with *Campanula;* and the herbage, when wounded, diſcharges a bitter milky fluid. Linnæus has ſix ſpecies in his Sp. Pl. and the ſame number in Syſt. Veg. ed. 14. Willdenow has ſixteen. One only is wild in Britain. Five exotic ſpecies occur in Hort. Kew. one of them before publiſhed by Dr. Sims alone. Three are added to the ſtock in Prodr. Fl. Græcæ, of which one is *Campanula limonifolia* of Linnæus and Willdenow. The alpine ſpecies are, in many inſtances, not free from obſcurity in their characters and ſynonyms, as being liable to vary much, according to ſhade or expoſure of ſituation, in the ſhape of their leaves, length and figure of their ſpikes, as well as in their whole habit and dimenſions. Hence ariſes ſo much obſcurity in their determination, that though we have examined not a few in their native ſtations, and have received ſome authentic ſpecimens from the authors, who have deſcribed them, the difficulty of arranging their ſynonyms, and defining their limits, ſeems rather to grow under our hands. We ſhall attempt to correct ſome errors, in enumerating a few of the moſt certain ſpecies. There can be no good reaſon for perſevering in the old blunder of making *Phyteuma* of the feminine gender.

Ph. *Scheuchzeri.* Willd. n. 2. Allion. Pedem. v. 1. 116. t. 39. f. 2. (Rapunculus, n. 682; Hall. Hiſt. v. 1. 304.)—Flowers in a round head, much exceeded by the long, linear, ſpreading bracteas. Stem leafy. Leaves linear-lanceolate, toothed, ſtalked, rough-edged.—Native of the alps of Switzerland and Savoy.—*Stem* from twelve to eighteen inches high, upright, weak, ſlender, ſmooth, ſimple. *Leaves* from one to three inches long, ſcattered, narrow, bluntiſh, minutely rough at the edges, and beſet with glandular diſtant teeth. *Flowers* not very numerous, in a perfectly round, ſolitary, terminal head. *Bracteas* few, one much longer, and more leafy, than the reſt. *Style* ſlender, hairy upwards. *Style* long, three-cleft, revolute.

Ph. *ſcorzonerifolium.* Villars Dauph. v. 1. 519. t. 12. f. 2.—Spike cylindrical. Bracteas ſhort, reflexed. Stem naked above. Leaves linear-lanceolate, toothed, ſmooth.—Native of the mountains of Dauphiny and Italy. We gathered it on the hill called *la Bocchetta*, above Genoa, in 1787. Willdenow conſiders this as but a variety of the former, to which he was perhaps led by an aſſertion of Villars, that it was ſent by Allioni as his *Ph. Scheuchzeri.* Here muſt have been ſome miſtake. The two ſpecies are eſſentially diſtinct in their infloreſcence, and all the reſt of the characters indicated above. The ſpike in our Genoeſe ſpecimens is in ſeed, and meaſures near two inches in length, though only a quarter of an inch in thickneſs. The *ſtem-leaves* are moſtly ſeſſile, quite ſmooth at the edges, numerous about the lower part of the *ſtem*, though wanting in the upper. Their teeth are more like ſerratures.

Ph. *hemiſphæricum.* Graſs-leaved Rampion. Linn. Sp. Pl. 241. Willd. n. 4. Ait. n. 1. Jacq. Ic. Rar. t. 333.—Head roundiſh. Bracteas ovate, pointed. Leaves linear, nearly entire, about as long as the ſtem.—Native of the alps of Switzerland, Italy, France, and Germany, as well as of the Pyrenees. It has been introduced from time to time into our gardens, but requires the ſhelter of a frame, like many other alpine productions, that are ſo long buried in ſnow in their native ſtations. The *roots* are ſomewhat creeping. *Stems* from two to ſix inches high, aſcending or curved, concealed by the numerous, chiefly radical, narrow, ſmooth *leaves*, which ſometimes overtop them, and whoſe graſſy aſpect characteriſes this ſpecies. The *bracteas* are ſeveral, ſhorter than the head, broad, taper-pointed, ſomewhat membranous, fringed. Two or three of the very earlieſt *leaves* are often ſhort and ſpatulate.

Ph. *comoſum.* Glaucous Rampion. Linn. Sp. Pl. 242. Willd. n. 5. Ait. n. 2. Jacq. Auſtr. append. 56. t. 50.—Flowers in a terminal leafy tuft. Leaves ſtrongly toothed, ſmooth, glaucous; the radical ones heart-ſhaped.—This beautiful ſpecies, ſo remarkable for its very glaucous *herbage*, and purple inflated *flowers*, was firſt found on mount Baldus. It occurs alſo on the alps of Carniola and the Tyrol, but ſcarcely elſewhere. The *ſtem* is but three or four inches high. *Leaves* broad, moſtly elliptical. No obſcurity attends this plant, of which many figures are to be found in the old authors. We have never ſeen a garden ſpecimen. The *root* is biennial.

Ph. *orbiculare.* Round-headed Rampion. Linn. Sp. Pl. 242. Willd. n. 6. Ait. n. 3. Jacq. Auſtr. t. 437. Engl. Bot. t. 142.—Head roundiſh. Leaves crenate; the loweſt ſomewhat heart-ſhaped; the uppermoſt ſeſſile, ovate, pointed.—Found on the mountains of Italy and Switzerland, as well as on the chalky hills of Suſſex and Surry, being the only Britiſh ſpecies. It flowers in Auguſt, and is perennial. The firſt or loweſt *leaves* only are heart-ſhaped; the reſt of the radical ones elliptic-oblong; all crenate, veiny, ſlightly roughiſh: the *ſtem-leaves* are ſcattered, ſeſſile, ſmall, lanceolate or ovate, taper-pointed. *Stem* about a foot high, in luxuriant ground twice as much, crowned with a denſe head of numerous dark-blue *flowers*, ſubtended by ſeveral ovate fringed *bracteas.*—Willdenow ſubjoins as varieties three ſpecies of Villars, which we can ſcarcely think belong to *orbiculare*, though we have not had an opportunity of ſeeing more than two of them. *Ph. lanceolatum*, Villars t. 12. f. 1, we have not ſeen, but the uniformly ovate *leaves*, all ſtalked, indicate a ſtrong ſpecific difference from our *orbiculare*. *Ph. ellipticum*, t. 11. f. 2, is ſtill more different, in its ſhort denſe hairineſs, as well as in its oblong blunt upper *leaves*, and long leafy *bracteas*. *Ph. Charmelii*, t. 11. f. 3, is abundantly diſtinct from all theſe, in its ſmall, violet-like, heart-ſhaped, radical *leaves*, rough with minute points, and ſupported by capillary *footſtalks*, above five times their own length; as well as in its humble *ſtem*, bearing many long, narrow, lanceolate or linear *leaves*, and the long narrow *bracteas* which accompany its ſmall denſe head of *flowers*.

Ph. *repandum.* Olympian Rampion. Sm. Prodr. Fl. Græc. Sibth. v. 1. 143.—Spike rather lax. Leaves elliptic-oblong, ſtalked, wavy, ſmooth. Stem perfectly ſimple, almoſt leafleſs.—Gathered by Dr. Sibthorp on the ſummit of the Bithynian Olympus. The *root* is ſtrong, woody, and perennial, producing many tufts of *leaves* not unlike thoſe of *Globularia nudicaulis*, but leſs coriaceous, and ſomewhat wavy at the margin. *Stems* ſolitary, erect, ſtraight, two, three, or four inches high, ſmooth, bearing one or two diſtant leaves. The *footſtalks* are all fringed at the baſe. *Flowers* blue, in a ſolitary, erect, lax *ſpike*, the lower ones often in pairs, and ſometimes very remote. *Bracteas* linear-lanceolate, fringed. This ſpecies is no where figured.

Ph. *ellipticum.* Elliptical Mountain Rampion. Sm. Prodr. Fl. Græc. Sibth. v. 1. 143. Fl. Græc. t. 217. unpubl. (Ph. campanuloides; Sims in Curt. Mag. t. 1015. Ait. n. 5.)—Spike rather lax. Leaves elliptical, ſtalked, crenate, rough. Stem perfectly ſimple, leafy, hairy.—Native of the Bithynian Olympus and of mount Caucaſus. The *root* is ſomewhat creeping. *Stems*, in the wild plant, from ſix to twelve inches high, erect, more or leſs rough with hoary denſe hairs, and bearing many elliptic or ovate, ſtrongly crenate, roughiſh *leaves*, about an inch and a half long, on fringed *footſtalks* of various lengths. *Flowers* deep blue, in a terminal bracteated *ſpike*, extremely variable in length and luxuriance. In a garden, it ſeems, the *ſtem* becomes ſmooth, and the *ſpike* racemoſe, with ternate *flowers*, which laſt character occaſionally preſents itſelf likewiſe in wild ſpecimens. Dr. Sibthorp's figure, with about ſeven flowers, and that in the Botanical Magazine, exhibit the two extremes of the infloreſcence. Our ſpecimens account for the appellation of *caneſcens*, under which Mr. Lodgiges received the plant; and it is much to be wiſhed that our ſpecific name, antecedent to that in the Magazine, might alſo take place of the probably unpubliſhed Flora Taurica, *campanuloides* being liable to ſeveral objections.

Ph. *betonicifolium*, Villars Dauph. v. 2. 518. t. 12. f. 3; *ſpicatum*, Linn. Sp. Pl. 242. Fl. Dan. t. 362; and *ovatum*, Willd. n. 10, which laſt is Haller's Rapunculus n. 683, are ſufficiently defined in Willdenow, nor does any obſcurity attend theſe ſpecies.

Ph. *limonifolium*. Sea-lavender Rampion. Sm. Prodr. Fl. Græc. Sibth. v. 1. 144. Fl. Græc. t. 218, unpubl. (Campanula limonifolia; Linn. Sp. Pl. 239. Willd. Sp. Pl. v. 1. 914. C. orientalis, limonii minimi facie, flore patulo; Tourn. Cor. 3.)—Leaves lanceolate, roughiſh with reverſed hairs, wavy, and ſomewhat toothed. Stem panicled. Flowers ſeſſile, about three together.—Gathered by Tournefort in the Levant; by Sibthorp in graſſy places towards the ſummit of the Bithynian Olympus. The *root* is very thick and woody, crowned with numerous tufts of narrow, bluntiſh, long-ſtalked, ſpreading *leaves*, about three inches long, and half an inch wide, of a bright green; their ſhort rigid pubeſcence directed backwards, or towards the baſe; their margin either toothed or waved. *Stems* about a foot high, erect, round, ſmooth, leafy, copiouſly branched in an alternate manner; their *branches* ſpreading, leafleſs, beſet with many ſmalliſh, blue, ſeſſile *flowers*, two or three together, having yellow *anthers*, and a rough, reddiſh, club-ſhaped *ſtyle*.

Ph. *lobelioides*. Willd. n. 12. Phytogr. faſc. 1. 6. t. 4. f. 2. (Rapunculus orientalis, heſperidis folio; Tourn. Cor. 4.)—Leaves linear-lanceolate, ſomewhat toothed, rough. Stem panicled. Flowers ſtalked, ſcattered.—Gathered by Tournefort in America. It is very remarkable that ſo great a *corolliſt* ſhould have ſeparated this plant generically from the laſt, their *flowers* agreeing ſo exactly in the depth of their ſegments. Indeed they come ſo near in ſpecific characters, that but for the different diſtributions of their *flowers*, which ſeems conſtant, we could hardly have diſtinguiſhed them.

Ph. *amplexicaule*. Toothed Rampion. Willd. n. 15. Sm. Fl. Græc. Sibth. t. 219, unpubl. (Rapunculus orientalis, campanulæ pratenſis folio; Tourn. Cor. 4.)—Leaves ovate, pointed, ſtrongly and doubly ſerrated, ſmooth; ſlightly heart-ſhaped, and claſping the ſtem. Cluſter leafy, ſomewhat panicled.—Gathered by Dr. Sibthorp, in graſſy ſpots, near the top of the Bithynian Olympus. A very handſome ſpecies, twelve or eighteen inches high, ſmooth and unbranched, with numerous, alternate, ſtrongly and ſharply ſerrated, or toothed, *leaves*, about two inches long. *Flowers* large, bright blue, vying in beauty with the following, but far leſs numerous.

Ph. *pinnatum*. Winged-leaved Rampion. Linn. Sp. Pl. 242. Willd. n. 16. Ait. n. 6. Venten. Jard. de Cels. t. 52. Sm. Fl. Græc. Sibth. t. 220, unpubl. (Rapunculus creticus, ſeu Pyramidalis altera; Tourn. Inſt. 113. Petromarula di Candia, overo lattuca petrea; Pon. Bald. 96. Imperati Hiſt. Nat. 668.)—Leaves pinnate. Panicle cylindrical, branched, many-flowered.—Very common on the rocks and mountains of Crete, but does not appear to be found wild any where elſe. Parkinſon is ſaid to have cultivated this beautiful plant in 1640; but it had long been loſt to our collections, till Dr. Sibthorp brought ſeeds, which produced flowering plants at Dr. Pitcairn's, Iſlington, from whom we obtained a ſpecimen in 1791, there being none previouſly in the Linnæan herbarium. The wooden cuts of Pona and Imperati are good and original; but the beſt hiſtory of the plant is given, from Honorius Belli's letter to Cluſius, by the former. This all writers have copied, and Ventenat attributes the credit of ſome of it to J. Bauhin, who certainly has nothing original on the ſubject. Ventenat alſo errs, in his own obſervation, when he ſays the ſimple ſtigma diſagrees with the character of *Phyteuma*. But this part, though drawn ſimply capitate in his plate, is truly three-cleft, as drawn by Bauer. The *root* is perennial, thick and milky, eaten, like that of *Campanula Rapunculus*, being ſuppoſed of an aphrodiſiac quality. The firſt *leaves* are ſimply heart-ſhaped, like thoſe of violets; the reſt pinnate, ſometimes interruptedly, a ſpan long, ſmooth, deeply ſerrated; pale, and often purpliſh, beneath; their terminal leaflet heart-ſhaped, the reſt obliquely ovate, ſtalked. *Flowers* very abundant, in a long, erect, terminal, denſe, *panicle*, with cymoſe branches; their ſtalks glaucous and purpliſh; their *corolla* and *ſtamens* of a lilac hue.

PHYTOLACCA was firſt ſo called by Tournefort, from φυτὸν, *a plant*, and *lacca*, a barbarous word, deſignating a kind of colouring ſubſtance; ſee LAKE or LAQUE; becauſe the berries of ſeveral ſpecies of this genus afford a beautiful, though not laſting, purple or crimſon dye.—Tourn. t. 154. Linn. Gen. 233. Schreb. 313. Willd. Sp. Pl. v. 2. 822. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 3. 139. Sm. Prodr. Fl. Græc. Sibth. v. 1. 318. Juſſ. 84. Lamarck Illuſtr. t. 393. Gærtn. t. 77.—Claſs and order, *Decandria Decagynia*. Nat. Ord. *Holeraceæ*, Linn. *Atriplices*, Juſſ.

Gen. Ch. *Cal.* inferior, of five roundiſh, concave, ſpreading, coloured, permanent leaves, inflexed at the ſummit. *Cor.* none. *Stam.* Filaments ten, or eight, or twenty, awl-ſhaped, the length of the calyx; anthers roundiſh, lateral. *Piſt.* Germen ſuperior, orbicular, depreſſed, marked with alternate furrows and ribs; crowned with ten, or eight, or five, or ſeven, very ſhort, ſpreading, reflexed ſtyles; ſtigmas ſimple, permanent. *Peric.* Berry orbicular, depreſſed, furrowed, with ten, or eight, or five, or ſeven, cells, the ſummit hollowed, lodging the ſtyles. *Seeds* ſolitary in each cell, kidney-ſhaped, ſmooth.

Obſ. *Ph. dioica* has the flowers of diſtinct ſexes, on different plants. Linnæus having now fixed the place of this genus, amongſt his *Holeraceæ*, not *Miſcellaneæ*, it becomes neceſſary to reform his generic character, as to the flower having a *calyx*, not a *corolla*, on which ſubject he ſpeaks with doubt in his Gen. Pl.

Eſſ. Ch. Calyx of five coloured leaves. Corolla none. Berry ſuperior, of five or ten cells, and as many ſeeds.

The genus before us is remarkable for having all its ſpecific differences depend on the number or ſituation of the organs of impregnation; ſo that, ſtrictly ſpeaking, every ſpecies belongs to a different claſs or order of the artificial ſyſtem. No genus, notwithſtanding this irregularity, can be more natural. Linnæus knew but four ſpecies; Willdenow has ſix, five of them in the gardens of England. It is worthy of remark, that the two new ſpecies, diſcovered ſince Linnæus wrote, differ in the number of their ſtamens and ſtyles from each other, as well as from all thoſe originally deſcribed, ſo as to preſerve the unity of the principle according to which they are all diſcriminated.

1. Ph. *octandra*. White-flowered Phytolacca, or Pokeweed. Linn. Sp. Pl. 631. Willd. n. 1. Ait. n. 1. (Ph. mexicana, baccis ſeſſilibus; Dill. Elth. 218. t. 239. f. 308. Sjooríku, vulgò Jamma Gobó; Kæmpf. Amoen. 828. t. 829.)—Stamens and ſtyles eight.—Native of Mexico, as well as of Japan. The *root* is perennial, long and fleſhy, according to Kæmpfer eatable, and like a turnip. *Stem* herbaceous, thick, fleſhy, alternately branched, leafy,

ſmooth, from three to ſix feet high. *Leaves* alternate, ovate, with a glandular point, ſmooth, wavy, veiny, reſembling thoſe of a *Rumex* or *Beta*, on thick ſtalks. *Flowers* white, numerous, in denſe, cylindrical, terminal, ſolitary ſpikes. *Berries* ſeſſile, black, the ſize of a large pea. The whole plant has a coarſe rank habit, like a dunghill herb, and ſmells unpleaſantly when bruiſed.

2. Ph. *ſtricta.* Erect Phytolacca. Willd. n. 2. Hoffm. Comm. Goett. v. 12. 27. t. 3. (Ph. heptandra; Retz. Obſ. faſc. 6. 29.)—"Stamens eight. Styles ſeven. Leaves lanceolate, pointed."—Native of America. We have ſeen no ſpecimen. Retzius deſcribes it as follows. *Root* perennial. *Stem* two feet high, branched, erect, ſtriated, ſmooth, hollow. *Leaves* ſcattered, ſtalked, lanceolate, entire, ſmooth, an inch and a half long. *Flowers* racemoſe, with ſeveral ſmall awl-ſhaped *bracteas*, at or near the baſe of their partial ſtalks. *Calyx* white within. *Stamens* ſeven. *Styles* ſix. *Berries* yellow, pellucid, of ſix diſtinct lobes, or grains. Hoffmann and Willdenow both give the number of *ſtamens* and *ſtyles* as above.

3. Ph. *abyſſinica.* African Phytolacca. Willd. n. 3. Ait. n. 2. Hoffm. Comm. Goett. v. 12. 28. t. 2. (Ph. dodecandra; L'Herit. Stirp. 143. t. 69.)—Stamens ten. Styles five. Said to have been brought from Abyſſinia, by Mr. Bruce, in 1775. It is a ſhrub, kept in the ſtove, and flowering in May and June. *Stem* ſix feet high. *Branches* ſlender and ſpreading. *Leaves* ſtalked, ſpreading, ovate, wavy, tipped with an acute, reflexed, channelled point. *Cluſters* long, drooping, downy, of many greeniſh downy *flowers*. *Berry* deeply lobed, red, with orange-coloured juice. L'Heritier found the *ſtyles* and *ſeeds* moſt commonly but five; the *ſtamens* uſually fifteen. Both are acknowledged to be variable. Our garden ſpecimen, in the collection of the younger Linnæus, bears the name of *Ph. ſcandens*, which we find no where in print, nor does it ſeem to agree with the character of the ſhrub.

4. Ph. *decandra.* Common Phytolacca, or Virginian Poke-weed. Linn. Sp. Pl. 631. Willd. n. 4. Ait. n. 3. Curt. Mag. t. 931. Mill. Illuſtr. t. 36.—Stamens and ſtyles ten.—Native of America, now naturaliſed in Spain, Portugal, Barbary, Zante and Greece. With us it is a tolerably hardy perennial, flowering from July to the end of autumn, forming a large herbaceous buſh, decorated at once with cluſters of greeniſh-white *flowers* and dark purple *berries*. The latter are ſaid to have ſometimes ſerved in Portugal. to improve the colour of ſuch red port as is compounded in that country, not in England.

5. Ph. *icoſandra.* Red Phytolacca. Linn. Sp. Pl. 631. Willd. n. 5. Ait. n. 4. (Ph. ſpicis florum longiſſimis, radice annua; Mill. Ic. v. 2. 138. t. 207.)—Stamens twenty. Styles ten.—Native of the Eaſt Indies. Annual with us, if planted abroad; but perennial in a ſtove, flowering in autumn. The *ſtem* is herbaceous, three or four feet high. *Leaves* rather narrower than in the laſt. *Cluſters* erect, long, and taper-pointed, of numerous bluſh-coloured *flowers*, the lowermoſt of which, Linnæus ſays, have certainly twenty *ſtamens*. By Miller's account the generality have much fewer. *Berries* dark purple, on rather ſhort partial ſtalks.

6. Ph. *dioica.* Tree Phytolacca. Linn. Sp. Pl. 632. Willd. n. 6. Ait. n. 5. L'Herit. Stirp. 145. t. 70.—Flowers dioecious, with many ſtamens.—Native of South America. Miller cultivated this ſpecies in 1758, and L'Heritier ſays it is extremely common in European gardens. The Hortus Kewenſis marks it as a ſtove ſhrub, without any mention of its flowering. The *ſtem* is thick, ten or twelve feet high, with round ſmooth leafy branches. *Leaves* preciſely ovate, pointed, ſmooth, entire, on long ſtalks. *Cluſters* drooping, ſomewhat downy. *Flowers* greeniſh-white; the female ones ſmalleſt. *Berries* large, crowded, pale, much depreſſed and umbilicated.

The *leaves* of all the ſpecies that we have ſeen terminate in an awl-ſhaped, channelled, pale or coloured, ſomewhat glandular point, or appendage, which ſeems characteriſtic of the genus.

Phytolacca, in *Gardening*, affords plants of the herbaceous hardy kinds, of which the ſpecies cultivated are; the white-flowered phytolacca (P. octandra); the branching phytolacca, or Virginian poke (P. decandra); the red phytolacca (P. icoſandra); and the tree phytolacca (P. dioica).

The firſt ſort is in ſome places found a palatable wholeſome green: the tender ſtalks being frequently ſerved up as young aſparagus.

Alſo, in ſome places the young ſhoots of the ſecond ſort are boiled and eaten as ſpinach.

The fruit in the third ſort is a globular berry.

Method of Culture.—The three firſt ſorts may be increaſed by ſeeds, which ſhould be ſown in pots, in the ſpring, and plunged in a moderate hot-bed; when the plants have had a few inches growth, they ſhould be removed into ſeparate pots in the firſt and third ſorts, but in the ſecond into the borders or other parts, allowing them good room. The two former may be ſet out in warm borders or other places during the ſummer in pots, being carefully watered, ſhaded, and kept free from weeds.

The fourth ſort may be raiſed by planting cuttings in the ſummer ſeaſon, in pots filled with light earth, plunging them in the bark hot-bed and covering the pots with hand-glaſſes, proper ſhade being given. When well rooted, they ſhould be removed into ſeparate pots of a ſmall ſize, replunging them in the hot-bed with proper ſhade till rooted, when they ſhould be gradually inured to the open air, being removed into a moderate ſtove during the winter ſeaſon.

The firſt ſorts afford ornament and variety among potted plants of the ſtove kind; and the ſecond ſort, in the borders of the natural ground.

PHYTOLOGI, Phytologists, authors who have written any treatiſe on botany, or the hiſtory or uſes of vegetables.

PHYTOLOGY, Φυτολογια, compounded of φυτον, *plant*, and λογος, *diſcourſe*, of λεγω, *I deſcribe*, or *rehearſe*, a diſcourſe upon plants, or a deſcription of their forms, kinds, properties, &c.

PHYTOTOMA, in *Ornithology*, a genus of birds of the order Paſſeres. The generic character is; bill conic, ſtraight, ſerrate; noſtrils oval; tongue ſhort and obtuſe; feet four-toed. There is but a ſingle ſpecies; *viz.*

Rara, which inhabits Chili, about the ſize of a quail; it has a harſh interrupted cry, reſembling the ſyllables *ra ra*; it feeds on freſh vegetables, which it cuts down near the roots with its bill as with a ſaw, and is, on account of the miſchief which it does to gardens, deteſted by the natives: it builds in high ſhady trees in retired places; the eggs are white, ſpotted with red. The bill of this bird is thick, and about half an inch long, toothed on each ſide like a ſaw; the irides are brown; the body above is of a duſky aſh, beneath it is paler; the quill and tail-feathers are ſpotted with black; tail rounded; the hind toes ſhorter than the fore ones.

PHYZANIA, in *Ancient Geography*, the name of a country of Africa, according to Ptolemy.

PIA Mater, in *Anatomy*, one of the coverings of the brain. See Brain and Nervous *Syſtem*.

PIABA, in *Ichthyology*, the name of a ſmall freſh-water fiſh, caught in all the rivers and brooks in the Braſils, and ſome other parts of America.

It is of the ſize of the common minow; is a well-taſted fiſh, and much eſteemed by the natives.

PIABUCU, the name of an American fiſh eaten by the natives in many places. It is a ravenous fiſh, and ſo greedy of blood, that if a man goes into the water with a wound in any part of his body, this fiſh will make up to it to ſuck the blood: it is a ſmall fiſh, ſeldom exceeding four inches in length. See Salmo *Argentinus*.

PIACENZA, in *Geography*. See Placentia.

PIACHE, Piazza, a covered arched walk, or portico. See Portico and Piazza.

PIADA, in *Ancient Geography*, a town of Aſia, in Serica, between Damna and Aſmiræa. Ptolemy.

PIADELLA, in *Geography*, a town of Italy, in the department of the Lario; 20 miles N. of Como.

PIADENA, a town of Italy, in the department of the Mincio; 16 miles W. of Mantua.

PIAFFEUR, in the *Manege*, is a proud, ſtately horſe, being full of mettle, or fire, reſtleſs and forward, with a great deal of motion, and an exceſſive eagerneſs to go forwards, makes this motion the more that you endeavour to keep him in, and bends his leg up to his belly. He ſnorts, traverſes if he can, and by his fiery action ſhews his reſtleſſneſs; whence ſome, though very improperly, ſay, he dances.

Such horſes as theſe, or ſuch as are bred to paſſage upon a ſtraight line, are much admired in carouſals and magnificent feſtivals. See Snort, and Passade.

PIALAPOUR, in *Geography*, a town of Bengal; 20 miles N. of Dacca. N. lat. 23° 35′. E. long. 90° 8′.

PIALITZ, a river of Ruſſia, in the government of Archangel, on the coaſt of the White ſea, near Pialitza. N. lat. 66° 10′. E. long. 37° 44′.

PIALITZA, a town of Ruſſia, in the government of Archangel, on the coaſt of the White ſea; 100 miles N. of Archangel.

PIAL-UL-GEEL, a town of Pruſſia, in the circle of Natangen; 10 miles E. of Lick.

PIALZY, a town of Hindooſtan, in the country of Dindigul; 23 miles W.N.W. of Dindigul. N. lat. 10° 28′. E. long. 17° 37′.

PIANA, a town of the iſland of Corſica; nine miles N.W. of Vico.—Alſo, a river of Ruſſia, which runs into the Sura, near Yadrin, in the government of Kazan.—Alſo, a ſmall iſland near the N. coaſt of Sardinia. N. lat. 41°. E. long. 8° 27′.—Alſo, a ſmall iſland near the W. coaſt of Sardinia. N. lat. 39° 17′. E. long. 8° 25′.—Alſo, a ſmall iſland in the Mediterranean, near the coaſt of Naples. N. lat. 40° 13′. E. long. 12° 55′.

PIANEG, a town of Ruſſia, in the government of Viatka; 16 miles E.N.E. of Yarenſk.

PIANELLO, a town of the iſland of Corſica; 18 miles E. of Corte.

PIANEZZA, a town of France, on the Dora; four miles W. of Turin.

PIANISSIMO, in the *Italian Muſic*. See Piano.

PIANKANSHAWS, or Pyankeshaws, *Vermilions* and *Muſcontins*, in *Geography*, are tribes of Indians in the Indiana territory, who reſide on the Wabaſh and its branches, and Illinois river. Theſe, with the Kickapoos, Muſquitons, and Ouiatanons, could together furniſh about 1250 warriors, in the year 1780.

PIANKATUNK, a ſmall river of Virginia, which runs E. into Cheſapeak bay, oppoſite to Gwin's iſland; navigable eight miles for ſmall craft.

PIANO, a town of Italy, in the department of the Panaro; 16 miles S.W. of Modena.

Piano *della Corte*, a town of Naples, in Principato Citra; 12 miles N.N.W. of Cangiano.

Piano *Picola*, a town of Naples, in Capitanata; two miles W. of Vieſte.

Piano, an Italian muſical term implying ſoft, with a ſubdued voice, was at firſt only uſed in repeating ſhort paſſages in the way of echo. It was no otherwiſe uſed by Corelli. At preſent its uſe is extended to whole periods in the way of chiaro-ſcuro, and contraſt to *forte*, loud, in every degree of compariſon. It is abridged to *pia*, and the initial letter P., as is its ſuperlative degree, *pianiſſimo*, to *pianiſs*, and *pp*. Sometimes *pp*. ſtands for *pian piano*, when it has ſomewhat more force.

Piano *Forte*, a keyed inſtrument, of which the tone is produced by hammers inſtead of quills, like the virginal, ſpinet, and harpſichord. There is a minute account of the invention, and a deſcription of the piano forte, in the "Giornale d'Italia," tom. v. p. 144, printed at Venice, 1711. This inſtrument was invented at Florence, by Bartolommeo Criſtofali, harpſichord maker, a native of Padua, in the ſervice of the grand duke of Tuſcany. For the hiſtory of the piano forte, ſee Harpsichord.

PIANOSA, in *Geography*, a ſmall iſland in the Mediterranean, near the coaſt of Etruria, anciently called "Plunatia," and uſed as a place of exile. Its flat ſurface is a league in extent, elevated only a few feet above the level of the ſea; an uncultivated rock, abandoned to wild goats; dangerous to navigators in the night; ſeven miles S.S.W. from the iſland of Elbe. N. lat. 42° 42′. E. long. 10° 15′.

PIAPET, or Magpie, in *Ornithology*. See Corvus *Pica*.

PIAPIS Harbour, in *Geography*, a port on the N. coaſt of the iſland of Waygoo, on the Equator. E. long. 130° 45′.

PIAQUEMINES, a river of Louiſiana, which runs into the Miſſouri, N. lat. 38° 25′. W. long. 91° 37′.

PIARANTHUS, in *Botany*, from πιαρος, *fat* or *thick*, and ανθος, *a flower*, a genus ſeparated by Mr. R. Brown from *Stapelia*, becauſe it wants the external crown. Brown Tr. of the Wernerian Society, v. 1. 23. Claſs and order, *Pentandria Digynia*. Nat. Ord. *Contortæ*, Linn. *Apocineæ*, Juſſ. *Aſclepiadeæ*, Brown.

Eſſ. Ch. Corolla bell-ſhaped, five-cleft, fleſhy, including the column of fructification. Crown of the ſtamens ſingle, of five leaves, toothed at their back. Anthers ſimple at the ſummit. Maſſes of pollen erect, attached by the baſe, cartilaginous and pellucid at one edge. Stigma pointleſs. Follicles . . . .

There are but two certain ſpecies.

1. P. *punctatus*. (Stapelia punctata; Maſſon Stapel. 18. t. 24. Willd. Sp. Pl. v. 1. 1289. Ait. Hort. Kew. v. 2. 92.)—Branches decumbent, jointed. Flower-ſtalks axillary, longer than the corolla. Found by Mr. Maſſon in the Namaqua lands, at the Cape of Good Hope. He ſent it to Kew in 1795, and it flowers there, in the dry ſtove, during moſt part of the autumn. The joints of the *branches* are obovate, ſquariſh, of a dark glaucous green, beſet with numerous prominences, each of which is tipped with a brown tooth. *Flower-ſtalks* axillary from the prominences, ſeveral together, an inch and a half long, ſmooth, purpliſh, ſingle-flowered. *Flowers* about an inch wide; internally pink, dotted with minute crimſon tubercles: externally whitiſh; the ſegments ſpreading, acute.

2. P. *pullus.* (Stapelia pulla; Maſſon Stapel. 21. t. 31. Willd. Sp. Pl. v. 1. 1288. Ait. Hort. Kew. v. 2. 92.)—Branches erect, with about ſix angles. Flower-ſtalks lateral, ſhorter than the corolla. Diſcovered by Mr. Maſſon in the hot ſandy region of Karrò in ſouthern Africa. He introduced it at Kew ſo early as 1774, and it flowers in Auguſt and September in the dry ſtove. The *ſtems* or *branches* form a thick tuft, about a ſpan high, of a light green, ſlightly glaucous; their angles beſet with ſtrong brown teeth. *Flowers* two or three together, on ſhort ſimple ſtalks, from the ſides of the branch, remote from the teeth. *Corolla* about an inch long, ſlightly ſpreading, acute; dark brown within; whitiſh, with five purple ribs, without; the edges revolute.

Theſe plants ſo preciſely accord with various *Stapeliæ* in every point of habit, that we ſhould preſume the ſingleneſs of the crown can afford no legitimate generic diſtinction, any more than the difference between five and ten ſtamens in *Ceraſtium,* the want or preſence of a nectary in *Tilia,* and other ſimilar caſes.

PIASANSKOI, Niznei, in *Geography,* a town of Ruſſia, in the government of Tobolſk, near the Frozen ſea. N. lat. 69° 16′. E. long. 87° 14′.

Piasanskoi, *Verchnei,* a town of Ruſſia, in the government of Tobolſk, near the Frozen ocean. N. lat. 68° 30′. E. long. 87° 14′.

PIASKY, a town of Poland, in the palatinate of Lublin; 12 miles E.S.E. of Lublin.

PIASTER, or Piastre, a Spaniſh money, more ordinarily called a *piece of eight.*

PIASTLA, in *Geography,* a town of Mexico, in the province of Chiametlan, on the river Piaſtla, which runs into the Pacific ocean, N. lat. 23° 25′. The town is ſituated at the diſtance of 50 miles N.W. of Chiametlan.—Alſo, a town of Mexico, in the province of Guaſteca; 15 miles S. of Panuco.—Alſo, a town of Mexico, in the province of Tlaſcala; 55 miles S. of Puebla de los Angelos.

PIASTRE, in *Commerce.* See Piaster, or Piece *of eight.*

Piastre is alſo a money of account and ſilver coin in Turkey, and the Levant. The piaſtre of Aleppo, and of its port, Alexandretta or Scanderoon, is accounted at 80 aſpers, or 24 ſyainos. The piaſtres of Alexandria are valued at 40 medini, each medino being ſubdivided into 8 borbi, or 6 forli, or 3 aſpers. The piaſtre at Algiers is the ſame with the *pataca gourda,* which ſee. At Grand Cairo accounts are kept, by European merchants, in piaſtres of 40 medini; but the Levanters reckon only in medini.

Conſtantinople and the whole of Turkey keep accounts in piaſtres, commonly called grouch by the Turks, and by the Engliſh, dollars. Each piaſtre is divided into 40 paras, and each para into three aſpers. Theſe are real coins; but the piaſtre is alſo ſometimes divided into 80, and ſometimes into 100 imaginary parts, called aſpers or minas. A jux or juck is a ſum of 100,000 real aſpers: a chiſe or purſe is 500 ditto. The gold coin, called ſequin fonducli, was coined in 1764; 100 of theſe weigh 5415 Engliſh grains, and they are about 23 carats fine; it paſſed at firſt for $3\frac{1}{2}$ piaſtres, or 440 aſpers, but its price was gradually raiſed to four piaſtres; and in 1769 moſt of them were called in for a new coinage. The dollar or piaſtre is a ſilver coin of 40 paras. By the regulations of 1780, the purſe of 500 piaſtres was to weigh $2812\frac{1}{2}$ Turkiſh drams, ſo that a ſingle piaſtre weighed $5\frac{5}{8}$ drams, or 277 Engliſh grains, and the other pieces in proportion. The ſtandard of fineneſs was reduced at the ſame time to 50 carats (or hundredth parts) of fine ſilver, and 50 of alloy; which gave the value of the piaſtre at $19\frac{1}{4}$*d.* ſterling, and the other ſilver coins in proportion. But ſince that period the Turkiſh have ſuffered a deterioration. Dr. Kelly, the author of the Univerſal Cambiſt, has cauſed a piaſtre of the lateſt coinage to be weighed and aſſayed, by the king's aſſay-maſter of the mint, and the report is as follows: weight, 8 dwt. 6 gr. Fineneſs, 5 oz. 6 dwt. worſe than the Engliſh ſtandard. This gives its fineneſs 47 carats 2 grains Turkiſh, and its value in ſterling $13\frac{1}{2}$*d.* Venetian ſequins paſs at preſent for $9\frac{1}{2}$ piaſtres; Dutch, Imperial, and Hungarian ducats, for 9 piaſtres; Spaniſh dollars, and German rix-dollars or Imperial tallaris (called by the Turks cara grouch) for $4\frac{1}{3}$ piaſtres.

Damaſcus keeps accounts in piaſtres of 80 aſpers like Aleppo, and has the ſame coins as Conſtantinople. Smyrna keeps accounts in piaſtres or dollars; which the Engliſh and Swedes reckon at 80 aſpers; the Dutch, French, and Venetians at 100; and the Turks, Greeks, Perſians, and Armenians, at 120 aſpers. This piaſtre (called by the Turks grouch) is alſo divided into 12 temins, and 40 paras or medini. Tripoli keeps accounts in piaſtres, of 13 grimellini, or 52 aſpers. The grimellin is valued at 6 ſous Tournois, which makes the piaſtre of Tripoli worth 3*s.* 3*d.* ſterling. At Tunis accounts are kept in piaſtres, of 52 aſpers; each aſper being divided into 12 borbes.

The aſſay, &c. of the Turkiſh piaſtres is as follows:

	Aſſay.	Weight.	Contents in pure Silver.	Value in Sterling.
	oz. dwt.	oz. dwt. grs.	grains.	s. d.
Piaſtre of Muſtapha III. (1757)	W. 4 11	0 12 7	161	1 $10\frac{1}{2}$
Piaſtre of Abdul. Hamed (1773)	W. 5 2	0 12 7	147.5	1 $8\frac{1}{2}$
Another of the ſame period -	W. 4 9	0 12 0	159.6	1 $10\frac{1}{4}$
Double piaſtre of Selim (1789)	W. 5 12	0 16 $22\frac{1}{4}$	186.4	2 2
Piaſtre of Selim (1801) -	W. 5 6	0 8 0	96.7	1 $1\frac{1}{4}$
Half piaſtre -	W. 6 13	0 4 1	35.9	0 5
Piaſtre of Crim Tartary (1778) -	W. 6 13	0 10 5	91.9	1 $0\frac{3}{4}$
Piaſtre of Tunis (1787) -	W. 6 $5\frac{1}{2}$	0 10 0	96.5	1 $1\frac{1}{2}$

N.B. W. denotes worſe than Engliſh ſtandard.

The piaſtre and other ſilver coins bear the ſame inſcriptions as the gold coins, and the ſame differences exiſt in them. The inſcriptions on the ſingle, double, and half piaſtres of Selim of 1789 are ſimilar to thoſe on the ſequin fonducli of this prince, which has on one ſide, *Sultan Selim, ſon of Muſtafa Khan,* and on the reverſe, *Struck at Slambul,* in the year 1203, being the date of the Hegira, which began in 622 of the Chriſtian era. The piaſtre of Tunis bears on one ſide the words, *Sultan of the two lands, and ſovereign of the two ſeas, Sultan Selim Khan, bleſt with victory:* and on the reverſe, *Struck at Tunis,* in the year, &c. See Kelly's Univerſal Cambiſt.

Piastre is alſo the French for a *dollar;* which ſee.

PIASTRINE. See Pistereen.

PIAT Sopok, in *Geography,* a cluſter of five iſlands, among the Fox iſlands, in the North Pacific ocean. N. lat. 53° 24′. E. long. 189° 46′.

PIATEK, a town of Samogitia; 15 miles N.N.E. of Miedniki.

Piatek, or *Piontek*, or *Prontko*, a town of the duchy of Warſaw, celebrated for its beer; eight miles N.N.E. of Lenczicz.

PIATIA, a town of Naples, in Calabria Ultra; eight miles S.W. of Gierace.

PIATIGER, a town of Ruſſia, in the government of Viatka; 16 miles E. of Kai.

PIATNITZKA, a town of Ruſſia, in the government of Tobolſk; 28 miles N.N.W. of Eniſeiſk.

PIATTA, a town of Italy, in the county of Bormio; two miles S. of Bormio.

PIATTI. See Patti.

PIATZINA, a town of Ruſſia, in the government of Olonetz; 32 miles N.W. of Kargopol.

PIAUBAU, in *Ornithology*. See Muscicapa *Rubricollis*.

PIAVE, in *Geography*, a river which riſes in the Tyroleſe, croſſes the Feltrin and Treviſan, and runs into the Adriatic; 16 miles N.E. of Venice.

PIAVO, a lake of Ruſſia, in the government of Archangel. N. lat. 66° 30′. E. long. 30° 14′.

PIAW, a river of Mexico, which runs into the bay of Honduras, N. lat. 15° 52′. W. long. 85° 50′.

PIAZIDA, a river of Ruſſia, which riſes in lake Piazinſkoi, in the government of Tobolſk, N. lat. 69° 40′. E. long. 89° 14′, and runs into the Kargſkoi ſea, at Verchnei Piazinſkoi. N. lat. 73° 30′. E. long. 87° 14′.

PIAZZA, a town of Naples, in Principato Citra; 14 miles E.N.E. of Salerno.—Alſo, a town of Sicily, in the valley of Noto, ſituated nearly in the centre of the iſland, and containing 18,000 inhabitants; 25 miles N. of Alicata. N. lat. 27° 23′. E. long. 14° 22′.

Piazza, in *Building*, properly called *piache*, an Italian name for a portico, or covered walk, ſupported by arches. The word literally ſignifies a broad open place, or ſquare; whence it alſo became applied to the walks, or porticos around them. See Portico.

PIAZZOLA, in *Geography*, a town of Corſica; 3 miles E.S.E. of La Porta.

PIBERSTAIN, a town of Auſtria; 10 miles W. of Freyſtatt.

PIBGORN, Welſh. See Hornpipe.

PIBIGGA, in *Geography*, a town of Hindooſtan, in Bahar; 35 miles S.W. of Patna.

PIBRAC, a town of France, in the department of the Upper Garonne; 9 miles W. of Toulouſe.

PIC, or Pike, in *Commerce*, a long meaſure in Turkey, which at Aleppo is equal to 299.8 French lines, or $26\frac{2}{3}$ Engliſh inches. At Conſtantinople it is of two ſorts: the longeſt, called Halebi, or Archim, with which ſilks and woollens are meaſured, is 314 French lines, or $27\frac{9}{10}$th Engliſh inches in length; the other, called Endaſſé, with which cotton goods and carpets are meaſured, is 3 per 100 ſhorter. But in the general courſe of European trade the pike is reckoned at $\frac{3}{4}$th of an Engliſh yard. But in different places it is of different lengths. In the iſle of Cyprus the pic or ell meaſures $26\frac{11}{24}$ Engliſh inches. At Damaſcus it is $22\frac{14}{15}$ Engliſh inches. The Morocco pic, or pic Moriſco is $26\frac{1}{3}$ Engliſh inches; ſo that 108 pics = 79 Engliſh yards. The long pic of Algiers is 24.5 Engliſh inches, and the ſhort pic = 18.4 inches. The pic of Candia is 25.1 Engliſh inches; that of Corfu, 22.6; that of Jeruſalem, 27; that of Negropont, 23.4; that of Oran, 27; that of Rhodes, 29.7; the long pic of Scio, 27, and the ſhort, 26; that of Sidon, 23.8; that of Smyrna, 27; that of Tripoli, 27; the woollen pic of Tunis, 26.5; the ſilk ditto, 24.8; and the linen ditto, 18.6 Engliſh inches.

Pic *de l'Etoile, Le*, in *Geography*, a ſmall iſland in the South Pacific ocean, ſo named from its reſemblance in form to a ſugar-loaf, by M. Bougainville in 1768. It is one of the group called by Quiros "Terra Auſtral del Spiritu Santo," by Bougainville "the Archipelago of the Great Cyclades," and by Cook "New Hebrides." S. lat. 14° 29′. E. long. 168° 9′.

Pic *Lamanon*, a mountain on the W. coaſt of the iſland of Saghalien, ſo called by Perouſe. N. lat. 48° 40′.

Pic *Martiniere*, a mountain on the W. coaſt of Saghalien, ſo called by Perouſe, after the name of a French botaniſt, the companion of his voyage, on account of the great number of curious plants found there.

Pic *de Luco*, a town of the duchy of Spoleto; 16 miles S.S.E. of Spoleto.

Pic-*bœuf*, in *Ornithology*. See Buphaga *Africana*.

Pic *de Cayenne, Petit*. See Yunx *Minutiſſima*.

Pic *Noir, &c. &c.* See Picus.

PICA, or Pye, in *Eccleſiaſtical Antiquity*, was a term formerly uſed in the ſame ſenſe with *ordinal*, for a table or directory, pointing out the order in which the devotional ſervices appointed for different occaſions were to be performed. Accordingly ſome derive it from Πι, a contraction of πιναξ, *a table*; and others from *litera picata*, a great black letter at the beginning of ſome new order in the prayer. In much the ſame ſenſe the term was uſed by officers of civil courts, who called their calendars or alphabetical catalogues directing to the names and things contained in the rolls and records of their courts, the *Pyes*.

Pica, in *Geography*, a river of South America, which runs into the Pacific ocean, forming a harbour at its mouth. S. lat. 20° 12′.

Pica *de Regalados*, a town of Portugal, in the province of Entre Duero e Minho; 5 miles N.N.E. of Braga.

Pica, in *Medicine*, called alſo *malacia*, and by the Greeks κιττα, *citta*, ſignifies a depraved ſtate of the appetite, which induces the patient to crave and ſwallow unuſual and indigeſtible things, ſuch as chalk, aſhes, coals, pitch, ſalt, cinders, &c. Why the appellation of *pica* was given to this morbid appetite we know not: ſome writers aſſert that the bird called *pica* (the pic) is ſubject to the diſeaſe.

This morbid longing for uneatable ſubſtances occurs principally in women, and that under two conditions of the uterine ſyſtem; namely, in a ſtate of chloroſis, in the unimpregnated female, and in the early months of pregnancy. The proximate cauſe of the deranged appetite is, doubtleſs, a morbid ſtate of the ſtomach and its ſecreted fluids, which we know to be commonly produced by the ſympathy with the uterus in the early period of pregnancy in general, and to accompany the chlorotic condition. It has been ſuppoſed that the prevalence of an acid in the ſtomach occaſioned this demand for earthy and abſorbent ſubſtances: but many of the ſubſtances, taken in different inſtances, are not poſſeſſed of any antacid qualities. The diſorder is very frequently beyond the power of medicine to relieve in a direct way. In the caſe of pregnancy, it commonly ceaſes altogether about the fourth month, and has been relieved by blood-letting in ſtrong and plethoric women: but in chlorotic girls it is only removed by the courſe of medicine, which removes the morbid ſtate of the habit in general, and reſtores the natural diſcharge where that was ſuſpended. See Chlorosis.

Pica *Naſi*, a name given by Cohauſen to the immoderate taking of ſnuff. It ſeems a whimſical term, but he chooſes to treat this habit as a diſeaſe, and has written an expreſs treatiſe concerning it. The word *pica*, in general, denotes an abſurd and unnatural appetite; and the deſire of taking the powder of tobacco in this manner is called a diſtempered appetite of the part into which it is taken, that is, the noſe.

The conſequences of the taking ſnuff immoderately, are, that the ſenſe of ſmelling is either entirely deſtroyed, or at leaſt greatly impaired: for the nervous tubercles of the noſtrils being continually vellicated by this powder, are by degrees clogged up, or wholly deſtroyed, and the ſenſible membrane, which lines the noſtrils, is rendered callous, and wholly unfit for the diſcharge of its office in ſmelling. The voice is next affected by this powder; for it cauſes a ſort of aſtriction at the bottom of the noſe, which affects the palate, and conſequently the ſpeech; this gives the perſon who takes it a continual deſire of taking more and more, to rid himſelf of that ſtoppage.

Pica, in *Ornithology*, the *Magpie*, a ſpecies of *Corvus*; which ſee.—Alſo, a ſpecies of Alca, the black-billed auk of Pennant and Latham. See Alca.

Pica is alſo a name by which ſome have called the *lanius*, or *butcher-bird*. See Lanius.

Pica *Braſilienſis*. See Merops *Braſilienſis*.

Pica *Glandaria*, the *Jay*. See Corvus *Glandarius*.

Pica *Glandaria cærulea criſtata*, the *Blue Jay*. See Corvus *Criſtatus*.

Pica *Jamaicenſis*. See Gracula *Quiſcala*.

Pica *Maderaſpatana*, &c. of Ray. See Oriolus *Melanocephalus*.

Pica *Marina*, *Puffin*. See Alca *Arctica*.

Pica *Marina*. See Hæmatopus.

Pica *Papuenſis*. See Todus *Paradiſacus*.

Pica *Papuenſis* of Briſſon. See Muscicapa *Paradiſi*.

Pica *Perſica*. See Oriolus *Perſicus*.

Pica, in *Printing*. See Printing.

PICACIA, a name given by the ancients to that diſtempered appetite of women with child, and maidens at a certain time of life, which makes them long for things not fit for food. It is more uſually called *pica*.

PICACUROBA, in *Ornithology*, the name of a Braſilian ſpecies of pigeon, of a greyiſh colour, variegated with a reddiſh-brown, and with very red legs and feet. See Columba *Carolinenſis*.

PICÆ, the ſecond order of the claſs Aves in the Linnæan ſyſtem. The diſtinguiſhing characteriſtics of this order of birds are; a bill ſomewhat compreſſed, more or leſs crooked, and always convex; toes divided, and adapted either for climbing or for ſtepping. Some of them feed on inſects, worms, and the fleſh and offal of other animals, and ſome on the ſeeds and juices of plants. During the breeding ſeaſon they are monogamous, and make their neſts in trees; and during the time that the female is ſitting ſhe is fed by the male. There are twenty-ſix genera, divided into ſections.

A. Feet formed for perching: this ſection contains

Buphaga,
Certhia,
Coracias,
Corvus,
Glaucopis,
Gracula,
Oriolus,
Paradiſea,
Sitta,
Trochilus,
Upupa.

B. Feet formed for climbing, containing

Bucco,
Crotophaga,
Cuculus,
Galbula,
Picus,
Pſittacus,
Rhamphaſtos,
Scythrops,
Trogon,
Yunx.

C. Feet formed for walking, containing

Alcedo,
Buceros,
Merops,
Momotus,
Todus.

PICANING, in *Geography*, a town of Africa, on the Ivory coaſt. N. lat. 5° 25′. W. long. 4° 35′.

PICARA, a large province of South America, in New Granada; bounded on the eaſt by the Andes.

PICARD, in our *Old Writers*, a kind of large boat, about fifteen tons or upwards, uſed on the river Severn. Stat. 35 Hen. VIII. cap. 9. 13 Eliz. cap. 11.

Picard, John, in *Biography*, an able French aſtronomer and mathematician in the 17th century, was born at Flèche, in Anjou, but in what year is not known. He was educated for the church, but had a ſtrong thirſt for mathematical knowledge, and for thoſe other branches of ſcience that depend upon it, particularly for aſtronomy. Coming to Paris, his talents ſoon rendered him known and reſpected; and as the Academy of Sciences was at that time forming, he was ſelected to become one of its members, and was aſſociated with them in the year 1666, with the appointment of aſtronomer to the academy. In the ſame year he publiſhed a new micrometer, for meaſuring the ſmalleſt apparent diameters of the ſtars, and their leaſt ſenſible diſtances. In 1671 he was ſent by order of the king to the obſervatory of Uraniberg, on the iſland of Huen, in the Sound, not far from Copenhagen, in order that by aſtronomical obſervations on the ſpot, he might determine, with the greateſt exactneſs poſſible, the true elevation of the pole, and the longitude of that place, for the purpoſe of adapting to the meridian of Paris the aſtronomical tables on the obſervations of Tycho Brahe. He was commiſſioned likewiſe to collect, as far as poſſible, the original manuſcripts of Tycho Brahe's obſervations which had been printed in Germany. He was ſucceſsful in his reſearches, and the MSS. were found to differ in many reſpects from the printed copies, and they contained a book more than had been printed. He traverſed ſeveral parts of the kingdom of France for the purpoſe of meaſuring the degrees of the French meridian, and he firſt gave a chart of the country, which the celebrated Caſſini carried to a great degree of perfection. He was one of the firſt who applied the teleſcope to aſtronomical quadrants; and he was the projector of the work entitled "Connoiſſance des Temps," which he calculated from 1679 to 1683 incluſively. He died in the laſt named year: his chief works are as follow: "A Treatiſe on Levelling;" "Practical Dialling by Calculation;" "Fragments of Dioptrics;" "De Menſuris;" "De Menſura Liquidorum et Aridorum;" "An Abridgment of the Meaſure of the Earth;" "A Journey to Uraniberg, or Aſtronomical Obſervations made in Denmark." Theſe and other of his pieces are to be found in the 7th and 8th vols. of the Memoirs of the Academy of Sciences. Moreri.

PICARDS, in *Eccleſiaſtical Hiſtory*, a religious ſect, which aroſe in Bohemia in the 15th century, ſo called from its author, who, becauſe he originally came from Picardy, was called *Picard*. He drew after him, as it has been ſaid, a great number of men and women, pretending he would reſtore them to the primitive ſtate of innocence in which Adam was created: and accordingly himſelf aſſumed the title of the New Adam.

Under this pretence (ſay their enemies) he taught his followers to abandon themſelves to all impurity; making them believe, that in this conſiſted the liberty of the ſons of God; and that all thoſe not of their ſect were in bondage.

He firſt began in Germany and the Low Countries, perſuading many people to go naked, and giving them the name of Adamites. After this, ſeizing an iſland in the river Lauſnecz, a few leagues from Thabor, the head quarters of Ziſca, he fixed himſelf and his followers therein; appointing his women to be common, but allowed none to enjoy them without his permiſſion: ſo that when any man deſired a woman, he carried her to Picard, who gave him leave in theſe words, "Go, increaſe, multiply, and fill the earth."

At length Ziſca, the great general of the Huſſites, (ſo famous for his victories over the emperor Sigiſmund), ſtruck with their abomination, marched againſt them; and, making himſelf maſter of their iſland, put them all to death except two; whom he ſpared to inform himſelf of their doctrine.

Such is the erroneous and injurious account, as many have thought, which different writers, ultimately relying on the inſufficient authorities of Æneas Sylvius and Varillas, have given of the Picards, who ſeem to have been a party of the Vaudois, or Waldenſes, that fled from perſecution in their own country, and ſought refuge, about the beginning of the 15th century, in Bohemia. It is very doubtful whether a ſect of this denomination, chargeable with the licentious principles and conduct above recited, ever exiſted; and we cannot forbear expreſſing our aſtoniſhment that Mr. Bayle, in his art. *Picards*, ſhould adopt the reproachful repreſentations of the writers juſt mentioned.

It is moſt probable, as competent and candid judges have maintained, that the whole or a great part of theſe charges is either an exaggeration or a calumny invented and propagated, in order to diſgrace the Picards, becauſe they deſerted the communion and proteſted againſt the errors of the church of Rome. Laſitius relates, that Picard ſettled in Bohemia in the year 1418, accompanied by forty other perſons, beſides women and children. The Jeſuit Balbinus, in his Epitome Rerum Bohemicarum, lib. ii. concurs in this account, and charges on the Picards none of the extravagancies or crimes aſcribed to them by Sylvius. Schlecta, ſecretary of Ladiſlaus, king of Bohemia, in his letters to Eraſmus, gives a particular account of the Picards; repreſenting them as perſons, who conſidered the pope, cardinals, and biſhops of Rome, as the true Antichriſts; who cenſured thoſe that adored the conſecrated elements in the euchariſt as idolaters, and denied the corporal preſence of Chriſt in this ordinance; who condemned the worſhip of ſaints, prayers for the dead, auricular confeſſion, the penance impoſed by prieſts, the feaſts and vigils obſerved in the Romiſh church; and confined themſelves to the obſervance of the ſabbath, and of the two great feaſts of Chriſtmas and Pentecoſt. From this abſtract of their ſentiments, it ſufficiently appears, that they were no other than the Vaudois; and M. de Beauſobre has plainly ſhewn that they were both of the ſame ſect under different denominations. Beſides, it is a certain fact, that the Vaudois were ſettled in Bohemia in the year 1178, where ſome of them adopted the rites of the Greek church, and others thoſe of the Latin church. The former were generally adhered to till about the middle of the fourteenth century, when the eſtabliſhment of the Latin rites occaſioned great diſturbance. When the national troubles commenced in Bohemia, on occaſion of the oppoſition to the papal power (ſee MORAVIANS), the Picards appeared more publicly in the avowal and defence of their religious opinions; and they formed a conſiderable body in an iſland by the river Launitz or Lauſnecz, in the diſtrict of Bechin, and recurring to arms, were defeated by Ziſca. Encyclop. art. *Picards*.

Moſheim conſiders the Picards as deriving their name from that of the *Beghards* (ſee that article), by a change in the pronunciation of that word, and concurs in the unfavourable account of them given by the writers to whom we have already referred. He repreſents them as appearing in the religious aſſemblies, and joining in the celebration of divine worſhip, without any veil or covering whatever; agreeably to the maxim which they are ſaid to have adopted, *viz.* that thoſe were not free (*i. e.* ſufficiently extricated from the ſhackles of the body) who made uſe of garments, particularly ſuch garments as covered the thighs and the parts adjacent. But though he mentions this practice, and denominates them an abſurd ſect, which by ſuch tenets incurred deſerved reproach, he acknowledges that in their religious aſſemblies nothing paſſed that was contrary to the rules of virtue, however they were ſuſpected of the moſt ſcandalous incontinence, and of the moſt laſcivious practices. He ſtates that Ziſca, the auſtere general of the Huſſites, gave credit to the rumours that were induſtriouſly circulated againſt them; and falling upon them in the year 1421, put ſome to the ſword, and condemned the reſt to the flames, which dreadful puniſhment they ſuſtained with the moſt cheerful fortitude, and alſo with a contempt of death that was peculiar to their ſect, and which they poſſeſſed in a degree that ſeems to ſurpaſs credibility. Theſe extravagant enthuſiaſts, he ſays, were diſtinguiſhed by other appellations, ſuch as thoſe of *Adamites* and *Beghards* (ſee theſe articles), and the denomination was extended ſo as to comprehend the Huſſites, and all the Bohemians who oppoſed the tyranny of the church of Rome. They were called by their enemies, and indeed by the multitude in general, "Picardiers." He ſays that Beauſobre, in his attempts to juſtify the Picards, or Bohemian Adamites, againſt the accuſations of their enemies, which he conſiders as altogether groundleſs, is manifeſtly endeavouring to waſh the Ethiopian white: and he adds, that it may be demonſtrated, by the moſt unexceptionable and authentic records, that his account is true; ſuggeſting at the ſame time a charge of prejudice and partiality againſt the reſpectable and learned author from whom he differs. Eccl. Hiſt. vol. ii. p. 464, note.

PICARDY, in *Geography*, a conſiderable province of France before the revolution, which now forms the departments of the Somme, part of the department of the ſtraits of Calais, and the department of the Aiſne; which ſee reſpectively.

PICARY, in *Zoology*, a name given by Bancroft, in his "Guiana," to the SUS *Tajaſſu*; which ſee.

PICATUM VINUM. See VINUM.

PICAUVILLE, in *Geography*, a town of France, in the department of the Channel; 9 miles N.W. of Charentan.

PICAWEES, Indians of America, on the banks of the Great Miami.

PICCINI, NICOLA, in *Biography*, born in 1728 at Bari, capital of the little province of that name, in the kingdom of Naples, may be ranked among the moſt fertile, ſpirited, and original compoſers that the Neapolitan ſchool has produced. An invincible paſſion for muſic fruſtrated the intention of his father, who deſigned him for the church, and made him ſtudy for that intent; but for fear of his neglecting ſerious buſineſs for amuſement, he would not let him learn muſic. The young man, whoſe genius ſuffered him not to reſt, never ſaw an inſtrument, eſpecially a harpſichord, without emotion; he practiſed in ſecret all the opera airs which he had heard, and which he retained with ſurpriſing accuracy. His father having carried him one day to the biſhop of Bari, he amuſed himſelf in the room where he was left alone, with a harpſichord which he found there, thinking he could be heard by no one; but the prelate in the next apartment having heard him, condeſcended to go to the harpſichord, and obliged him to repeat many of the airs which he had been playing; this he did with ſo much accuracy and preciſion, with the ritornele and accompaniments, which he likewiſe remembered, that the biſhop perſuaded his father to ſend him to the Conſervatorio of St. Onofrio, at Naples, of which the celebrated Leo was then the principal maſter.

The young Piccini was admitted in that ſeminary in 1742, and was placed at firſt under the tuition of a ſubaltern maſter, whoſe leſſons, given in a dry and contracted manner, ſoon diſguſted him: and in a few months his diſcontent at ſuch unprofitable inſtructions drew on him the reſentment of his tutor, expreſſed in no very gentle way. Shocked with this treatment, he reſolved to ſtudy by himſelf, and began compoſing without rules, or any other guides than his own genius and fancy, pſalms, oratorios, and opera airs; which ſoon excited the envy or admiration of all his fellow ſtudents. He even had the courage to compoſe an entire maſs. One of the maſters who had ſeen it, and even permitted him to have it rehearſed, thought it right to mention it to Leo; who, a few days after, ſent for Piccini to come and ſpeak to him. The young man, penetrated with the higheſt reſpect for ſo great a maſter, which is in ſome ſort an intuitive indication of genius, was extremely frightened at this meſſage, and obeyed the order with fear and trembling. "You have compoſed a maſs," ſaid Leo, with a cold, and almoſt ſevere countenance: "Yes, ſir." "Shew me your ſcore;"—"ſir, ſir,"—"ſhew it me, I ſay." Piccini thought himſelf ruined; but he muſt obey. He fetched his ſcore, at which Leo looked, turned over the leaves, examined each movement, ſmiled, rung the bell, as the ſignal for a rehearſal. The young compoſer, more dead than alive, begged in vain to be ſpared what he thought ſuch an *affront*. The ſingers and inſtrumental performers obeyed the ſummons; the parts were diſtributed, and the performers waited only for Leo to beat the time. When turning gravely to Piccini, he preſented him the *baton*, which was then uſed every where in the performance of full pieces. Piccini, put to new confuſion, offered freſh prayers to be excuſed obeying this command, wiſhing he had never dared to meddle with compoſition. At length he muſtered his courage, and marked with a trembling hand the firſt bars. But ſoon animated and inflamed by the harmony, he neither ſaw Leo, nor the ſtanders by, who were numerous; he was abſorbed in his muſic, and directed its performance with a fire, energy, and accuracy which aſtoniſhed the whole audience, and acquired him great applauſe. Leo kept a profound ſilence during the performance: when it was over, —"I forgive you, for once," ſaid he, "but if you are again guilty of ſuch preſumption, you ſhall be puniſhed in ſuch a manner as you will remember as long as you live. What! you have received from nature ſo eſtimable a diſpoſition for ſtudy, and you loſe all the advantages of ſo precious a gift! Inſtead of ſtudying the principles of the art, you give way to all the wild vagaries of your imagination, and fancy you have produced a maſter-piece." The boy, piqued by theſe reproaches, related what had paſſed between him and the aſſiſtant maſter under whom he was placed. Leo became calm, and even embraced and careſſed him; ordering him to come to his apartments every morning, to receive inſtructions from himſelf.

This truly great maſter died ſuddenly ſome months after. Happily for his promiſing pupil, his ſucceſſor was the celebrated Durante, one of the moſt learned compoſers Italy ever produced. He ſoon diſtinguiſhed Piccini from the reſt of his claſs; conceived a particular affection for him; and had pleaſure in communicating to him all the ſecrets of his art. "Others are my pupils," he ſometimes uſed to ſay, "but this is my ſon."

At length, after twelve years' ſtudy, Piccini, in 1754, quitted the Conſervatorio, knowing all that is permitted to an individual to know in practical muſic, and poſſeſſed of ſuch a creative and ardent imagination, as perhaps, till then, was unexampled.

He begun his career at the Florentine theatre in Naples, which is that of San Carlo, what Foote's theatre uſed to be compared with Drury Lane, or the Opera Houſe. His firſt production there was "Le Donne Diſpettoſe," and the next year, "Le Geloſie," and "Il Curioſo del ſuo Proprio Danno," of all which the ſucceſs increaſed in a duplicate ratio. At length, in 1756, he ſet the ſerious opera of "Zenobia" for the great theatre of San Carlo, which was crowned with ſtill greater ſucceſs than his comic operas. In 1758, he compoſed "Aleſſandro nell' Indie," for Rome; and after this, every theatre in Italy was eager to engage him. In 1760, his celebrated comic opera of the "Buona Figliuolo" had a ſucceſs that no muſical drama could boaſt before. It was no ſooner heard at Rome than copies were multiplied, and there was no muſical theatre in Europe where this burletta was not frequently performed, in ſome language or other, during many years. In 1761, he compoſed ſix operas, three ſerious and three comic, for different theatres of Italy; and was at once applauded in Turin, Reggio, Bologna, Venice, Rome, and Naples. Sacchini aſſured us, in 1776, that Piccini had compoſed at leaſt three hundred operas, thirteen of which were produced in ſeven months. On his arrival at Paris, he received many mortifications before his reputation was firmly eſtabliſhed, from the partizans of the old French muſic, as well as the friends of Gluck. The ſucceſs of his operas of "Roland," "Atys," "Iphigénie en Tauride," "Adele de Ponthieu," "Didon," "Diane et Endymion," and "Penelope," ſeems to have ſolved a problem which was long thought inſolvable: "Whether the French language was capable of receiving Italian melody?"

If we add to ſo many dramatic works the oratorios, maſſes, cantatas, and occaſional ſongs and ſcenes in paſticcio operas, it would prove, that in twenty-five years he had produced more muſic, and good muſic, than any other ten maſters had done in their whole lives.

What ſtill more aſtoniſhes in ſuch innumerable works, is the prodigious variety which reigns in them all; and the ſcience which never degenerates into pedantry or affectation; an harmony pure, clear, and profound; a melody perfectly ſuited to the ſubject and ſituation of the performers; and a force, an originality, and reſources of all kinds, unknown till his time, and of which perhaps the ſecret will long remain undiſcovered. And what appears as extraordinary as the reſt is, that the genius of this maſter, far from being exhauſted by ſo many labours, by frequent and ſevere ſickneſs, by domeſtic diſquietude and chagrin, inſeparable from a numerous family, ſeemed, before the revolution, to continue in full force. Deprived of all his appointments, and well-earned theatrical penſions, he returned to Naples, where, after he had eſtabliſhed himſelf in France, all his appointments had been diſpoſed of. Unluckily, on the arrival of a French army at Naples, he either did adhere to the invaders, or was ſuppoſed by the court to be in correſpondence with them, which occaſioned his diſgrace, and precipitated his flight back to Paris, where he was received with open arms, and placed at the head of a new ſinging ſchool; but we have heard nothing of new compoſitions after his return, nor any thing more concerning him, except that he died at Paris in 1800.

PICCININI, Alessandro, of Bologna, lived about the year 1570, and was in the ſervice of the duke of Ferrara in 1594. He is author of a treatiſe on the tablature of the lute, which was in great eſtimation. In this work, we find the origin of the *theorbo* and *pandore.* He pretends to have been the inventor of the *arch-lute*.

PICCIOLO, in *Commerce*, a money of account in the iſland of Sicily. Thus, a taro contains 2 carlini, 15 ponti, or 120 piccioli; a carlino, 10 grani; a ponto, 8 piccioli; and a grano, 6 piccioli.

PICCITONO, Parde Angelo da, in *Biography*, author of a book entitled "Fior Angelico di Muſica," publiſhed at Venice in 1547; a work which, however difficult to find at preſent, is, from its dulneſs and pedantry, ſtill more difficult to read.

PICCOLOMINI, Alessandro, a learned Italian, was born at Sienna in 1508. He paſſed the early part of his life in his native place, and was a member of the celebrated academy of Degli Intronati, in which he bore the name of "Stordito." He is ſuppoſed to have been in that city at the time of the viſit of the emperor Charles V. in 1536, when his comedy, entitled "Amor Coſtante," was recited before that prince. He wrote two other comedies, "L'Aleſſandro" and "L'Ortenſio," and tranſlated the 13th book of Ovid's Metamorphoſis, and the 6th book of Virgil's Eneid, into Italian verſe, and printed a collection of 100 ſonnets. About the year 1540 he went to Padua, where he was aggregated to the academy Degli Infiammati, and engaged to read lectures in it on moral philoſophy. He wrote books alſo on morals, on philoſophy, and aſtronomy; and by order of duke Franceſco de Medici, he wrote a book on the reformation of the calendar undertaken by pope Gregory XIII. He reſided ſeveral years at Padua and Rome, and at an advanced age retired to Sienna, where he poſſeſſed a villa and a fine garden. In 1574 Gregory nominated him to the titular archbiſhopric of Patras, and made him coadjutor of the archbiſhop of Sienna. He died in 1578, and was interred in the cathedral of that city.

PICE, in *Commerce*, a money of account and copper coin in the Eaſt Indies. At Calcutta and in Bengal, 12 pice = 1 anna, and 16 annas = 1 current rupee. See Rupee.

The double and ſingle pice are copper coins, with a mixture of tin or lead at Bombay, the ſingle pice being 4 reas, and the double pice or fuddea being 8 reas, the rea being $\frac{1}{100}$dth of the quarter, and the quarter $\frac{1}{4}$th of the rupee. At Anjengo, on the Malabar coaſt, accounts are kept in fanams, pice, and budgerooks: a fanam being = 12 pice, or 16 vis, and 1 pice = 4 budgerooks: a ſilver rupee is worth 7 old fanams, or 6 new ones, called gallon fanams. All theſe are real coins. At Scindy the coins are ſilver rupees of 16 annas or 48 copper pice. At Surat, accounts are kept in rupees of 16 annas or 64 pice. Here are alſo pezas or pice of copper or lead, 64 of which are reckoned to 1 ſilver rupee. Sixty padens, a ſort of bitter almonds from Perſia, paſs for 1 pice.

Pice is alſo a weight in the Eaſt Indies. See Maund.

PICENDACA, in *Ancient Geography*, a town of India, in the interior of the country belonging to the people called Arvari. Ptolemy.

PICENTES, a people of Italy, inhabitants of Picenum, who were originally Sabines. Strabo ſays that they took their name from the word *picus*, which they followed whilſt they were going to eſtabliſh themſelves in their new country. See Picenum.

PICENTIA, Bicenza, a town of Italy, and capital of the Picentini. It was ſituated in the interior of the country: and Pliny reports, that the inhabitants were driven from it on account of their having taken part with Hannibal. It continues to ſubſiſt under the ſame name; though at preſent there are merely traces of it remaining.

PICENTINI, a people of Italy, who were deſcended from the Picentes, and whoſe immediate origin is very uncertain; they were ſettled towards the weſt on the ſea-coaſt.

PICENTINUM, Pezentinum, or *Peſcentinum*, a town of Pannonia, upon the route from Æmona to Sirmium, between Inicerum and Leuconum, according to Antonine's Itinerary.

PICENUM, a country of Italy, on the Adriatic gulf; extending from the Æſis, towards the N.W., as far as Truentus. It was bounded to the N. by the Æſis, to the S. by the Truentus, to the E. by the Adriatic ſea, to the W. by a ſmall part of Umbria and mount Fiſcelus, and ſome other mountains which ſeparated it from the country of the Sabines. Its principal rivers were the Æſis, the Miſios, the Potentia, the Tinna, and the Truentus. The moſt noted places were, commencing from the N., Ancona, Auximum, Firmum, and Aſculum. The origin of its name has been given under Picentes. Euſebius and Servius, however, give the name of Picus to the chief of the colony.

PICHANA, in *Geography*, a town of South America, in the province of Cordova; 130 miles N.W. of Cordova.

PICHINCA, a mountain of Peru, in the juriſdiction of Piura, and biſhopric of Truxillo, whoſe height is ſaid to be 2432 toiſes above the level of the ſea. M. Von Humboldt was twice at the mouth of the crater of this mountain; no one but Condamine having ever reached it before. From the edge of the crater, he ſays, riſe three peaks, which are free from ſnow, as it is continually melted by the aſcending vapour. At the ſummit of theſe is a rock that projects over the precipice, and from which he made his obſervations. The rock is about twelve feet long by ſix broad, and ſtrongly agitated by frequent ſhocks, of which he counted eighteen in leſs than half an hour. On this he lay on his belly, that he might the better examine the bottom of the crater. The mouth of the volcano forms a circular hole, near a league in circumference, the perpendicular edges of which are covered with ſnow on the top. The inſide is of a deep black; but the abyſs is ſo vaſt, that the ſummits of ſeveral mountains may be diſtinguiſhed in it. Their tops ſeemed to be ſix hundred yards below his ſtation; and he has no doubt but the bottom of the crater is on a level with the city of Quito, which the mountain overlooks. Condamine found it extinct, and even covered with ſnow: but M. Humboldt found it burning. On his ſecond viſit, being furniſhed with inſtruments, he found the diameter of the crater to be 1600 yards, whereas that of

Veſuvius is but 670. The height of the mountain is 5280 yards.

PICHINCHAS, a town of South America, in the province of Quito; 15 miles N.E. of Quito.

PICHMANSKOI, a town of Ruſſia, in the government of Olonetz, on the lake Latcha; 32 miles S.S.W. of Kargapol.

PICICITLI, in *Ornithology*, the name of a bird in the Spaniſh Weſt Indies, deſcribed by Nieremberg. Its head and neck are black, and its whole body grey; it is a ſmall bird, and makes its appearance in Mexico after the rainy ſeaſons; it is a bird of paſſage, and it is not known where it breeds. See Pipra *Criſtata*.

PICIERNO, in *Geography*, a town of Naples, in the province of Baſilicata; eight miles W.N.W. of Potenza.

PICIOTTI, a river of Naples, which runs into the ſea, 15 miles S.E. of Reggio.

PICK, a river of Upper Canada, which runs into lake Superior, N. lat. 48° 28′. W. long. 86° 4′.—Alſo, a ſmall iſland, in the N. part of lake Superior. N. lat. 48° 31′. W. long. 86° 28′.

Pick, among *Miners*, is a tool which they uſe to cut down the clifts and rocks of ſtone to make paſſages in the earth; and which is alſo uſed in digging canals.

Pick-*Axe*, in the *Military Art*, a tool carried by the pioneers to dig up ground that is too hard for the ſpade; they are of great uſe for mending the ways, and in fortifications.

Picks, *Ear*. See Ear-*picks*.

PICKAGE, or Piccage, *Piccagium*, an ancient cuſtom, or duty, paid at fairs and markets, for breaking the ground, and pitching up ſtalls, or ſtandings.

This profit of pickage was uſually given, or granted, in charters for holding a fair or market.

PICKAWAY, in *Geography*, a county in the ſtate of Ohio, containing, in 1810, 10 towns and 7124 inhabitants.—Alſo, a town in the ſaid county, of the ſame name, containing 1598 inhabitants.

PICKEERING, or Pickerooning. See Picqueering.

PICKER, or Horse-picker, in the *Manege*, an iron inſtrument five or ſix inches long, bent or crooked on one ſide, and flat and pointed on the other. It is uſed by grooms to cleanſe the inſide of the horſes feet, and to pick out the earth, ſand, or ſmall ſtones that get into them.

PICKERELL, in *Ichthyology*, an Engliſh name uſed by ſome authors for the jack or pike.

PICKERING, in *Geography*, a market-town in the weſt diviſion of the wapentake of Pickering-Lythe, and North Riding of Yorkſhire, England, is pleaſantly ſeated on an eminence, ſurrounded by the lofty mountains of Blakemore, at the diſtance of 26 miles from York, and 225 from London. It is a town of very remote antiquity. It ſeems formerly to have enjoyed the privileges of a borough, and undoubtedly ſent members more than once to parliament. How it loſt this right is unknown; but it was moſt probably through neglect. The market day here is on Monday weekly; and there are beſides four annual fairs for horned cattle, horſes, and ſheep. Pickering is an honour belonging to the duchy of Lancaſter, and poſſeſſes a juriſdiction over ſeveral of the neighbouring villages, lying within its boundaries. Here are, therefore, held the courts of the honour, and alſo the petty ſeſſions for the weſt diviſion of the wapentake.

In the parliamentary returns of 1811, the houſes in this town are eſtimated at 540 in number, and the inhabitants at 2332. The former are arranged chiefly in one long ſtraggling ſtreet, which offers no edifice worthy of notice, except the church, an ancient and ſpacious ſtructure, adorned with a lofty ſpire. Here are three meeting-houſes appropriated to the public worſhip of Quakers, Preſbyterians, and Methodiſts. Its weſtern extremity, however, is rendered intereſting by the remains of a ſtrong caſtle, which occupies the brow of a hill overlooking the town, and commanding a delightful view of the vale of Pickering. The date of the foundation of this fortreſs is uncertain, but it appears from Domeſday book to have belonged to Morcar, earl of Northumberland, in the time of Edward the Confeſſor. In the beginning of the reign of Henry III. the cuſtody of it was committed to William, lord Dacre, high ſheriff of the county; but this nobleman had only retained it two or three years, when it was beſtowed by the monarch on his own ſon, Edmund, earl of Lancaſter, whoſe ſucceſſor, Thomas, forfeited it to the crown by rebellion. His deſcendants, however, afterwards recovered it; and it conſequently came by marriage into the poſſeſſion of the celebrated John of Gaunt, duke of Lancaſter and king of Caſtile. What became of it after his death is unknown; but in the reign of queen Elizabeth we find it once more poſſeſſed by the crown; and in the time of the civil wars, in the ſeventeenth century, it is recorded to have ſtood a long ſiege againſt a party of the parliamentary forces ſent to reduce it. Beauties of England and Wales, vol. xvi., by John Bigland.

Pickering, a townſhip in the Eaſt Riding of the county of York, in Upper Canada, between Whitby and Scarborough, and parting lake Ontario.

PICKERSGILL Cove, a harbour within Chriſtmas Sound, on the S. coaſt of Terra del Fuego, at the S. extremity of South America.

Pickersgill *Harbour*, a port of New Zealand, on the S. ſhore of Duſky bay. S. lat. 45° 47′. E. long. 166° 18′.

Pickersgill *Iſland*, a ſmall iſland in the South Atlantic ſea, near the S. coaſt of the iſland of Georgia, ſo called after the name of captain Cook's third lieutenant. S. lat. 54° 47′. W. long. 36° 42′.

PICKERSVILLE, the chief town of Waſhington diſtrict, in South Carolina; 771 miles from Philadelphia.

PICKET, Picquet, or *Piquet*, in *Fortification*, a ſtake ſharp at one end, and uſually ſhod with iron; uſed in laying out the ground, to mark the ſeveral meaſures and angles thereof.

There are alſo larger pickets, driven into the earth to hold together faſcines, or faggots, in any work caſt up in haſte.

Pickets are alſo ſtakes driven into the ground by the tents of the horſe, in camp, to tie their horſes to; and before the tents of the foot, where they reſt their muſkets, or pikes about them, in a ring.

The picket was a corporal puniſhment, chiefly uſed by the cavalry and artillery, and in the former often inflicted by order of the commanding officer, without the ſentence of a court-martial. The mode of inflicting it was this: a long poſt being driven into the ground, the delinquent was ordered to mount a ſtool near it, when his right hand was faſtened to a hook in the poſt by a nooſe round his wriſt, drawn up as high as it could be ſtretched; a ſtump, of the height of the ſtool, with its end cut to a round and blunt point, was then driven into the ground near the poſt before-mentioned, and the ſtool being taken away, the bare heel of the ſufferer was made to reſt upon the ſtump, which, though it did not break the ſkin, put him to great torture: the only mitigation he could obtain was by reſting his weight on his wriſt, the pain of which ſoon became intolerable. Soldiers were frequently ſentenced to ſtand on the picket for a quarter of an hour. This, like the riding of the wooden horſe, has been for ſome time left off, as it lamed and ruptured many ſoldiers. See *Wooden* Horse.

Pickets are alſo ſtakes with notches toward the top, to which are faſtened the cordages of tents. Thus, to plant the picket, is to encamp.

Picket, in *Gaming*. See Picquet.

Picket, *Watching*, in *Ornithology*. See Oriolus *Nidipendulus*.

PICKLE, a brine, or liquor, ordinarily compoſed of ſalt, vinegar, &c. ſometimes with the addition of ſpices; in which meats, fruits, and other things, are preſerved and ſeaſoned.

Pickle is alſo uſed ſubſtantively, for a fruit, root, leaf, or other vegetable matter, prepared in pickle, to be uſed by way of ſauce, &c. See Sallet, &c.

They pickle artichoaks, muſhrooms, aſhen-keys, barberries, aſparagus, beans, onions, &c. Broom-buds, capers, and olives, are pickled with oil and vinegar.

Pickle, in *Agriculture*, a ſort of brine or liquor uſed for ſteeping grain, to preſerve it from diſeaſe, ſlugs, and vermin.

A great number of different compoſitions have been at different times employed as ſteeps or pickles, for freeing grain from diſeaſe; but thoſe which are the moſt in uſe at preſent are ſuch as are deſcribed below, though very ſtrong ſolutions of common ſalt, and other ſimilar ſubſtances, have been often employed.

Pickle Arſenic.—Much advantage is ſaid to have been found by Mr. Young, from the uſe of half a hogſhead of ſtrong lixivium of wood-aſhes, put in a caſt-iron boiler, with ſeven pounds of common ſalt, and one pound of arſenic boiled well, and kept in the boiler for uſe when cold. And which, without the ſalt, was employed with benefit by Mr. Andrews.

Pickle Salt.—This is prepared, according to Mr. Summerville, ſometimes with plain water, into which common kitchen ſalt is put, till it is of ſuch a ſtrength as to float an egg. In many caſes, however, ſea-water is uſed, and ſalt added to it, till it will alſo carry an egg. The advantage of uſing ſea-water is, that leſs ſalt is required. The pickle, thus prepared, is put into a large open veſſel, that will hold perhaps 30 or 40 gallons: the wheat is then poured into it, in the quantity of from a buſhel, to two buſhels at a time, and well ſtirred round, either with a broom or a ſtick; during the ſtirring, the light grains riſe to the ſurface and are ſkimmed off; the veſſel is then lifted up, and the contents poured into another of equal dimenſions, upon the mouth of which a ſieve is placed; the ſieve retains the grain, and ſuffers the pickle to paſs through it into the veſſel beneath. The ſame quantity of wheat is again put into the pickle, and the ſame proceſs repeated, till the whole has been waſhed and pickled; and progreſſively as it is taken out of the water, ſome new ſlaked lime is ſifted upon it. The whole is then carefully mixed up with a wooden ſhovel, and frequently turned over, till it attain a ſufficient degree of dryneſs, in which ſtate it is committed to the earth without any further preparation or management.

Pickle Urine.—This is prepared in this way, according to the ſame writer: a quantity of urine, in as ſtale a ſtate as poſſible, is put into a veſſel, in the ſame manner as for the ſalt pickle, into which the grain is put and well ſtirred. The contents are then poured through a ſieve, and the proceſs continued till the whole of the wheat intended to be ſown is moiſtened. It is then ſprinkled with lime, as in the former caſe, and committed to the earth. It is, however, added, that in many caſes, inſtead of mixing the whole of the grain with the urine, it is common to ſpread the wheat upon the barn-floor, and ſprinkle the urine upon it, either with a watering-pan or a kind of bruſh made of ſtraw: when it is ſufficiently moiſtened, lime is made uſe of as before, and the grain ſown.

Pickle Italian.—This is that recommended by J. B. Scandella, an Italian phyſician, which is prepared in this manner: Take of nitre, three pounds; alum, one pound; vitriol, ſix ounces; verdigris, three ounces; wood-aſhes, well ſifted, ſix pounds; boil the whole in a copper with five pails of water for an hour, then remove them from the fire, and pour them into a large veſſel; then add ſixteen pails of water, in which half a buſhel of quick-lime has been previouſly diſſolved; mix the whole intimately, and allow them to ſtand ſtill till they are quite cold. In this ſteep, two buſhels and a half of wheat are to be plunged, and left for about ſix hours, ſtirring it up frequently with a wooden ſhovel, and ſkimming off what riſes to the ſurface: the wheat is then to be withdrawn, and ſpread out till it is dry enough for ſowing. The proceſs is thus to be continued until the whole quantity of ſeed intended to be ſown is pickled. The above ſteep is generally ſufficient for preparing about twenty-four buſhels of wheat.

And on theſe different pickles or ſteeps the ingenious writer has made ſeveral pertinent reflections. On the firſt he remarks, that as far as his own obſervation, aided by the teſtimony of the moſt reſpectable farmers, can be depended upon, it has never been known to fail in a ſingle inſtance, where judiciouſly applied; that is to ſay, it has always prevented the crop from ſuffering by ſmut. But though it has anſwered this purpoſe moſt effectually, and the proofs in favour of it are too numerous to be diſputed, there is little doubt that, under certain circumſtances, it may be highly injurious to the crop. And that while the grain, ſteeped in this pickle, continues in a moiſt ſtate, it may be kept for any length of time, without much injury to its vegetative powers; a circumſtance of no ſmall conſequence, as it not unfrequently happens that after the grain has been pickled, and made ready for ſowing, a ſudden fall of rain prevents it from being put into the earth for ſeveral days, perhaps weeks. But though the pickle is thus harmleſs while the grain continues in a moiſt ſtate, repeated trials convince him that it is quite otherwiſe when well dried, and expoſed to a certain degree of heat. He does not hazard this merely as an opinion, but ſpeaks from conviction, when he ſays that if wheat, which has undergone this preparation, and has had lime in a very active ſtate mixed with it, is ſown early in the autumn (as in Auguſt), upon dry warm land, and no rain falls for a conſiderable time after, a thing by no means uncommon at that ſeaſon of the year, a great proportion of the grain will either be entirely deſtroyed, or materially injured, by the dry cauſtic cruſt with which it is ſurrounded. The miſchief in this caſe is certainly done by the action of the lime, and in many inſtances is, he ſuppoſes, very conſiderable. But in order to avoid this inconvenience, the writer ſtates, that from much inquiry, as well as numerous trials of his own, he is perfectly ſatisfied that the moſt valuable part of this preparation conſiſts in immerſing the wheat in the brine, and that the lime is only added afterwards as an abſorbent to dry up the ſuperfluous part of the moiſture, and make the grains ſeparate, and ſow more readily. If this is admitted, and it certainly is the caſe, it will be extremely eaſy to reap the whole benefit of the ſalt pickle, without any of its defects, merely by ſubſtituting ſome other article in the place of lime; and for that purpoſe nothing ſeems better calculated than powdered chalk, or common whitening. The former is known, in its unburnt ſtate, to be entirely deſtitute of any cauſtic or corroſive quality; and the latter conſiſts of burnt limeſtone, which has been completely ſaturated with moiſture, and afterwards dried, by which proceſs its activity is deſtroyed. Both of theſe articles can be obtained in ſufficient quantity, in moſt ſituations; and as neither of them are expenſive, they will be ſound good ſubſtitutes for lime; and if properly managed, will anſwer every purpoſe that can be expected from it, without the ſmalleſt degree of riſk.

It is aſſerted, in reſpect to the urine pickle, that there is no article at preſent employed that requires to be uſed with more circumſpection than this; nor is there any where the riſk or loſs attending its uſe has a chance of being ſo great. He is ready to admit, that where the urine is ſufficiently ſtale, and the grain properly moiſtened with it, every inſect or animalcule contained therein will be completely deſtroyed; but to counterbalance this, he has to ſtate that as yet there has been no teſt eſtabliſhed to aſcertain the neceſſary degree of ſtaleneſs: and as it is known that urine, which is not ſtale, will not deſtroy vermin, there is an abſolute certainty, if it is uſed in that ſtate, it will be of no ſervice; and that, on the other hand, when urine is completely ſtale, it abounds with volatile alkali, which, in its naked ſtate, is known to be hurtful, when applied either to ſeeds or plants; but when united with lime, it then forms what is called cauſtic alkali, in which ſtate its ſtrength and dangerous qualities are very conſiderably increaſed. This compound, though an excellent manure when applied to the ſoil, and allowed to operate properly upon it before the crop is ſown, is completely deſtructive both to ſeeds and plants, when brought into contact with them. When wheat, therefore, has been completely moiſtened with urine, and is afterwards mixed with quick-lime, the cruſt with which it is ſurrounded will be of the moſt acrid nature, and nothing but throwing the ſeed immediately into a tolerably moiſt ſoil can poſſibly ſave it from deſtruction. Accordingly it has often happened, when wheat pickled in this way has, by bad weather, or any other accident, been prevented from being ſown even for a ſingle night, nine-tenths of the ſeed have been known to periſh. He has ſaid, that nothing can ſave the ſeed thus cruſted over from deſtruction, but ſowing it inſtantly upon land containing a certain ſhare of moiſture. If the ſoil happens, however, to be of a warm nature, is very dry at the time of ſowing, and the weather continue warm and dry for any conſiderable time afterwards, an immenſe deal of the ſeed will periſh by the action of the pickle. And theſe objections to the urine pickle, which every man who is in the ſlighteſt degree acquainted with its chemical properties will readily underſtand, apply to thoſe caſes where the pickle has been moſt faithfully prepared and adminiſtered, and that is when the grain has been completely immerſed in it. The other method, *viz.* that of laying the wheat upon the barn-floor, and ſprinkling it with a wiſp of ſtraw dipt in the urine, is alſo liable to many objections. He has already hinted, that we have at preſent no teſt for aſcertaining the neceſſary degree of ſtaleneſs in urine: the want of this muſt always ſubject the uſe of it to very great uncertainty. But admitting that it were in all caſes ſufficiently ſtale, there is no poſſibility of applying it properly or equally, when the wheat is ſpread upon the floor: ſome of it will have more moiſture than it requires, ſome will be very imperfectly moiſtened, and many of the grains will not be moiſtened at all. He need ſcarcely add what the conſequences of ſuch management will be. The part of the ſeed, which has got an over-doſe, will be ſubjected to all the riſks he has mentioned, from the cauſtic quality of the urine and lime; and the remaining part, which has been either imperfectly moiſtened, or not moiſtened at all, will, by the vermin not being deſtroyed, produce blighted or ſmutted ears. When ſpeaking of the ſalt pickle, he has ſaid, that if powdered chalk or common whitening are uſed, it will deſtroy the inſects as effectually as lime, and that without the leaſt riſk to the grain, and has accordingly recommended it to be prepared in that way. The urine pickle he decidedly condemns, as it is in every point of view liable to inſuperable objections: for whether the urine is uſed ſingly, or in conjunction with lime, great miſchief may be done by it, if the wheat is either prevented by any accident from being ſown even for a ſingle night, or, if it is ſown upon dry land, and the weather continues warm, and no rain falls for a conſiderable time afterwards; but if the urine pickle is ever had recourſe to, it will certainly be much milder, if chalk or whitening be employed as abſorbents in place of lime, than under other circumſtances.

But he is fully ſenſible that much oppoſition will be made to the doctrine here laid down concerning theſe pickles, eſpecially by thoſe who have been long accuſtomed to the uſe of them; and who, without knowing the riſk with which they are attended, have generally aſcribed the failure or deficiency of their wheat crop to other cauſes. But the ideas here held forth are by no means the offſpring of conjecture, or a warm imagination. Careful trials have been made of each, under almoſt every variety of circumſtances that can occur, with this reſult;—that though, in a few fortunate caſes, both the ſalt and the urine pickles may be uſed without any ſeeming loſs or inconvenience, yet in a majority of all the inſtances in which they are employed, more or leſs of the ſeed periſhes from their effects. He has, for ſeveral years paſt, made trials of both pickles upon a given number of ſeeds, ſown at different periods of the ſeaſon, and under different circumſtances of heat and moiſture, and he has uniformly ſound that when wheat, pickled with ſalt and lime, was ſown either upon ground containing a moderate ſhare of moiſture, or had a ſlight ſhower ſoon after it was ſown, ſcarcely one grain in ten periſhed; whereas, when it was ſown upon warm dry land, and no rain fell for perhaps two or three weeks afterward, nearly a third of the ſeed never vegetated. And that when the urine pickle was uſed, even under the moſt fortunate circumſtances, two grains out of ten, or one-fifth part of the whole, was generally the leaſt failure that happened, even when it was ſown immediately after being pickled: but in caſes when it was kept a night or two in the pickle, nine-tenths of the ſeed have been known to periſh; and when ſown upon very dry land, and much dry warm weather followed, the loſs has alſo been very great. Theſe trials having been made with a given number of grains, the writer was enabled to aſcertain, with perfect accuracy, the proportion which periſhed in each experiment.

But with regard to the laſt ſort, or Italian pickle, it has not hitherto been ſufficiently in uſe fully to aſcertain in what reſpects it may be injurious, or beneficial, when made uſe of in preparing ſeed corn for being put into the ground. From the nature of the different ingredients, it would, however, ſeem to be a preparation of an active nature, and which ſhould be employed with caution, till more full experience has ſhewn its effects and advantages.

Pickle is alſo a term ſometimes applied to the grains of wheat, in diſcriminating its quality: thus we have a *lean* and a *hungry* pickle, &c.

PICKLED Fish. See Fish.

PICKLING *of Grain*, in *Agriculture*, the art of ſteeping it in pickles, in order to preſerve it, and prevent the crops from being diſeaſed.

It is ſufficiently plain, from what has been obſerved in reſpect to pickles, that they are liquors of a very active nature, and which muſt be employed with conſiderable care, and nice attention to the circumſtances of the weather and ſtate of the land; as, without this, much injury and diſadvantage, inſtead of benefit, may be the reſult. The length of time for effecting the purpoſe, in the ſafeſt manner, muſt alſo be had in the mind of the farmer; as the ſteeping of grain from twenty to twenty-four hours in ſolutions of wood-aſhes and arſenic, as well as in lime-water, gave clean crops from extremely ſmutty ſeed; while the retaining it in theſe mixtures only a ſhort time had but a comparatively trifling effect. In all caſes, in uſing theſe pickles, great attention ſhould likewiſe be paid to having the grain as equally as poſſible imbibed and impregnated with the liquors, as in this way the moſt beneficial effects muſt be produced.

But whatever danger there may be in pickling ſeed corn, for the purpoſe of preventing its being affected with the ſmut, it is a practice that is ſeldom or ever neglected in the northern parts of England, and in Scotland, without the farmers in theſe parts ſuffering from ſuch omiſſions.

PICKOUAGAMIS, in *Geography*, a river of Canada, which runs from lake Shabamouſhan to lake St. John.

PICLE, Pictellum, a ſmall parcel of land incloſed with a hedge; a little cloſe. This word ſeems to come from the Italian *picciola*, i. e. *parvus*; and in ſome parts of England is called *pightel*.

PICO, Giovanni, of Mirandola, in *Biography*, one of the moſt extraordinary perſons of his time, ſurnamed the Phœnix, was the third ſon of Gianfrancheſco Pico, prince of Mirandola, and Concordia. He was born in 1463, and almoſt from his childhood diſplayed an eager attachment to literature. At the age of 14 he was ſent to Bologna to ſtudy canon law, but after ſpending two years there, he ſet out to viſit the moſt celebrated ſchools in Italy and France. He went to Ferrara, where he was kindly received by his relation duke Hercules I., and ſtudied under Batiſta Guarino. He had a great readineſs in acquiring languages, and is ſaid to have thoroughly underſtood twenty-two by the time he was eighteen years of age. This is probably an exaggeration. After he had employed ſeven years in his academical tour, he returned to Rome at the age of twenty-three. There he poſted up 900 propoſitions appertaining to dialectics, morals, phyſics, mathematics, &c. offering to diſpute with any antagoniſt whomſoever upon any one of them. This cauſed him to be looked upon with envy and jealouſy, none daring to accept of his challenge. Thirteen of his propoſitions were however accuſed before the pope as contrary to ſound doctrine. He publiſhed an elaborate defence of them addreſſed to Lorenzo de Medici, and after putting him to a conſiderable deal of trouble in juſtifying himſelf, he was acquitted of all blame. The effect of the anxiety produced by this buſineſs cauſed a total change in his courſe of life, and though young, rich, elegant in perſon and manners, and in ſome degree habituated to pleaſure, he gave himſelf up to devotion, and confined his future ſtudies to theological ſubjects. He fixed his abode in Florence, where he enjoyed the intimacy of ſeveral illuſtrious characters, among whom was Lorenzo de Medici, who teſtified his affection for him by calling him to a parting embrace on his death-bed. His high reputation cauſed him to be thought of for the cardinalate, but it does not appear that any ſteps were taken to advance him to that dignity. At this period he had a moſt enthuſiaſtic deſire to be uſeful, and he reſolved to diſtribute all his property among the poor, and travel bare-footed through the world to preach the goſpel. An early death, at the age of 32, put an end to his projects. The writings of Pico diſplay an acute genius, and a vaſt extent of learning, but they added very little to true ſcience. His principal works are "Hexaplus, or an Explanation of the Six Days of Creation;" "Adverſus Aſtrologiam Divinatricem;" Epiſtolarum, lib. viii.

Pico, Gianfrancesco, prince of Mirandola, nephew of the preceding, being ſon of his brother Galeotto, was born in 1470. He ſtudied at Ferrara, and manifeſted, like his uncle, an early attachment to literature. After the death of his father, he ſucceeded to the ſovereignty of Mirandola, an elevation which proved the ſource of many troubles. His brother Lodovico, who had married a daughter of general Trivulzi, was his competitor, and by the aſſiſtance of a third brother, he expelled Gianfranceſco in 1502. He was reſtored by the arms of pope Julius II. in 1511, but was again dethroned, and on the 15th of October, 1533, Galeotto, nephew of Lodovico, with a band of armed men ſurpriſed Mirandola, and entering the chamber of Gianfranceſco, put him and one of his ſons to death, and then impriſoned his wife and younger ſon. He was probably much better fitted for a private than a public ſtation. In the midſt of all the changes of fortune, religion and letters were his chief ſolace. He was in habits of correſpondence with all the eminent literary characters of his time, many of whom held him in the higheſt eſtimation. He was author of many works, but that by which he is beſt known is a life of his uncle, containing much curious information reſpecting that extraordinary man. He alſo compoſed a life and apology of the famous Savonarola.

Pico, or the Peak, in *Geography*, one of the Azores, which derives its name from a high mountain, terminating in a peak. This volcanic mountain is by ſome reported to be equal to the peak of Teneriffe in height. Mr. Adanſon, who viſited theſe iſlands in his return from Senegal in 1753, ſays that the peak is about half a league in perpendicular altitude, which, allowing the French league to be 2450 toiſes, would give a moderate height, not exceeding 7350 feet. The peak would form a very convenient firſt meridian, from which to reckon the longitude. The dimenſions of the iſland are about 30 Britiſh miles in length, and 10 in breadth. The chief places are Pico, Lagoas, Santa Cruz, San Sebaſtian, Paſquin, San Rocko, Playa, and Magdalena. The iſland is productive; its cattle are numerous, of various kinds, and excellent; its wine is highly commended; and it furniſhes a conſiderable quantity and variety of wood, particularly the cedar and teixo, which is ſolid and hard as iron, and veined when finely poliſhed. The inhabitants live wholly on the produce of their own iſland in plenty and comfort. Pico carries on a conſiderable trade in wine, which ſeems to be ſold as Canary. N. lat. 38° 30′. W. long. 28° 16′.

Pico, a mountain of Spain, on the confines of New and Old Caſtile, and Eſtremadura.

Pico, or *Puerto de Pico*, a town of Spain, in Old Caſtile, on a mountain, near the ſource of the Tormes.

Pico *Sacro*, a mountain of Spain, in Galicia; nine miles S. of Santiago.

Pico *Teneriffe*, a mountain of Barbadoes; one mile S. of Cuckold's point.

Pico *el Teja*, a town of Spain, in Old Caſtile; 20 miles W.S.W. of Segorbe.

Pico *d'Urbino*, a mountain of Spain, in Old Caſtile; 12 miles S. of Calzada.

PICOLATA, a fortreſs of Eaſt Florida, on the river St. John; 27 miles from St. Auguſtine.

PICOLET Point, a point on the N. ſide of the iſland of St. Domingo, that forms the W. boundary of the bay which ſets up to cape Francois. Under its cannon ſhips have been ſecured in time of war.

PICOLO, a town of Italy, in Friuli; ſix miles S. of Udina.

PICOLOS, the name of an ancient Pruſſian idol, to which human ſacrifice was offered. See POTRIMPOS.

PICOSA, or PISANA, in *Geography*, mountains of the coaſt of Peru, extending about ſeven leagues between Colamahe river and Salango iſland, S. of the equator, and ſerving for the direction of mariners.

PICOTA, a name given by ſome authors to a diſtemper which they deſcribe as conſiſting wholly in an eruption of a number of very minute pimples upon the ſkin, all over the body; it is attended with no danger, unleſs they are ſtruck in.

PICOY, in *Geography*, a town of Peru, in the dioceſe of Guamanga, on a river of the ſame name, which runs into the Xauxa, 20 miles N. of Guanca Velica.

PICQUEERING, PICKEERING, or *Pickerooning*, a little flying war or ſkirmiſh, which the ſoldiers make when detached from their bodies to pillage, or before a main battle begins.

PICQUET, or PICKET, a celebrated game at cards, much in uſe throughout the polite world.

It is played between two perſons, with only thirty-two cards; all the duces, threes, fours, fives, and ſixes, being ſet aſide.

In reckoning, at this game, every card goes for the number it bears, as a ten for ten; only all court-cards go for ten, and the ace for eleven: and the uſual game is one hundred up. In playing, the ace wins the king, the king the queen, and ſo down. Twelve cards are dealt around, uſually by two and two; which done, thoſe that remain are laid in the middle. If one of the gameſters finds he has not a court card in his hand, he is to declare he has *carte blanche*, and tell how many cards he will lay out, and deſire the other to diſcard, that he may ſhew his game, and ſatisfy his antagoniſt, that the *carte blanche* is real; for which he reckons ten.

Each perſon *diſcards*, *i. e.* lays aſide a certain number of his cards, and takes in a like number from the ſtock. The firſt, of the eight cards, may take three, four, or five; the dealer all the remainder, if he pleaſes.

After diſcarding, the eldeſt hand examines what ſuit he has moſt cards of; and, reckoning how many points he has in that ſuit, if the other have not ſo many in that, or any other ſuit, he tells one for every ten of that ſuit. He who thus reckons moſt is ſaid to win the *point*.

The point being over, each examines what *ſequences* he has of the ſame ſuit; *viz.* how many tierces, or ſequences of three; quarts, or fours; quintes, or fives; ſixiemes, or ſixes, &c. For a tierce they reckon three points, for a quarte four, for a quinte fifteen, and for a ſixieme ſixteen, &c. And the ſeveral ſequences are diſtinguiſhed in dignity by the cards they begin from: thus, ace, king, and queen, are called *tierce major;* king, queen, and knave, *tierce to a king;* knave, ten, and nine, *tierce to a knave*, &c. and the beſt tierce, quarte, or quinte, *i. e.* that which takes its deſcent from the beſt card, prevails; ſo as to make all the others in that hand good, and deſtroy all thoſe in the other hand. In like manner, a quarte in one hand ſets aſide a tierce in the other.

The ſequences over, they proceed to examine how many aces, kings, queens, knaves, and tens, each holds; reckoning for every three, of any ſort, three; but here too, as in ſequences, he that with the ſame number of threes has one that is higher than any the other has, *e. gr.* three aces, has all his other made good hereby, and his adverſary's are all ſet aſide. But four of any ſort, which is called a *quatorze*, always ſet aſide three.

All the game in hand being thus reckoned, the eldeſt proceeds to play, reckoning one for every card he plays above a nine, and the other follows him in the ſuit: and the higheſt card of the ſuit wins the trick. Note, unleſs a trick be won with a card above a nine (except the laſt trick), nothing is reckoned for it: though the trick ſerves afterwards toward winning the cards; and that he who plays laſt does not reckon for his cards, unleſs he win the trick.

The cards being played out, he that has moſt tricks reckons ten for *winning the cards*. If they have tricks alike, neither reckons any thing. The deal being finiſhed, and each having marked up his game, they proceed to deal again as before; cutting afreſh each time for the deal.

If both parties be within a few points of being up, the carte blanche is the firſt thing that reckons; then the point, then the ſequences, then the quatorzes or threes, then the tenth cards.

He that can reckon thirty in hand by carte blanche, points, quintes, &c. without playing, before the other has reckoned any thing, reckons ninety for them; and this is called a *re-pique*. If he reckons above thirty, he reckons ſo many above ninety. If he can make up thirty, part in hand, and part in play, before the other has told any thing, he reckons for them ſixty. And this is called a *pique*. Whence the name of the game.

He that wins all the tricks inſtead of ten, which is his right, for winning the cards, reckons forty; and this is called a *capot*.

This game has, in ſome caſes, been the object of mathematical computation.

Thus M. de Moivre has propoſed and ſolved the following problems:

1. To find at picquet the probability which the dealer has for taking one ace or more in three cards, he having none in his hand. He concludes from his computation, that it is 29 to 28 that the dealer takes one ace or more.

2. To find at picquet the probability which the eldeſt has of taking an ace or more in five cards, he having no ace in his hand. Anſwer; 232 to 91, or 5 to 2, nearly.

3. To find at picquet the probability which the eldeſt hand has of taking an ace and a king in five cards, he having none in his hand. Anſwer; the odds againſt the eldeſt hand taking an ace and a king are 331 to 315, or 21 to 20 nearly.

4. To find at picquet the probability of having twelve cards dealt to, without king, queen, or knave; which caſe is commonly called *cartes blanches*. Anſwer; the odds againſt *cartes blanches* are 1791 to 1 nearly.

5. To find how many different ſets, eſſentially different from one another, one may have at picquet before taking in. Anſwer; 28,967,278. This number falls ſhort of the ſum of all the diſtinct combinations, whereby twelve cards may be taken out of 32, this number being 225,792,840; but it ought to be conſidered, that in that number ſeveral ſets of the ſame import, but differing in ſuit, might be taken, which would not introduce an eſſential difference among the ſets.

M. De Moivre alſo gives ſome obſervations on this game which he had from an experienced player. See Doctrine of Chances, p. 179, &c.

M. de Monmort has alſo treated of picquet in his Analyſe des jeux de Hazard, p. 162.

Picquet *Guard.* See Guard.

Picquet-*Berg*, in *Geography*, a diviſion of the diſtrict of Stellenboſch and Drakenſtein in ſouthern Africa, near the Cape of Good Hope. It terminates the plain of the Four-and-twenty rivers to the northward. Here, beſides corn and fruit, the inhabitants rear horſes, horned cattle, and ſheep. And from hence alſo is ſent to the Cape market a conſiderable quantity of tobacco, which has the reputation of being of the beſt quality that ſouthern Africa produces.

PICQUIGNY, a town of France, in the department of the Somme, and chief place of a canton, in the diſtrict of Amiens. The place contains 1253, and the canton 14,125 inhabitants, on a territory of $202\frac{1}{2}$ kiliometres, in 22 communes.

PICRA, Hiera. See Hiera.

PICRAMNIA, in *Botany*, ſo named by Swartz from πικρος, *bitter*, and θαμνος, *a ſhrub*, on account of the great bitterneſs of every part of the plant. Swartz. Prodr. 27. Fl. Ind. Occ. 217. Schreb. 687. Willd. Sp. Pl. v. 4. 761. Ait. Hort. Kew. v. 5. 384.—Claſs and order, *Dioecia Pentandria.* Nat. Ord. uncertain; perhaps akin to *Rhus.*

Gen. Ch. Male, *Cal.* Perianth of one leaf, in three or five deep, lanceolate, erect ſegments. *Cor.* Petals three or five, lanceolate, ſomewhat ſpreading, longer than the calyx. *Stam.* Filaments three or five, awl-ſhaped, approximated at the baſe, erect, longer than the corolla; anthers ovate, two-lobed.

Female, on a different plant, *Cal.* as in the male, permanent. *Cor.* as in the male. *Piſt.* Germen (ſuperior?) oblong, rather compreſſed; ſtyles two, ſhort, recurved, permanent; ſtigmas ſimple, acute. *Peric.* Berry roundiſh-ovate, of two cells. *Seeds* two in each cell, ovate-oblong.

Eſſ. Ch. Male, Calyx in three or five deep ſegments. Petals three or five. Stamens three or five.

Female, Calyx and Corolla like the male. Styles two. Berry of two cells. Seeds two in each cell.

Obſ. The berry is ſaid to have ſometimes, though very rarely, three cells, and ſolitary ſeeds.

1. P. *Antideſma.* Aſh-leaved Picramnia. (Berberis fruticoſa racemoſa, fraxini folio alato, fructu nigro dipyreno; Sloane Jam. v. 2. 101. t. 208. f. 2. Antideſma; Browne Jam. 123.)—Cluſters ſlender, pendulous. Stamens three. Styles recurved.—Native of Jamaica and Hiſpaniola; brought to Kew by admiral Bligh's ſhip in 1793, but it has not yet bloſſomed. The *ſtem* is nine or ten feet high, according to Sloane, as thick as a man's arm, ſmoothiſh. *Leaves* ſcattered, pinnate, of about ſeven ſmooth, elliptical, nearly entire, leaflets. *Cluſters* long, looſe, of numerous little yellowiſh-white *flowers.* *Berries* the ſize of gooſeberries, at firſt red, then black, ripe in November. The negroes eſteem this ſhrub antiſyphilitic, and uſe its infuſion as a remedy for the colic.

We quote Willdenow after the Hort. Kew. without having that part of his work at hand, ſo that we know not whether he deſcribes, as the ſpecific character ſeems to imply, more than one ſpecies.

PICRIA, ſo called by Loureiro, from πικρια, *bitterneſs*, on account of the flavour of every part of the plant. Lour. Cochinch. 392.—Claſs and order, *Didynamia Angioſpermia*, or rather perhaps *Diandria Monogynia.* Nat. Ord. *Perſonatæ*, Linn. *Scrophulariæ*, Juſſ.

Gen. Ch. *Cal.* Perianth ſuperior, four-leaved, deciduous; two of the leaves ovate, flat, longer than the corolla; two others alternate, linear, ſhorter. *Cor.* tubular, ringent; tube contracted in the middle; upper lip ſpatulate, emarginate; lower broadeſt, in three rounded equal ſegments. *Stam.* Filaments four; the two longeſt erect, ſeparately ſheathed with papillary tubes; their anthers of one cell, curved, diſtant; two ſhorter inflexed; their anthers connected together, each of two cells. *Piſt.* Germen ovate; ſtyle the length of the corolla; ſtigmas two, lanceolate, erect. *Peric.* Berry ovate, inferior, of two cells. *Seeds* very numerous, roundiſh.

Eſſ. Ch. Calyx of four leaves. Corolla ringent. Berry inferior, of two cells.

1. P. *Fel-terræ.* Cultivated in the gardens of China and Cochinchina. The leaves are eſteemed for their aperient, ſudorific, diuretic, and emmenagogue properties; and uſed in incipient dropſy, intermittent fevers, colics, and various ſuppreſſions. The *ſtems* are numerous, herbaceous, perennial, eighteen inches high, erect, ſquare, branched. *Leaves* oppoſite, ovate, ſerrated, rough, but not hairy. *Flowers* pale red, crowded, ſtalked, axillary, and terminal.—Such is Loureiro's deſcription. We find no notice of this genus in other writers; yet it muſt be preſumed that a plant ſo generally cultivated, and of ſo good report as to its medical uſes, can hardly have eſcaped the notice of botanical travellers. Many points indicate an affinity to *Gratiola*, but the fruit being a berry, and inferior, is foreign to that genus, nor can we, by any probable conjecture, reduce Loureiro's plant to any other with which we are acquainted.

PICRIDIUM, ſo called from its bitterneſs, a genus eſtabliſhed by Desfontaines in his *Flora Atlantica*, the only two ſpecies of which, mentioned by that able writer, are *P. tingitanum* and *P. vulgare.* The firſt is *Scorzonera tingitana*, the other *Scorzonera picroides*, of Linnæus. Both are removed by Willdenow to *Sonchus*, a meaſure adopted in the Prodr. Fl. Græc. v. 2. 126; nor can we trace any thing like an eſſential difference, in the character given by Desfontaines, to ſeparate them from that genus, with which moreover they well accord in habit.

PICRIS, from πικρος, *bitter*, a name for the wild ſuccory, or ſome bitter herb of that family. It is well choſen for the preſent genus, inferior to few of its natural order in this reſpect. Linn. Gen. 399. Schreb. 526. Willd. Sp. Pl. v. 3. 1556. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 814. Prodr. Fl. Græc. Sibth. 131. Ait. Hort. Kew. v. 4. 447. Juſſ. 170. Lamarck Illuſtr. t. 648. Gærtn. t. 159. (Helmintia; Juſſ. 170. Willd. Sp. Pl. v. 3. 1607. Ait. Hort. Kew. v. 4. 461. Lamarck Illuſtr. t. 648. Gærtn. t. 159.)—Claſs and order, *Syngeneſia Polygamia-æqualis.* Nat. Ord. *Compoſitæ ſemifloſculoſæ*, Linn. *Cichoraceæ*, Juſſ.

Gen. Ch. *Common calyx* double; the outer of ſeveral flat, lax, converging ſcales; inner ovate, of many equal parallel ſcales. *Cor.* compound, imbricated, uniform, of numerous monopetalous, ligulate, linear, abrupt, five-toothed, perfect florets. *Stam.* Filaments five, capillary, very ſhort; anthers united into a cylindrical tube. *Piſt.* Germen to each floret nearly ovate; ſtyle the length of the ſtamens; ſtigmas two, reflexed. *Peric.* none, except the permanent calyx, finally reflexed. *Seeds* ſolitary, ſwelling, obtuſe, tranſverſely furrowed; down feathery, ſeſſile or ſtalked. *Recept.* naked.

Eſſ. Ch. Receptacle naked. Calyx double; the inner equal; the outer lax. Down feathery. Seeds tranſverſely furrowed.

Obſ. The inner calyx is by no means imbricated. Its ſcales, or leaves, are parallel, cloſe, all of equal length. The Helmintia of authors, ſee that article, conſiſts of the firſt of our ſpecies only; its outer calyx has but five leaves, the inner about eight; and the ſeed-down is ſtalked. The habit alſo is rather peculiar; but we are always on our guard againſt the unneceſſary multiplication of genera, that ſnare to the moſt accurate obſervers.

1. P. *echioides.* Briſtly Ox-tongue. Linn. Sp. Pl. 1114. Curt. Lond. faſc. 3. t. 51. Engl. Bot. t. 972. (Helmintia echioides; Willd. Sp. Pl. v. 3. 1607. Bugloſſum luteum; Ger. Em. 798.)—Outer calyx of five broad prickly leaves. Down ſtalked. Leaves wavy.—Native of banks and the borders of fields, eſpecially on a clay ſoil, in England, France and Italy, flowering in June and July. The *root* is annual. *Herb* two or three feet high, branched, bright green, copiouſly beſet with rigid pungent prickles, of which thoſe on the diſk of the *leaves* proceed each from a hard tubercle. Lower *leaves* lanceolate; upper heart-ſhaped and claſping the ſtem. *Flowers* rather large, of a bright golden yellow. The plant abounds with a bitter milky juice; yet Dr. Sibthorp found the leaves in uſe among the modern Athenians, either raw, as an ingredient of their ſallads, or boiled as a pot-herb.

2. P. *hieracioides.* Hawkweed Ox-tongue. Linn. Sp. Pl. 1114. Willd. n. 1. Ait. n. 1. Engl. Bot. t. 196. (Hieracium aſperum; Ger. Em. 298.)—Stem rough. Outer calyx many-leaved, ſhort, lax. Leaves lanceolate, wavy; the radical ones toothed. Down ſeſſile.—Found about dry gravelly banks, and the borders of fields, in the north of Europe; not rare in the chalk or gravel counties of England; flowering in July and Auguſt. *Root* biennial. *Herb* corymboſe and widely ſpreading, dark green, rough. *Flowers* yellow, with a broader corolla, but ſmaller calyx, than the former.

3. P. *japonica.* Japaneſe Ox-tongue. Thunb. Jap. 299. Willd. n. 2.—Stem hiſpid. Leaves ſeſſile, lanceolate, hairy, toothed. Flowers panicled. Calyx hiſpid; the outer one erect.—Native of hills in Japan, flowering in April or May. *Stem* two feet high, hiſpid. Lower *leaves* a finger's length, ſomewhat ſtalked; upper ſhorter and ſeſſile, alternate. *Flowers* yellow, panicled, on long, naked, hiſpid, compound ſtalks.

4. P. *aculeata.* Prickly Ox-tongue. Vahl Symb. v. 2. 89. Willd. n. 3.—Stem very prickly. Leaves elliptic-lanceolate, toothed. Flowers corymboſe. Calyx hiſpid; the outermoſt lax.—Native of uncultivated hills in Barbary. Perennial. A foot high, rough all over with copious ſmall rigid prickles. Vahl deſcribes it as differing from *P. echioides* in the want of a five-leaved outer *calyx;* yet he ſays there is an outer *calyx*, only all the calyx-ſcales are linear-lanceolate. Such is the caſe with every ſpecies except *echioides.*

5. P. *pauciflora.* Few-flowered Ox-tongue. Willd. n. 4. Prodr. Fl. Græc. n. 1912.—Stem hairy. Leaves lanceolate, ſeſſile, toothed. Flower-ſtalks elongated, ſwelling. Calyx hairy; the outermoſt lax.—Native of the ſouth of France and of Greece. It was raiſed in Chelſea garden in 1788, as well as in that of the late Dr. Gwyn at Ipſwich, from ſeeds given to the writer of this by M. Gerard. The *root* appears to be annual. *Stem* from eight to twenty-four inches high, more or leſs branched, ſpreading, rough with ſhort briſtly cloven-pointed hairs, as is all the herbage. *Flowers* yellow, of an ordinary hawkweed aſpect, open in the morning only. Villars's figure of his *Hieracium pappoleucum*, Dauph. t. 31, is a very tolerable repreſentation of this plant, as Willdenow has likewiſe noted; but ſpecimens from the author himſelf prove very different from our *Picris.*

6. P. *aſplenioides.* Spleenwort-leaved Ox-tongue. Linn. Sp. Pl. 1115. Willd. n. 5. Vahl. Symb. v. 2. 90. Prodr. Fl. Græc. n. 1913. Ait. n. 2. (Leontodon muricatum; L'Herit. Stirp. 173. t. 82. Virea ſcabra; Scop. Del. Inſub. v. 2. 25. t. 13.)—Stem rough. Leaves oblong-lanceolate, obtuſe, ſinuated. Flower-ſtalks elongated, ſwelling. Calyx rough; the outermoſt reflexed.—Native of the ſandy ſea-coaſt of Barbary. Perennial. Much larger than the laſt, with blunt, ſtrongly ſinuated, or pinnatifid, *leaves;* and ſome of the *ſeed-down* is ſtalked, which greatly invalidates the ſuppoſed character of *Helmintia*, as a diſtinct genus.

7. P. *ruderalis.* Rock Ox-tongue. Willd. n. 6.—Stem hiſpid. Leaves lanceolate, with fringe-like teeth. Flower-ſtalks and calyx hiſpid; the outermoſt ſpreading. Found on rocks near Prague in Bohemia. *Schmidt.* *Root* perennial, abrupt. *Stems* ſeveral, ſix inches high, erect, beſet from top to bottom with axillary, diſtant, very hiſpid *flower-ſtalks.* The *flowers* are ſmall, like *Crepis tectorum.* Willd.

8. P. *hiſpida.* Hiſpid Ox-tongue. Ait. n. 3.—Leaves oblong-lanceolate, nearly entire, ſeſſile, hiſpid, as well as the calyx, with hairs barbed at the point.—Native of the Levant. A ſpecimen in the Bankſian herbarium, it is ſaid, ſhews this plant to have been cultivated before 1789, in the gardens of England. It is marked as a hardy perennial, flowering in July and Auguſt. We have had no opportunity of examining this ſpecies, but we greatly ſuſpect it to be no other than our *pauciflora*, whoſe pubeſcence anſwers to the deſcription, and which we believe was communicated to ſir J. Banks, as well as to Kew garden, in 1788 or 1789.

PICRIUM, from πικρος, *bitter*, an appellation for which Schreber has exchanged the barbarous *Coutoubea* of Aublet. Schreb. Gen. 791. Mart. Mill. Dict. v. 3. See Exacum.

PICROTOXINE, in *Natural Hiſtory*, a name given by M. Boulley to a peculiar ſubſtance, which he extracted from the "Cocculus indicus," and to which that ſubſtance owes its deleterious qualities. It may be obtained by the following proceſs. Boil the ſeeds deprived of their pericarp in a ſufficient quantity of water; filter the decoction, and precipitate it by acetate of lead; then filter again, and evaporate ſlowly to the conſiſtence of an extract; diſſolve this extract in alcohol, and evaporate the ſolution to dryneſs. Repeat theſe ſolutions in alcohol and evaporation, till the reſidue is wholly ſoluble in alcohol and water. It then conſiſts of picrotoxine mixed with a little colouring matter; agitate it with a very ſmall quantity of water, the colouring matter is diſſolved, and the picrotoxine ſeparates in ſmall cryſtals. Its properties are as follow: its colour is white, and it cryſtallizes in four-ſided priſms; its taſte is diſguſtingly bitter; 100 parts of boiling water diſſolve four parts of picrotoxine, one-half of which ſeparates as the ſolution cools; the ſolution does not alter the colour of vegetable blues; alcohol, of the ſpecific gravity 0.810, diſſolves the third of its weight of this ſubſtance; a little water throws down the picrotoxine, and the addition of a greater quantity rediſſolves the precipitate; ſulphuric ether, of the ſpecific gravity 0.700, diſſolves only 0.4 of picrotoxine; it is inſoluble in oil, both fixed and volatile; diluted ſulphuric acid does not act upon it; concentrated acid diſſolves it, aſſuming a yellow colour; when heat is applied, the picrotoxine is changed and deſtroyed; nitric acid diſſolves it without the diſengagement of nitrous gas; the ſolution is yellowiſh-green; when heat is applied, the picrotoxine is converted into oxalic acid; but about eighteen parts of nitric acid are requiſite to produce this effect:—muriatic, oxymuriatic, and ſulphureous acids, do not act upon it:—acetic acid readily diſſolves it:—carbonate of potaſh precipitates it from this ſolution unaltered:—potaſh, ſoda, and ammonia, diluted with ten times their weight of water, readily diſſolve picrotoxine:—when triturated with potaſh, it aſſumes a yellow colour, but does not emit the odour of ammonia:—

when heated, it burns without melting, or flame, exhaling a white ſmoke, which has a reſinous odour :—when diſtilled, it yields very little water, and gaſeous products, but much yellow-coloured empyreumatic oil, and a brilliant bulky charcoal remains behind. Annal. de Chim. vol. 80.

PICTA Toga. See Toga.

PICTAVIENSIS, or Pictonum *Colica*, the *colic of Poictou*, called alſo the *painter's colic*, *Devonſhire colic*, and, in the Weſt Indies, the *dry belly-ache*, is now known to be occaſioned ſolely by the poiſon of lead, and is more properly called the *ſaturnine colic*. See Colica.

PICTOU, in *Geography*, a growing ſettlement of Nova Scotia, in the county of Halifax, built on the bay of Pictou, on the N.E. coaſt of the province, nearly oppoſite to the S.E. end of the iſland of St. John's, and about 100 miles diſtant from Halifax, with which it has a free and ſpeedy communication. It contains 40 houſes, and 500 inhabitants, moſtly Scots. Formerly it was inconſiderable, but now is the moſt flouriſhing place in the province. Its trade conſiſts chiefly in the exportation of timber, annually ſhipped to Great Britain and Ireland, in return for which are imported dry goods.

PICTS, in *Hiſtory*, a denomination given to the inhabitants of the eaſtern parts of Scotland, concerning whoſe origin, the etymology of their name, and various particulars relating to them, antiquarians, after all their reſearches, have been divided almoſt to the preſent day ; though we have reaſon to believe, that the principal queſtions in diſpute with regard to theſe people are now nearly ſettled. The firſt mention of them under this denomination occurs in a panegyric of Eumenius, the orator, during the year 297, and again in 308 ; who, referring to Conſtance's arrival in Britain in 306, for the purpoſe of repelling the Caledonians and "other Picts" (*Caledones aliique Picti*), expreſsly and ſignificantly repreſents them as the ſame people. The Caledonians had been often mentioned before by claſſic authors, under other names ; but on this occaſion they were called Picts, on account of their peculiar ſecluſion from the Roman provincials on the ſouth ; and they were often mentioned, during the decline of the Roman empire, by orators, hiſtorians, and poets, under that ſignificant appellation. As the learned profeſſor of Autun knew the meaning of his own language, ſays Mr. Chalmers, we are bound to regard the Caledonians and Picts as the ſame people, at the end of the third century. Towards the concluſion of the fourth century, Ammianus Marcellinus (l. xxvii. c. 7.) ſpoke of theſe people in the ſame manner. The poets alſo, referring to the cuſtom of painting themſelves, that prevailed among the Caledonians, and perhaps erroneouſly imagining that they were on this account called *Picti*, confirm the ſame opinion. Thus Claudian, about the year 400, "De Bello Getico," alludes to them in the following lines :

> " ——— ferroque notatos
> Perlegit exanimos Picto moriente figuras."

And in his panegyric on Theodoſius's victories, he again thus ſpeaks of the Picts :

> " Ille leves Mauros, nec falſo nomine Pictos
> Edomuit."

It appears, therefore, from the mention of claſſic authors, during three centuries, that the Picts were Caledonians. That the Caledonians were the North Britons, who fought Agricola, at the foot of the Grampian, we know from the nature of the events, and the atteſtation of Tacitus ; and that the Northern Britons of the firſt century were the deſcendants of the Celtic aborigenes, who were the ſame people as the Southern Britons, during the earlieſt times, has been ſatisfactorily proved, ſays Chalmers, as a moral certainty.

At the period of the Roman abdication, A.D. 446, when the Pictiſh period commenced, the ſixteen tribes of Picts, under this appropriate denomination, ranged unſubdued beyond the wall of Antonine, and acquired from their independence higher importance, when they were no longer overawed by the Roman power. By degrees they became the ruling nation, and retained their dominion throughout four centuries of the North Britiſh annals, *viz.* until A.D. 843, when the Pictiſh period terminated. It has been a ſubject of diſpute, as we have already intimated, whether the Picts were of a Celtic, or of a Gothic origin ; but it has been ſhewn, on the moſt ſatisfactory evidence, that their genealogy may be clearly traced through three ſucceſſive changes ; from the Gauls to the Britons ; from the Britons to the Caledonians ; and from the Caledonians to the Picts ; thus changing their names, but not their nature. The venerable Bede, who was contemporary with the Pictiſh government, ſpeaks doubtfully of the Picts, as the ſecond people, who came into this iſland from Scythia ; firſt to Ireland and thence to North Britain, and many later writers have been miſled by his authority ; but it has been ſince concluded, from more accurate examination, that the Picts were undoubtedly Caledonians, that the Caledonians were Britons, and that the Britons were Gauls, or Celts. Towards the concluſion of the third century, the Caledonians acquired the comprehenſive appellation of Picts ; and this appellation, before the end of the fourth century, ſuperſeded every other name. Some writers, indeed, maintained, with Buchanan, that a great part of North Britain was, even before the invaſion of Britain by the Romans, inhabited by a people called Picts, Piks, or Pechts, who are thought by ſome to have migrated from Scandinavia, and to have driven out the ancient inhabitants ; neverthleſs it is ſaid, that they were a Celtic colony, and ſpoke at leaſt a dialect of the language of the original inhabitants. But for theſe aſſumptions there ſeems to thoſe who have been induſtrious in their reſearches no ſufficient authority. Camden, whoſe teſtimony commands deference and reſpect, is the firſt perſon of eminence who avowed it as his opinion, that the Picts were the genuine deſcendants of the ancient Britons ; and Selden, having duly conſidered the ſubject of the origin of the Picts, adviſes the reader, rather to adhere to the learned Camden, who makes the Picts very genuine Britons, diſtinguiſhed only by an accidental name. Different etymologies have been given of the name *Picti*. The moſt probable opinion is, that theſe diſtinguiſhed deſcendants of the Caledonians acquired this name, during the Roman period, from their relative ſituation, and local qualities, as compared with the romanized Britons, who lived in the province of Valentia, within the Roman wall ; whereas the Picts dwelt without the province, and roamed free from the Roman authority, and ſeparated from the romanized tribes within, who often felt their rigorous incurſions, and frequently required the protection of the Roman government. In the Britiſh ſpeech, the Picts were from theſe diſtinctive qualities called "Peithi," which was naturally latinized by Roman writers into "Picti," when, during the third century, they came to be the objects of Roman obſervation, by aſſimilating the Britiſh term to their own familiar word "Picti," which was deſcriptive of the cuſtom of painting the body, ſeen by the Romans among the Northern Britons. "Peithi" in the Britiſh language ſignifies "thoſe that are out or expoſed," "the people of the open country," or of the waſte and deſart ; and alſo thoſe "who ſcout, or lay waſte." Accordingly the "Peithi" and "Peith-wyr" are the terms commonly uſed by the Welſh poets for the Pictiſh people ; and on the confines of Wales, thoſe Britons who threw off their allegiance to their native princes, and ſet up a *regulus* of their own, or adhered to the Saxons, were called "Peithi" or "Picti." Moreover, the Welſh, in order to diſtinguiſh the northern from the ſouthern Picts, called the Caledonian Picts by the appellation of "Gwyddyl Pichli," or "Fichli;" the *p* of the Britiſh being often changed into *f*. We may here add, that the Welſh, as Owen obſerves, in his Dictionary, apply the term "Brython," and Brythonig, to the Picts, and hence it has been inferred, that the Welſh conſidered them as Britons.

Innes, in his "Critical Eſſay," has given from an ancient chronicle a ſeries of the Pictiſh kings, comprehending forty, who ſucceeded one another from Druſt, the ſon of Erp, A.D. 451, to Bred, the laſt, A.D. 843. Theſe Pictiſh kings ſucceſſively governed uncivilized clans, during the rudeſt ages. In the third century, they were in a high degree barbarous ; but in proceſs of time they gained ſome improvement from their intercourſe, either civil or hoſtile, with the romanized Britons, or Roman armies, and ſtill more from the introduction of Chriſtianity among them.

The appropriate country of the Picts acquired different names, in ſucceſſive periods. The mountainous part of it was denominated by the firſt coloniſts in their native ſpeech "Alban," *i. e.* the ſuperior height. This appellation, originally applied to the hilly region that forms the weſt of Perth, and the north-weſt of Argyle, was in ſubſequent times extended to the whole country. In the firſt century, the Britiſh term "Celyddon," literally ſignifying the "Coverts," was applied by the Roman authors to the whole country on the N. of the Friths, though the ſame name was reſtricted by the Roman geographers to the interior highlands, lying northward of Alban : and both theſe appellations were afterwards applied more largely to North Britain. The Pictiſh chronicle, from the Pictiſh people, called their country "Pictavia." The annals of Ulſter generally mention this country under the name of "Fortruin," derived, with a ſlight variation, from "Fother," the name of the Pictiſh capital. Saxo, the Daniſh hiſtorian, plainly refers to "Petia," as the name of Pictland ; and this "Petia" of Saxo approaches the neareſt to the Britiſh term "Peith," or "Peithw," which the Britiſh people applied to the open country, lying along the eaſt coaſt, on the northward of the Forth. In the ſequel of this article, we ſhall merely mention ſome incidental circumſtances that occur in the hiſtory of the Picts. The reign of Bridei was rendered illuſtrious by his converſion to Chriſtianity, under the inſtruction of Columba, in 565. From this epoch, the Picts may be conſidered as Chriſtians, though this change in the profeſſion ſeems not to have produced any conſiderable alteration in their principles, or their cuſtoms. About the year 724, a civil war commenced among the Picts, and they were at the ſame time expoſed to the deſtructive incurſions of their enterpriſing neighbours, on the north-eaſt. The anarchical governments of Norway, Sweden, and Denmark, during the middle ages, produced the pirate kings of the northern ſeas, and theſe were for a long time the ſcourges of the navigators, who ſailed from every nation, on the European ſeas. In 839 the Vikingr, as they were called, landed among the Picts, and a bloody conflict enſued, which proved fatal to many of the Pictiſh chiefs. Weakened by domeſtic ſtrife, and by a formidable invaſion, the Picts were unable to reſiſt the arms, or to defeat the policy of Kenneth, the ſon of Alpin, when he acquired their diſtracted government, A.D. 843.

With regard to the *language* of the Picts, it has been obſerved, that as they were merely the Cambro-Britons, who appeared at various periods under a new and laſting name, the ſpeech of the Britons and of the Picts muſt have been the ſame. Accordingly Aber-nethy, the metropolis of the Pictiſh kingdom, derived from the Britiſh language its appropriate appellation, which it retained till the lateſt period of the Pictiſh government ; and upon inveſtigation, which we have not room to purſue, it has been found that the moſt ancient repertory of Pictiſh language is the topography of North Britain. The Pictiſh language may alſo be traced in the vernacular language of North Britain even at this day : and the municipal law of that country has even borrowed ſeveral of its ſignificant terms from the Pictiſh ſpeech. This language of the Britons and Picts has been conſidered, by judicious writers, as maſculine, copious, and poetical. Although from not ſeeing it, in its primitive orthography, it ſeems to be harſh, in its ſounds, to the ears of ſtrangers, yet, when it is put into verſe, and is read with its genuine pronunciation, it is, like the Greek and the Hebrew, melodious and ſtrong. As the Celts were the original ſettlers of Weſtern Europe, they tranſmitted to their poſterity an energetic paſſion, for impoſing their own ſignificant names on all the prominent objects of nature. In exerciſing this peculiar prerogative of firſt diſcoverers, they diſplayed thoſe appropriate qualities of their language, which have been remarked ; its ſtrength and diſcrimination, its copiouſneſs of epithet, and its frequency of metaphor. In the ſubſequent progreſs of the Gothic tribes over Europe, they adopted the names of mountains, rivers, &c. which had been impoſed upon them by the Celts who had previouſly occupied the countries of which they took poſſeſſion ; and the Saxons, who ſettled in Britain, were prompted, by their poverty of ſpeech, to follow the example of their Gothic fathers. The Anglo-Saxons, who, in more recent times, acquired ſettlements in North Britain, borrowed many words from the Celts and Britons, and Scoto-Iriſh, which have maintained their place, and which give ſtrength, copiouſneſs, and ornament to the Scoto-Saxon of the preſent times.

The *religion*, as well as the *language*, of the Picts, derived its origin from thoſe of the Gauls ; and hence we may conclude that the Picts and the Britons were the ſame people, as well as from the identity of their ſpeech, topography, and monuments. The tenets and the forms of the Pictiſh religion were Druid in the ſixth century ; as we know from a thouſand relics of ſtone that ſtill engage attention within the diſtrict of the Pictiſh country. The modes of ſepulture were the ſame among the Picts as thoſe of the Caledonians, and the ſepulchral rites of the latter were the ſame as thoſe of the Britons. Their hill forts, their weapons of war, their ornaments, and their modes of life, were the ſame as thoſe of the Caledonian Britons, of whom the Picts were the immediate deſcendants. That the Caledonians and Picts were the ſame people is now univerſally allowed. Buchanan, Camden, Lloyd, Jones, the M'Pherſons, O'Connor, d'Anville, and Stillingfleet, however they may differ in other points, are here all agreed. But ſome have aſſerted, without proof, and againſt probability, that the Caledonians were a Gothic colony, who conquered North Britain in ſome unknown age. With regard to any Gothic expedition for this purpoſe, hiſtory is ſilent. Few queſtions have engaged more general attention among learned antiquaries than that of the origin of the Picts. Mr. Chalmers has given a minute detail of the different opinions that have been maintained with regard to this queſtion ; and he concludes with adducing the teſtimony of the learned antiquary. Mr. Edward King, the author of the "Munimenta Antiqua ;"

tiqua;" who maintains, that the Picts were deſcended from the aboriginal Britons. With him concurs the late Dr. Henry, who ſays, that we hear nothing of any invaſion of the Caledonians by any ſuch diſtinct people as the Picts; and he therefore concludes, as Innes had done before him, that this denomination was merely a new name, which was given to the old ſettlers. Upon the whole, Mr. Chalmers obſerves, the twenty-one Britiſh tribes, who occupied North Britain during the firſt century, remained for ages in their ancient ſettlements. Five of thoſe tribes were ſubdued by the Roman arms, and civilized by the Roman arts. After the Roman abdication, theſe five tribes continued, in their appropriate country, on the ſouth of the Friths, diſtinguiſhed by no other circumſtance than their civilization from the ſixteen tribes, who equally remained unſubdued on the north of the ſame Friths, and who obtained the name of Picts. Theſe were as much the deſcendants of the Cambro-Britons as their ſouthern neighbours of Strathclyde, who were noticed, till recent times, as genuine Welſh.

Upon the death of Bred, the laſt Pictiſh king, A.D. 843, Kenneth, the ſon of Alpin, king of the Scots, obtained the Pictiſh government; in his perſon a new dynaſty commenced: the king was changed, but the government remained the ſame. The Picts and Scots, who were a congenial people, from a common origin, and ſpoke cognate tongues, the Britiſh and the Gaelic, readily coaleſced; and the union of the Picts with the Scots, A.D. 843, conjoined the ſeparate dominions of both, and led on to the annexation of other territories. The Picts had been confined, for ages before that epoch, by the Forth on the ſouth, and Drumalban on the weſt, and by the German ocean on the eaſt and north. Their ſouthern limits had been fixed at an early period by the prevalence of the Roman power. They were induced, probably by the long continuance of that power, to conſolidate the diſtant diſtricts of the various tribes, which had, from the earlieſt times, divided their country, by their ſpirit of independence, and enfeebled their ſtrength, by their deſires of revenge. Tradition reported, even ſo lately as the twelfth century, that Pictavia had been once ſeparated into ſix kingdoms. But theſe fictitious monarchies had long ceaſed to exiſt before the memorable union of the Picts and Scots, except in the natural diviſions of the country, as they had been named by a Celtic people. The Scots, at that epoch, poſſeſſed the whole weſtern coaſt, from the Clyde to Loch-Toridon, with the adjacent iſles. In the days of Bede, their colonies extended from the northern margin of the Clyde, along the ſhores of the Iriſh ſea, far into the north: and in the courſe of another century, they occupied the ample extent of Argyle, from the river Clyde on the ſouth to Loch-Ew and Loch-Maree on the north, and from the ſea on the weſt to Drumalban on the eaſt. Such were the dominions which the Scots brought with them, when, by overpowering the Picts, an union was effected between them, both of authority and of territories. Chalmers's Caledonia, vol. i. See Scotland.

Picts' *Wall*, in *Antiquity*, a famed piece of Roman work, begun by the emperor Adrian, A.D. 124, on the northern bounds of England, to prevent the incurſions of the Picts and Scots.

At firſt it was made only of turf, ſtrengthened with paliſadoes, till the emperor Severus, coming in perſon into Britain, repaired it, as ſome ſay, with ſolid ſtone, reaching eighty miles in length, from the Iriſh to the German ſea, through Carliſle and Newcaſtle; with watch-towers garriſoned, now called caſtle-ſteeds, at the diſtance of a mile from each other.

It does not appear, with ſufficient evidence, that Severus's wall was formed of ſtone: Bede expreſsly aſſerts the contrary, though Spartian intimates that Severus built both a *murus*, *i. e.* a wall of ſtone, and a *vallum*, or a wall of turf. Bede's words are theſe: Severus, after ſeveral great and difficult engagements, thought it neceſſary to ſeparate that part of the iſland which he had recovered, from the other nations that were unconquered; not with a *murus*, as ſome think, but with a *vallum:* now a *murus*, ſays he, is of ſtone; but a *vallum*, ſuch as they made round a camp, to ſecure it againſt the attacks of the enemy, is made of turf, cut regularly out of the ground, and built high above ground like a wall, with the ditch before it, out of which the turf has been dug; and ſtrong ſtakes of wood all along the brink. Severus, therefore, drew a great ditch, and built a ſtrong earthen wall, fortified with ſeveral turrets from ſea to ſea. The learned Camden adopts this opinion; and adds, that Severus's wall is expreſſed by no other word than vallum, either in Antoninus or the Notitia. Camd. Brit. vol. ii. p. 1045. See Agger.

This wall was ruined ſeveral times by the Picts, and often repaired by the Romans. At laſt Ætius, a Roman general, ordered it to be rebuilt of ſtone, about the year 420; but the Picts ruining it in the year following, it was no longer regarded but as a boundary between the two nations. The wall was eight feet thick, and twelve high from the ground: it ran on the north ſide of the rivers Tyne and Irthing, up and down ſeveral hills: the tract, or remains of it, are to be ſeen to this day in many places, both in Cumberland and Northumberland.

The inhabitants of the country pretend, that there was a brazen trumpet or pipe, ſo artificially laid in the wall between each caſtle and tower, that upon the apprehenſion of danger at any one place, by the ſounding of it, notice might be given to the next, and then to the third, &c. whence it derived the ancient name *cornage*; and in the inſide a fort of fortified little town, now called Cheſter, the foundations of which appear, in ſome places, in a ſquare form.

PICTURE, an imitation or repreſentation by lines and colours of any natural object. Such repreſentations are alſo called paintings, from the name of the art by which they are produced; which being capable of general application, and of great influence upon the mind, has, at all times, ſince men have cultivated their intellectual powers, been regarded with peculiar intereſt.

Were that art employed merely as ornamental, as the amuſement of leiſure time, or an agreeable ſource of innocent delight, we could not regard it as unworthy of attention; but when conſidered as an uſeful inſtrument of inſtruction, an univerſally intelligible means of communicating ideas, with all the force, the brilliancy, and ſublimity of poetry; and with ſome advantages ſuperior to thoſe poſſeſſed by that divine art, it claims undoubted reſpect.

The well-known aphoriſm of Hippocrates, that "art is long, and life is ſhort," applies to no peculiar art ſo well as to painting; ſince not only has no ſingle man unaided been able to carry it to perfection, but in the progreſſive accumulation of knowledge through the lapſe of ages, ſucceeding ones benefiting by the experience and examples of the former, no man has yet arrived at that degree of excellence in the practice of it, which a perfect union of all its principles and qualities would produce.

The power of exerciſing this uſeful and delightful art has, at all times, been ſlow of acquirement, as the hiſtory we have given of its progreſs under the article Painting evidently ſhews. It has this diverſity in its growth from that of poetry; which has ſhone with conſpicuous luſtre at very early periods of human culture, whilſt painting has never flouriſhed, but in gradual advance with the general improvement of mankind; and has been truly conſpicuous only at thoſe times, when the arts of civilization have riſen to their higheſt pitch of excellence in the countries where it has been practiſed.

In no art has the profeſſor greater or more numerous difficulties to encounter than in painting: ſince he not only is under a neceſſity, equally impoſing as is the hiſtorian or the poet, of obtaining accurate ideas of the events he records, or the ſcenes he diſplays; but he has alſo to invent and perfect himſelf in the medium, or language, in which he communicates his ideas, before he proceeds to the uſe of it. This medium is utterly out of the ordinary way of human culture; and whatever may be the aids derived from the advantages we now poſſeſs, in having the experience of our predeceſſors as our guide, there muſt have been infinite difficulty in bringing it ſo near to perfection as the great maſters have done; and it has been only effected by an extremely gradual progreſs, and the union of ſucceſſive exertions operating in one continued line of action. Even now, with the works of preceding painters in our hands, the language of the art (the value and uſe of its materials) is neceſſarily, in a very great degree, new to every profeſſor who attains any tolerable degree of eminence. And though it muſt, no doubt, appear very extraordinary to thoſe who have never made the practice of painting their ſtudy, that when ſuch exemplars of art remain to us, men poſſeſſed of good ſenſe ſhould heſitate in producing the like; or that, when they are become capable of making copies, perfect almoſt to deception, they ſhould not be alſo capable of employing the means they have acquired, in a ſyſtematic mode, in works of original invention; yet the reverſe, in many inſtances, is a fact of univerſal notoriety; and proves inconteſtibly, that the art of painting, particularly when employed upon original matter, is more dependant upon mental exertion, than manual dexterity, in its execution, as well as in its object and effect; and well worthy of the rank aſſigned it by the Greeks among thoſe arts which they denominated liberal.

Notwithſtanding the high degree of perfection to which this art has been carried, no ſcientific or complete ſyſtematic arrangement has yet been adopted for the perfect guidance of the painter; nor does it appear probable that any one ever can be formed, that will effectually apply to the practice of an art ſuch as his, which is capable of ſuch an infinite diverſity of character and effect. A man of enlarged mind, carefully conſulting the pictures of preceding artiſts, cannot avoid acquiring information which may aſſiſt him in his labour; and it is by this means, more than by regular ſyſtematic inſtruction, that painting has arrived at eminence. But then, the power of extracting valuable information, and of employing it judiciouſly, even in the practical part of the art, is almoſt as rare as the ſuperior ones of invention, of compoſition, or deſign. Thus, however, as in other arts or ſciences, ſomething is ready done to the hands of the painter; he builds upon a foundation laid by his predeceſſors; but the benefit is derived principally from ſeeing what may be done, rather than in being informed how to do it. He has yet to diſcover what colours or materials will moſt effectively combine to attain his end, even in copying pictures; and when he ventures to attempt the imitation of nature, to trace her varieties and intricacies through the numberleſs paths of light and ſhade, and colour, and in all the diverſities of view in which objects preſent themſelves, then the whole value of the information obtained by the ſtudy of the works of former maſters in the practical part of the art, falls ſtill lower in the ſcale of utility, from the extreme difficulty of applying it. Perhaps there cannot be a greater proof of the originality of thought required in the mere practice of the art, than the great diverſity of the works produced in competition with old pictures, by thoſe who have at different periods admired and ſtudied them enthuſiaſtically. No man of genius, or of good ſenſe, will, however, ſlight the advantages which the ſtudy of them may afford him. He may not, at firſt, obtain the full and actual information he ſeeks, but the attempt will lead him in a right way to the diſcovery of the true principles of art; and time may be ſaved for their application, which, without ſuch helps, muſt have been loſt in experiment. Without tuition, the only mode of advancement in mental culture is by diſcovering our imperfections; a mode by no means favourable to rapid improvement, when there is nothing better than our own productions to operate as a corrective. But when good examples are before us, and our firſt object is to rival them; this advantage, at leaſt, is derived from the attempt, that we ſet forth in a road which leads to a happy termination, and have no occaſion to retrace our ſteps; like him who ſtarting without a guide, wanders in the mazes of ignorance.

If to acquire poſſeſſion of the means of the art of painting, the mere power of combining colours in ſuch a manner as to produce imitations, be thus encompaſſed with difficulties, how great is the taſk of him who undertakes to unite its higher principles with its nobleſt aims; and ſucceſsfully to apply it in extended compoſitions, illuſtrative of hiſtory, of poetry, or of philoſophy. Such has been the exalted and ſucceſsful ambition of many painters: and their works have proved the beauty, the utility, and ſublime power of the art they profeſſed, when exerciſed by genius, and applied with energy.

To effect this, the hand and the head muſt equally combine in their efforts. No vulgar or uninformed man, no one who has not taken pains to cultivate and improve his mental faculties, can be a great painter, in the exalted ſenſe in which we view it. Whatever is requiſite for the poet or the hiſtorian, in cultivation and information, ought not to be diſregarded by the painter, whoſe deſire is to exerciſe his art in an honourable or uſeful manner, as the great maſters among the ancient Greeks and in the more modern Italian ſchools have done. If it be not required of him to become as learned in natural philoſophy as Newton, he ought not to be unacquainted with its principles: his buſineſs is not merely with the ſurface of things, if he wiſhes to repreſent their appearances in a ſenſible and characteriſtic manner. A knowledge in the ſciences, ſufficient to inform him of the principles which direct and govern the actions of animals, and cauſe the various appearances of natural unanimated objects, cannot, or ought not to be unintereſting to him whoſe whole life is employed in contemplating and repreſenting their forms or their effects. If he knows the natural ſtructure of an animal, its modes and habits of life and action, he at once, and without heſitation, directs his attention to the parts moſt materially neceſſary to its delineation; and does not loſe his time, as an ignorant perſon would do, in repreſenting thoſe parts, which, though they may, from accidental cauſes, ſtrike the eye, yet are, in effect, prejudicial to true character; and if marked too ſtrongly, even with the hand of ability, counteract the effect of thoſe more efficient in general repreſentation, which always ought to be the ſole object of him who wiſhes to be a great painter. In the repreſentation of objects of unanimated nature, a juſt comprehenſion of their cauſes and effects will, in great meaſure, operate in the ſame way. We do not mean to ſay, that if a man happens, for example, to know the cauſe of a rainbow, or can form a pleaſing theory upon it, that he will therefore be able to ſelect and blend, in a proper manner, the colouring ſubſtances neceſſary to paint one with truth and taſte : we have already ſaid that this is a matter utterly unconnected with all other ſpecies of information : but, if he add to his technical and practical acquirements the ſcientific one alluded to, he will moſt undoubtedly ſet about the taſk with leſs confuſion of mind than the moſt ingenious among thoſe who are ignorant of it ; and will the more eaſily ſatisfy himſelf of the tones to be employed ; and, of courſe, be more fully aſſured of its propriety when done, and know when to leave his labour with greater certainty of ſucceſs.

To this knowledge of the principles of nature, an unremitting attention to her productions is abſolutely required of the painter. To him whoſe mind is devoted to the art, no ſcene can be vacant or unintereſting ; every place affords him matter of obſervation and inveſtigation. All appearances of natural objects, from the ſimpleſt to the moſt awful ; all the actions of man, the varied expreſſions of his countenance, when under the influence of his paſſions ; the characters of health, of age, of beauty, and even deformity, are entitled to his regard, indeed demand his cloſeſt enquiry into their moſt characteriſtic lines and effects. All the varieties of country, the characteriſtic forms of animals, trees, rocks, &c. &c. ought neceſſarily to be known to him ; in fact, there is no object the obſervation of which may not, either immediately or collaterally, be uſeful to him. The trouble which attends this conſtant application of the mind, is in the end moſt highly rewarded. His ſphere of viſion is enlarged, almoſt to the creation of another ſenſe, unknown to thoſe who are uninitiated in the art, which finds continual nouriſhment in ſcenes even of apparent dulneſs and inſipidity : imagination is ſtrengthened by it, as the power of creating new images increaſes in proportion to the ſtore of ideas he acquires ; and the power of invention or combination, with whatſoever degree nature may have bleſſed him, is rendered ſo much the more effective, as he is careful and active in obſervation ; whereas it would be utterly uſeleſs, or worſe, if not thus ſupplied by a well digeſted maſs of materials, raiſed by continual ſtudy of nature ; particularly of the beautiful, the grand, the intereſting, and the characteriſtic.

This union of general knowledge with practical ability, may be regarded as the material, or the body of the art, the ſervant of its more exalted and ſpiritual eſſence, the power of invention and expreſſion, by which alone the charm of the art is acquired and imparted. In vain may the moſt ſkilful operator combine his colours, and arrange his lines ; or the moſt ſcientific compoſer determine his groups, and perfect his forms, in exact imitation of nature, if a vivid and correct invention, amply ſupplied with the ſtores of nature and of art, has not formed the baſis of the work ; and if an enthuſiaſtic feeling of expreſſion does not pervade every part, and add, with its glowing energy, the true and forcible impreſſion of life, of motive, and of motion.

To this end, the nature of the ſubject is the only proper guide ; the little that can be taught being quite unavailing, if not directed by feeling and the principle of the ſubject. Rules are allowed to controul in the arrangement of inferior matters ; indeed it is only by ſcience, that ſcenes of common, or ſtill life, become intereſting ; but whenever expreſſion, action, character, are required, when the object is, to develope ſentiment, to create emotion, or impreſs with ſublimity, the prime governing power muſt be the original impreſſion made upon the artiſt's own mind, and emanating from the ſubject ; to which rules muſt be made ſubſervient, ſyſtematic arrangements muſt give way, and whatever can be ſupplied by commonplace tuition, can only be appealed to in a minor degree.

The baſis of the art of painting is imitation : its object, when it is beſt employed, is to excite emotion. The pleaſure or pain which it is capable of exciting, reſts not, however, altogether upon actual imitation ; ſince all the moral purpoſes of the art may be effectually anſwered by lines only ; at leaſt, all that can be imparted by the action and expreſſion of figures. (See OUTLINE.) It is ſufficient for thoſe purpoſes, that a hint intelligible to the underſtanding be given, by which the mind is filled with idea ſufficient to fix its attention. Hence ariſes the notion, which has been ſupported and oppoſed with conſiderable power by men of talents, that an union of the qualities of the different ſchools of painting would be injurious, inſtead of beneficial, to the practice and effect of the higher object of art. (See PAINTING.) It is a certain fact, and allowed by both, that too cloſe an imitation weakens the ſentiment of a picture ; abſtracts the mind too much from the object to fix it upon the means ; and by dividing the intereſt, diminiſhes its power. We do not mean by too cloſe an imitation, that narrow view of nature, which, without ſelection, takes men and things as they are, and copies defects and beauties with equal fidelity ; but would extend it to the moſt perfect ſyſtem of combination and ſelection, unleſs wrought upon the general principles of ideal nature. (See IDEAL.) Yet it is not in the quality of the imitation the danger lies, ſo much as in the degree ; and we perfectly agree with thoſe who are in favour of truth in colour and effect, as well as form : and know no reaſon why the imperfect colouring of the Florentine, or any other ſchool, ſhould be an allowed medium, through which, by incorrectneſs, the mind ſhould be made to conceive of what is right ; in preference to another, which, without diſturbing the imagination by preſenting images too minutely juſt, yet has its baſis in correct imitation.

Nothing can juſtify the impropriety of attempting to make falſehood the ſource of truth. It has by no one ever yet been made apparent, that an hieroglyphic is more emphatic than a true image ; and till that is done, we muſt be excuſed from believing that a falſe imitation of nature can be ſubſtituted, with equal effect, in place of a juſt one. Whatever is introduced muſt, of courſe, be ſubject to the governing principles of the art in chiaro-ſcuro and tone of colour ; and alſo in the degree of imitation, or of advance towards the appearance of abſolute projection and reality ; and theſe all depend entirely upon the nature of the ſubject. But what is done, ought ſurely to be founded upon the general principles of nature, and not upon a fictitious ſubſtitute, which perhaps may have originated leſs in choice than neceſſity. The limited number and kind of the colours employed in freſco, together with its peculiarities of execution, forbade, for a while, any great degree of richneſs, of brilliancy, or of truth, in colouring, but we have many ſpecimens to prove, that when more beautiful, more artful, and true colouring was effected by the uſe of oil, that the great maſters themſelves of the Florentine and Roman ſchools attempted, as far as poſſible, to impart ſomething of it to their freſcoes. Raphael's pictures of the Heliodorus and the Miracle at Bolſenna, are very ſtriking examples of this fact, that true, though general imitation, was the guide of his pencil ; and ſtill more did he exhibit his ſenſe of its value in his picture of the Transfiguration ; and in almoſt all his productions in that medium which permitted the attempt freely. Even M. Angelo ſought to unite the richneſs, vivacity, and reality of Titian's colouring, with his own grandeur and ſimplicity of deſign, by employing the pencil of Sebaſtian del Piombo, and others, upon his own compoſitions.

We cannot conceive that the great ſtyle of deſign may not have its appropriate tones of colour true to nature, yet ſuitable to its dignity and ſimplicity in form; and probably ſir Joſhua Reynolds and Mr. Opie, who ſtand oppoſed to each other in opinion in this matter, may not, in reality, ſo widely differ, as at firſt ſight they appear to do. The former aſſerts in his fourth diſcourſe, that "there are two ſtyles of hiſtorical painting, the grand ſtyle," (that of the Florentine ſchool,) "and the ſplendid or ornamental," (that of the Venetian); and again, "that the great ſtyle ſtands alone, and does not require, perhaps does not well admit, any addition from inferior beauties." Had he not in a former part of the ſame lecture aſſerted, "that the pictures of the Venetian ſchool were not only too brilliant, but alſo too *harmonious*, to produce that ſolidity, ſteadineſs, and ſimplicity of effect, which heroic ſubjects require," and which ſimple and grave colours only can give to a work, there would have been no reaſon to conclude from the other remark, that he thought truth of imitation, with certain limitations, inimical to that grandeur of impreſſion required: and when it is conſidered, that he is ſpeaking of the characteriſtic diſtinctions of the two ſtyles, and has previouſly declared, that he wiſhed it to be underſtood, "that in ſpeaking of the Venetian or ornamental ſtyle he excluded Titian, who had a ſort of ſenatorial dignity about him, particularly in his portraits," and meant only the works of P. Veroneſe and Tintoretto; and that, in another place, he declares it to be his opinion, that "the tone and ſtyle of colour of Ludovico Carracci is the proper vehicle for hiſtoric art," we cannot believe that his mind could be made up to the approval of the dry, hard, and imperfect management of colours exhibited in the general ſtyle of the large freſco pictures of the Florentine and Roman ſchools, when compared with the truly fine efforts of imitation by Titian, or even ſome of thoſe works themſelves more perfect in harmony, depth, brilliancy, and truth. It appears moſt probable that his ideas of diſſonancy, were principally attached to thoſe peculiarities which diſtinguiſh the ſtyles; where they turned aſide from nature, to mark more ſtrongly their peculiar objects; and which ſeparate completely and neceſſarily the ſeverity and purity required by the one, from the luxuriance and ſenſuality attached to the other.

To this opinion Mr. Opie aſſents, when he cautions the painter to "beware of loſing the terrors of the crucifixion, in the magnificence of a triumphal ſhow; or of diſturbing the pathetic ſolemnity of the laſt ſupper, with the impertinent gaiety of a bacchanalian revel;" and juſtly obſerves, that "the grand ſtyle conſiſts not in neglecting to give all the apparent truth, force, and reality of objects to the eye; but in ſupplying the defects, and avoiding the redundancies, of individual and imperfect forms;" and adds, that "colouring is not leſs capable, by rejecting what is merely accidental, and copying only the general and characteriſtic hue of each object, of being elevated to the ſame ideal ſtandard."—"One ſimple and refined principle operating equally on all parts of the art," muſt ſurely produce a correſpondent effect in all: and there is no apparent reaſon, why the ſame ſyſtem of operation, which, whilſt it elevates, ſtill maintains deſign in purity, ſhould not produce in colouring a correſpondent degree of expreſſion, of ſimplicity, and of truth; without violating harmony, or preſenting diſcordant and harſh contraſts in ſhades and colours.

We muſt again repeat, however, that the *degree* of imitation is the eſſential part for conſideration, as being that wherein the difficulty lies. If colours are to be reduced in their tones, and made ſerious in their effect, to ſuit the dignity of hiſtoric deſign, they may be reduced as twilight reduces them, in which forms and colours together are ſeen only in general maſſes. The St. Peter Martyr by Titian, is a fine exemplar of that kind of effect; grand and impoſing, yet true. Time has indeed produced ſome changes in the effect of that work, but the principle of imitation remains diſcernible to a well-informed eye, and is broad, yet juſt; ſimple, yet effective and rich. The execution of the inferior parts is not, as has been ſaid by a learned critic, (ſee Edin. Rev. Aug. 1810, art. Barry,) wrought "with all the accurate truth of a botaniſt;" and if they were ſo executed, it would, as ſir J. Reynolds has more juſtly ſaid, only be labour waſted. They have truth in character, but not minute botanical markings; and it perhaps would puzzle a botaniſt to do more than point out the genus of the plants upon the fore-ground. Nature, however, is evidently the guide, and Titian has only omitted thoſe parts which, if he had imitated them, would never have been ſeen at a proper diſtance for viewing the picture, and which being unneceſſary, muſt have diminiſhed the general intereſt if made obſervable. They are not even ſeen in nature minutely, when the eye is not immediately directed to them, but is attached to ſome peculiar object which they ſurround; and the imitation of them therefore ought to be general, as the natural impreſſion is; if it is wiſhed that the principal object ſhould remain undiſturbed in effect.

But however intereſting and agreeable, perfect and full imitation in colour, and light and ſhade may be, yet wherever it is intended to produce a great or ſublime effect, it muſt be remembered that form is the moſt effective agent which painting can employ. Sir Joſhua Reynolds, fully conſcious of its value, has ſaid that "he who is capable of delineating fine forms, even if he can do nothing more, is a great artiſt:" and in perfect conſonance with this opinion, the principal object of all the greateſt maſters has been to acquire a knowledge of the forms of natural objects, and the power of delineating them. Annibal Caracci is ſaid to have told his ſcholars, "firſt to make a good outline, and then, however the middle be filled up, it muſt be a good picture." This, however, muſt be regarded as a freedom of ſpeech, too looſe to be followed to the letter; yet it conveys his ſtrong ſenſe of the powerful neceſſity of employing ſkilful deſign,—the original foundation and the moſt uſeful principle of the art; without which, the others are completely nugatory.

This ſimple principle, which apparently offers little difficulty to be overcome, requires, nevertheleſs, the deepeſt ſtudy, and the moſt conſtant practice, in order to obtain its two moſt important requiſites,—correctneſs and expreſſion. The only mode of acquiring theſe, is derived from that general ſtudy of nature which we have ſpoken of above. No man, for inſtance, can draw the human figure in ſuch a mode, as to correſpond with either of thoſe terms, who is not well verſed in the anatomy of it; not even when it is in a tranquil ſtate: how much leſs ſo then, when it is animated and in motion; when the agitations of the paſſions extend, or contract the limbs; or the gentle ſentiments of affection cauſe them to play in graceful undulation. Without the knowledge of the ſtructure of the bones, the forms and attachments of the muſcles, and their conſequent varieties of action,

tion, he muſt neceſſarily confound the eſſential with the uſeleſs; the ſolid, unchanging, and characteriſtic forms, with the integuments that encumber them and diſguiſe their action.

It is not, however, in outline alone, that the underſtanding of form is requiſite to the painter; ſince in a ſtyle correſpondent to the character which that poſſeſſes, ſhould the ſpace it circumſcribes be wrought by the chiaro-ſcuro, which comes next in value among the principles of the art, and by which the form ſuggeſted to the fancy by outline is rounded, made to project from the ground, or from other forms, to obtrude itſelf upon the notice of the ſpectator, or recede and fall back from the view. (See CLAIR-OBSCURE.) The paſſion or the action which the drawing of the outline preſented, may be in moſt caſes greatly aſſiſted by this branch of the ſcience of art; as in poetical ſcenery, for inſtance, and whatever depends upon illumination in tone or degree. Scenes of horror and obſcurity, which participate of the myſterious or ſublime; and the enchanting bland effects of ſerenity and repoſe, alike find in chiaro-ſcuro their main ornament and ſupport; though colouring, when judiciouſly applied and conducted, is that which lends the finiſhed perfection of the art, and completes the degree of illuſion which is its aim. See COLOURING.

The beſt mode of acquiring the practical part of painting, is certainly, in the firſt inſtance, to copy the works of good painters, under the guidance of an able inſtructor. Slight, however, in compariſon with the object, is all that tuition can afford in this matter. The arrangement of the pallette, the preparation of colours, the general principles of their union or oppoſition, and conſequently the order of their moſt agreeable arrangements and moſt powerful effects, together with the beſt or readieſt mode of exerciſing the implements of the art, may of courſe be communicated and learnt. The mind may be directed to ſeek for refinement in taſte of form and colour, and to ſelect and combine them; but will be taught in vain, unleſs nature has implanted the ſeeds of diſcrimination, of judgment, and of taſte itſelf. And even if ſomewhat of this ſhould be imbibed, vain is every effort to impart imagination, invention, or the feeling of expreſſion: theſe are qualities, improvable, when poſſeſſed, by exerciſe and ſtudy; but not to be created by the power of man. To thoſe who poſſeſſing them, feel the inclination to ſtudy the art of painting, we would ſay,—the true mode of learning to rival the ſucceſsful efforts of the great maſters, is not by copying ſervilely the ſurfaces of their works; but when the power of execution is in part obtained, endeavour, while copying, to ſearch into the principles by which compoſitions are arranged, and upon which their execution is effected: wherein conſiſt, and what are the peculiar features of colour, or of handling, that give the character of grace and taſte expreſſed in them; and what peculiar traits of imagination moſt beautifully and moſt juſtly develope their ſubjects. In inveſtigating pictures with views dictated by ſuch deſires, it will frequently be found, that what appears to ſuperficial obſervers mere freaks of fancy, or mere recreation or indulgence of the pencil, is the reſult of the moſt deeply inventive faculty, and admitted, not for pleaſure only, but for the moſt important purpoſes. Such, to inſtance in a work open every ſeaſon to the inſpection of artiſts by the liberality of the marquis of Stafford, is the little vaſe in the middle of Titian's picture of the bath of Diana. To the common obſerver it preſents, as intended, a proper accompaniment to the toilette of the goddeſs, perhaps a veſſel containing perfume, no matter whether diſpoſed of here or there, provided it were introduced; yet more an ornament than a neceſſary adjunct in the compoſition: in the eyes of the artiſt, it is beheld as an inſtrument of ineſtimable value, in preſerving the brilliancy and richneſs of fleſh in full, yet juſt character, by its own ſuperior power of reflection; and producing a brilliant focus to the light of the picture, without attracting the eye too powerfully to itſelf; not to ſpeak of its interrupting, by its beautiful form, the too great regularity of the maſs of ſtone-work on which it ſtands. It ſhould never be forgot, that painting is more a work of the mind, than of the hand; it is the former which creates, the latter only diſplays; and though the art conſiſts, abſolutely ſpeaking, in that diſplay, its value is nothing, if not ſupplied with well ſelected, well arranged materials; and is comparatively of eaſy acquirement, as is teſtified by every day's experience. We muſt not be thought to undervalue the benefit of copying. It ſeems almoſt abſolutely neceſſary, under judicious management, to perfect the hand, and ſhorten the labour neceſſary for acquiring the practical part of the art, and therefore the more early in life it is begun the better; and if, while the hand is engaged in the labour of it, the mind be employed in developing the principles upon which the work is conducted, then there is the chance of advantage being derived from the neceſſity of devoting ſo much time to one object; as it affords the opportunity of deeper and more ſolid inveſtigation. One thing is certain, that there is no mode of obtaining excellence in painting but by a regular and ſteady purſuit. Let the original foundation of genius and talent be as good as it may, nothing ſhort of perſevering induſtry can raiſe the ſuperſtructure. "There is no royal road to the arts," no ſhort cut whereby the painter may arrive at the end of his courſe, and eſcape the labours of ſtudy and exerciſe; and of this the practice and declarations of the very greateſt artiſts are ſatisfactory proofs. Apelles, it is ſaid, never allowed a day to paſs without exerciſing his art in a greater or leſs degree. The induſtrious exertions of the moſt able of the Italian artiſts are on record: and our own great example, ſir Joſhua Reynolds, is a hoſt in himſelf: the immenſe quantity of his works amply teſtifying his induſtry, as well as his attachment to the art. Indeed, without that entire devotedneſs which ſuperſedes, though it does not exclude, all attention to other objects, it is impoſſible to obtain that facility of hand, or intelligence of mind, which reſorts to the proper ſources for a ſupply of materials to fill the canvas, to improve or embelliſh a compoſition, to ſupply deficiencies or correct defects, by a prompt and happy recollection of the moſt appropriate objects in form or colour.

The power of execution in painting being ſecured, the next ſtep is to invent compoſitions, and execute the parts from nature; combining them with the principles of the art. Then comes the proof, whether the ſtudent has felt in his previous ſtudies like an artiſt, or only as a man poſſeſſing no higher qualifications for his profeſſion, than thoſe with which his fellow mortals in general are endowed. Our exhibitions inform us too frequently of the miſguided hopes and labours of numerous claſſes; and gratify us but rarely with any proſpect of future excellence or originality; manifeſting, by the woeful diſappointment and ruin of hundreds, the rarity of the peculiar talent which leads to perfection in painting, and the difficulty of attaining any great degree towards that point, even by thoſe endowed with taſte and ſenſe to feel and practiſe the art with great ingenuity.

It is an advantage to thoſe who are ſo favoured, if they endeavour to look forward beyond the ſkill exhibited by others, and aim at improving even upon the practice of their predeceſſors. They at leaſt who hold this courſe are more likely to do ſomething meritorious than others, who fear to launch out of the beaten track: and if their works are conducted upon ſound principles, with elevated ideas, and freedom in execution, though they may fail to obtain the object of their wiſhes; yet they have the beſt chance of ſoaring above mediocrity, and the moſt reaſonable ground to hope for applauſe.

There is, however, a danger attending this ambitious adventure; it is that of miſtaking novelty for improvement; of ſubſtituting the raſhneſs of a licentious imagination, for the corrected and chaſte effuſion of true well-founded feeling and judgment. Unfortunately we have too frequent reaſon to regret, that a man may poſſeſs great vigour of fancy, unaccompanied by ſound judgment; the want of the latter rendering abortive the vivacity and brilliancy of the former. There are none who are more in need of the corrective hand of a maſter, than a youth whoſe imagination outſtrips his reaſon: and it not unfrequently occurs in the practice of the art, that the ſlow but ſteady growth of one endowed with a capacity little above the common ſtandard, ſurpaſſes in the end the precocity of the former; who, indulging his imagination, plays with the ſtore of knowledge early tuition has ſupplied, and forgets that the only mode of maintaining the fancy in full force, is by ſupplying it with new images; which perpetual recurrence to nature only can produce, and perpetual practice only can ſecure. "Invention," it has been ſaid, "is not creation;" therefore to be a good and ingenious inventor in art, is not to run far into the riot of fancy, by the mere indulgence of it in wanton and monſtrous devices; but rather to bring together ſuch combinations of natural objects in their pureſt forms, as will beſt illuſtrate the ſubject adopted. This is its regulator in the higher claſs of pictures; in others of a lower order, and particularly what is called ornamental paintings, falſe and heterogeneous combinations, beginning at firſt in allegory, and afterwards continued, in ſpite of their acknowledged abſurdity, merely on account of their beauty of form, allow of all the looſe indulgence of the fancy which the moſt vivacious can deſire.

When we conſider the general extent of the gratification and information afforded by painting, it is extraordinary that a due attention to its principles is not yet admitted as a portion of polite education; ſince the knowledge of them ſo evidently increaſes the pleaſure the art is capable of producing: the more particularly when, among the higher claſſes of mankind, it forms ſo very conſtant and material a ſource of their delights, and is ſo conſtantly alſo a ſubject of diſcuſſion, although ariſing from, and pretty generally decided by, ſenſation, rather than reaſon; and neceſſarily ſo indeed! "What can we reaſon, but from what we know?" Pope has juſtly ſaid, and how can they decide with reaſon upon the merits of a work, who are ignorant of the principles upon which it is conſtructed? Yet ſo much of it is felt to be deſirable, that every gentleman and lady conceives it neceſſary to learn to draw, regarding the art as worthy of a partial devotion of time: but this is generally effected in ſo inferior a degree, as to leave the poliſhed learner utterly uninformed of its higher claims, its worthier objects, and its real utility.

To be truly a connoiſſeur or a judge of the qualities of painting when exerciſed in its higheſt ſtyle, notwithſtanding the impertinent flippancy of thouſands of pretenders, requires a peculiar cultivation of mind; quite as much ſo as any other art or ſcience requires an initiation into its principles, to be a judge of its effects. Our art, however, appealing to the ſenſe of ſight, more than to reaſon, and producing its effects from the repreſentation of well known objects, has a great advantage over others, in that its end is more eaſily comprehended, although the principles which govern its practice are not leſs abſtruſe and difficult of application. Moſt men, therefore, of good mental capacities, are capable of underſtanding and feeling the grand and general points; ſuch as of colour, whether it be like that of natural objects, under peculiar circumſtances; of expreſſion, and if the ſtory be fully and clearly exhibited; and of the general effect of the chiaro-ſcuro, whether it preſent an agreeable ſurface to the eye, &c.; but of the ſubtleties of arrangement and execution, whereby difficulties ariſing from the nature and diſunion of the materials and parts are overcome; of the delicate hues, which are covertly introduced to produce harmony; and of the art which attaches light to light, and dark to dark, to produce maſſes, without violating the principles of nature: of theſe things, hidden as they are in the myſtery of the art, none but an artiſt can well judge; though a portion of that knowledge may be acquired by ſcientific ſtudy without practice. No doubt a man being conſtantly or frequently in the habit of comparing picture with picture, and both with nature; and reflecting upon the diverſities of each, their beauties, and their defects; may acquire a very conſiderable power of diſcrimination and judgment in matters of art; and more particularly if he devotes that time, which the regular artiſt is obliged to employ at his eaſel, to a careful inveſtigation of nature, and the ſtudy of the means and principles of art. A man ſo tutored may become able to guide, in many points, the pencil of a good painter: ſtill there are many others to which his attention can never be attracted, as they ariſe only from practice, and conſequently can only be known and appreciated by thoſe who are engaged in it. Theſe, it may be remarked, muſt be of an inferior nature; and true it is they are ſo, in compariſon with the great leading and eſſential features of a picture, whoſe ſubject is of a grand and heroic character; but nevertheleſs they enter into the aggregate, and aſſiſt in affording delight to that organ of ſenſe through which the art appeals to the mind, and more readily enable it to attract attention.

This valuable art has, in the courſe of the world, been generally regarded as worthy of the greateſt honours; and its eminent profeſſors of a proportional ſhare of eſtimation and rewards. Some of the greateſt among men have, at different periods, upheld this opinion of its excellence, as its hiſtory teſtifies (ſee PAINTING); but Pericles, at the head of the Athenian republic, was the firſt who duly eſtimated its value as a national political inſtrument; and encouraging it, in conjunction with ſculpture and architecture, laid, in part, the baſis of the long continued fame of the city. He ſatisfied the people, who murmured at the expence he indulged in in the public works, that by advancing the intereſts of the arts, he was promoting their own glory. In tracing the mode in which they were employed, we diſcover the principles upon which they act; and which, being founded upon feelings and ſentiments of the human heart, muſt always produce the ſame effect.

It is doubtleſs to the direction in which talent is employed, that we owe its utility, or its power to do miſchief. The love of fame was the firſt object of the Greeks, and their leaders therefore very wiſely employed every means to maintain ſo uſeful a ſpirit. In compliance with this, Panænus and Polygnotus were employed by Pericles to adorn the public buildings with paintings, the ſubjects of which were the heroic actions of the moſt renowned among their countrymen; thus perpetuating a record of thoſe deeds which excited to emulation, which, appealing to the natural and inſtinctive pride of man, in a becoming manner, neceſſarily leads, wherever it is ſtrongly felt, to great and uſeful conduct. There is no denying that painting is peculiarly adapted to this ſpecies of excitement, its effect being full and inſtantaneous; as the impreſſion made upon the mind by witneſſing the exhibition of a ſcene of heroiſm, of diſtreſs, or of delight, is greater than any which can ariſe from a detail of it in deſcription. The intereſt in the relation is the weaker, as impreſſion ſucceeds to impreſſion; whereas in the fact, or the repreſentation of it, the whole ruſhes upon the ſight at once. But then it muſt be acknowledged, that there is this drawback in its effect upon the minds of men in general, that they are not prepared to comprehend more than the general impreſſion; therefore the public works of the Greeks in painting, appear to have been conducted upon the moſt ſimple principles, in order that their whole object and intention might be univerſally embraced.

It is ſcarcely credible that, in direct oppoſition to this ſentiment of the Greeks, any one ſhould aſſert, in this enlightened period, that no inculcation of moral or religious truth can be effected by painting; the more ſo, when the works of Hogarth, the moſt inſtructive of painters, are in our hands, and no one who ever thinks of art at all can plead ignorance of them. An aſſertion to that effect has, however, lately been made by a very learned and ingenious author, in a critique on the life and works of J. Barry, eſq. (ſee Edinb. Review, Auguſt 1810,) and he has gone the length of ſaying, "that as to conveying moral, religious, or political inſtruction in pictures, it is the moſt abſurd of all abſurd notions." If the ingenious gentleman means, by the word inſtruction, that kind only which properly belongs to painting, and to which, when ſpeaking of the art, (if he mean well to its cauſe,) he ought to confine himſelf, *viz.* that ſudden and unavoidable impreſſions of truth, which moſt men, not utterly deſtitute of ſenſe, receive upon the firſt ſight of a well regulated moral, or poetical compoſition; more particularly ſuch as, being drawn from common nature, applies common objects to its purpoſe, and preſents to the obſerver familiar incidents, ſurely every day's experience is againſt him. We would appeal to himſelf, if he has never received the impreſſion of diſguſt at pride; abhorrence of avarice and of ſenſuality; diſdain of vanity and idle waſte of time, a prudential hint of the folly of extravagance, and of truſting to gay diſſipation for the enjoyment of happineſs; from the ſeries of pictures called The Marriage-a-la-mode by Hogarth. What moral lectures in rhetoric would, or could, more completely illuſtrate, in a more univerſally intelligible manner, the fatal effects of vice, or the beneficial ones attendant upon virtue, than that ingenious painter has done in this, and others of his productions; as the induſtrious and idle apprentices, the Rake's and the Harlot's progreſs, &c. &c.; and yet with theſe deſigns in his hand, has he riſked ſo unjuſt and ungenerous a ſentiment as his aſſertion conveys. Ungenerous, becauſe, if true, it can be productive of no good to extend ſuch an opinion, and it tends to diminiſh the regard which painting has deſervedly received from the world, wherever its higheſt powers have been engaged; and unjuſt, becauſe it is contrary to the acknowledgment of ages, and is upheld by no reaſoning at all applicable, and ſcarcely tangible; ſince, in ſupport of it, he only inquires with a ſneer, "what *argument* can be drawn in ſupport of the idea of a future ſtate, from Mr. Barry's picture of final retribution?" Does he not, in this, miſtake the ground on which he ought to reaſon upon painting? If, by argument, he means its uſual acceptation, a deduction from point to point, till we arrive at a ſatisfactory definition of what is virtue and religion, or what is the probable nature of that future ſtate of exiſtence which man is deſtined to partake of: then we anſwer, that no *argument* in proof is expected from the art, none deſired of it. The painter's buſineſs was to make that future ſtate, the belief of which was already ſettled, as engaging as poſſible; to exemplify it in an attractive manner, and make beholders anxious to participate in its glory; and the enquiry ought to have been, has Mr. Barry effected that purpoſe? We do not heſitate to ſay, that in the point of invention he undoubtedly has. Who, beholding the aſſemblage of illuſtrious characters which he has introduced in that picture, upon a moſt judicious ground of reaſoning, *viz.* their uſefulneſs to mankind, is not led to ſerious reflection, and an ardent wiſh to unite with them, to be ranked with the great and good, and emulous to merit ſuch exaltation; to ſhare their converſation; to receive their inſtruction; and to adore in their enlightened ſociety, that beneficent Creator whoſe incomprehenſible greatneſs and goodneſs made and ſuſtains the univerſe. Such was, ſuch alone could be, the juſt object of the painter; and no attempt to prove the fact, whether this "corruptible ſhall put on incorruptible" or not; for that the Chriſtian reſorts to his Teſtament, and the heathen and the philoſopher to nature. The artiſt can only exemplify it, and enlarge our conſideration of that ſtate wherein rational beings may be ſuppoſed to enjoy the higheſt poſſible degree of felicity; and in this reſpect Mr. Barry is borne out in the opinion he has endeavoured to illuſtrate, by the writings of many ingenious divines.

To ſay, what indeed is not ſaid, but muſt almoſt neceſſarily be inferred, that no impreſſion could be made upon the mind of an obſerver, favourable to virtue and religion by the contemplation of that picture, would be to ſay, that he either was incapable of reflection, or that by vice and ſenſuality he was become ill fitted to receive ſuch impreſſions as it is calculated to produce upon well regulated minds; common experience is againſt it, and hundreds have left the room where it hangs with as ſerious and uſeful emotions, as a ſermon on the ſubject would produce. Many have expreſſed theſe ſentiments to the writer of this article; and he himſelf takes his opportunity of paying a grateful tribute of reſpect to the memory of Mr. Barry, whilſt he acknowledges the laſting impreſſion it made upon his mind, when he ſaw it in early life. Thus although the avowed truiſm, that virtuous conduct is the wiſeſt and beſt that man can purſue for his own happineſs, will find no *argument* in the pencil for its ſupport; it will have a moſt able aſſiſtant, by the exhibition it is capable of affording of its effects. Is the moral or religious effect of painting, when duly appreciated and exerciſed, to be denied, when, as we have ſtated, ſuch works as Hogarth's exiſt? and is that to take place firſt of all in the country where he was born, and exerted his uſeful talents?—He, whoſe pencil inculcates ſo powerfully the value of good, and the enormity of evil, and by the repreſentation of the common events of life, brings home the ſentiments of morality to every mind, and makes ſo forcible an appeal to the heart and head of every man poſſeſſed of ordinary underſtanding, be his ſtate in life what it may; not, we will venture to ſay, to the exception of the learned author himſelf, whoſe ungentle ſentiment towards the art is the cauſe of theſe remarks;—a ſentiment whoſe object, or whoſe effect at leaſt, if it have any, can only be to reſtrict the pencil from its moſt honourable and moſt valuable application; and render it a mere inſtrument of amuſement, or of idle and uſeleſs gratification, or worſe.

The appeal of the pencil is not ſo much to the underſtanding, as to the heart and mind ; by that the firſt excitement is produced, and thence neceſſarily follow reflections, attached to the nature of the images preſented to the eye. Do we not fearfully acknowledge its power to corrupt young minds, and take conſtant care to keep improper drawings from their view ? What mode of information does it purſue in this caſe, but that of preſenting images of agreeable vices in an engaging manner ? And is it allowed to be ſo ſufficiently potent for the production of evil, that all our care is requiſite to counteract or prevent its influence in that reſpect, and ſhall it be denied any influence in the promotion of good ! forbid it reaſon, ſenſe, and juſtice ! If the objection to its utility be juſt, how ſhall we eſtimate the wiſdom of thoſe whom the learned author alluded to ſufficiently honours on other occaſions ; of thoſe who employed ſculpture and painting as political and religious agents, to ſtimulate the ardent minds of the Greeks to heroiſm or devotion. The opinions of almoſt all ancient authors who have noticed it, are moſt decidedly in favour of the utility of the pencil ; and thoſe of the wiſeſt politicians among the moderns have been amply illuſtrated by the uſe they have made of its powers.

If any thing can moſt effectively contribute to ſtrengthen the diſinclination of the government of our own country, towards the employment of painting in a way more worthy of its powers than portraiture, it is remarks of this nature, originating with men of acknowledged talent, of great acquirements, and partial devotion to the arts ; and which, while they are ſo guarded as to be capable of juſtification in their author's peculiar view ; yet leave an impreſſion on the reader, much more widely effective in preventing or deſtroying the energies of the art, than he perhaps intended. But Dr. Johnſon is reported to have ſaid, that " he never could ſee any connection between the hiſtorical relation of a fact, and a picture of it ;" and perhaps the author alluded to may have ſome ſimilar diverſity from the majority of mankind with regard to moral culture, which prevents him from regarding pictures in a moral or inſtructive point of view.

PICTURE, *Pictura*, a piece of painting, or a ſubject repreſented in colours, on canvas, wood, or the like ; and incloſed in a frame.

Pictures or paintings in oil are preſerved by coating them with ſome tranſparent and hard ſubſtance, as a varniſh, in order to ſecure the colours from the injuries of the air or moiſture ; and to defend the ſurfaces from ſcratches or any damages the painting might receive from ſlight violence. The ſubſtances that have been, or may be uſed for this purpoſe, are gum arabic, diſſolved in water, with the addition of ſugar or ſugar-candy, to prevent its cracking ; glair or whites of eggs, mixed with a little brandy or ſpirit of wine, in order to make it work more freely, and a lump of ſugar to prevent its cracking ; iſinglaſs-ſize, uſed as either of the former, or mixed with a fourth or fifth of its weight of honey or ſugar, and varniſhes formed of gum reſins diſſolved in ſpirit of wine, or oil of turpentine, which laſt are called oil-varniſhes.

Paintings in miniature are preſerved by plates of glaſs, or the talc called iſinglaſs, placed before them in the frame. Paintings in diſtemper may be rendered more durable, and preſerved from foulneſs by varniſhing them with hot ſize, boiled to a ſtrong conſiſtence, in which a fifteenth or twentieth part of honey has been diſſolved. Crayons muſt be preſerved in the ſame manner with paintings in water colours, by plates of glaſs or iſinglaſs.

When pictures are cut or torn, they may be repaired by laying them on an even board or table, carefully putting together the torn or divided parts with colour laid as a cement, in and over the joint, and keeping them in the ſituation till the cement is thoroughly dried. The protuberance of the cement may be eaſily reduced with a penknife, and the repaired part properly coloured ſo as to correſpond with the picture. When part of the cloth is deſtroyed, a piece of canvas ſomewhat bigger than the vacant ſpace is to be plaſtered over on the outſide of the cloth with white or any other colour, and when it is thoroughly dry, the inequality of the picture in this part is to be filled up with the ſame matter, and properly reduced and coloured.

The art of cleaning pictures and paintings is of great conſequence in order to their preſervation : in this operation great ſkill and care are requiſite, ſo that the menſtruum uſed for taking off any foulneſs may not diſſolve the oil in the painting itſelf, or diſorder its colours, and that each ſort of varniſh with which paintings are coloured may be taken off without injury to the painting. The firſt and moſt general ſubſtance uſed for cleaning pictures is water, which will remove any foulneſs ariſing from many kinds of glutinous bodies, as ſugar, honey, glue, &c. and any varniſh of gum arabic, glair of eggs or iſinglaſs, without affecting the oil that holds the colours together. Olive oil or butter will diſſolve pitch, reſin, and other ſubſtances of a like kind, without injuring the oil of the painting. Pearl-aſhes, diſſolved in water, form a proper menſtruum for moſt kinds of matter that foul paintings ; but they muſt be very cautiouſly uſed, as they will corrode the oil of the painting, if there be no varniſh of the gum reſins over it. Soap is of the ſame nature, and ſhould be cautiouſly applied, and only to particular ſpots, that elude all other methods. Spirit of wine will diſſolve all the gums and gum reſins, except gum arabic, and is therefore very neceſſary for taking off from pictures varniſhes compoſed of ſuch ſubſtances, but it alſo corrodes the oil of the painting. This is alſo the caſe with oil of turpentine, and eſſence of lemon, ſpirit of lavender, and roſemary, and other eſſential oils. With regard to paintings that are varniſhed with gum arabic, glair of eggs, or iſinglaſs, the varniſh ſhould be taken off when they are to be cleaned. This may be eaſily diſtinguiſhed by wetting any part of the painting, which will feel clammy, if varniſhed with any ſubſtance ſoluble in water. This kind of varniſh may be taken off with hot water and a ſpunge, or by gentle rubbing with a linen cloth dipped in warm water. If paintings, on this trial, appear to be varniſhed with gum reſins, or ſuch ſubſtances as cannot be diſſolved in water, they may, in ſome caſes, be ſufficiently cleaned by a ſpunge with warm water ; and any remaining foulneſs may be removed by rubbing the painting over with olive oil made warm, or with butter, which ſhould be wiped off with a woollen cloth ; and if the picture require farther cleaning, wood-aſhes or pearl-aſhes may be uſed in the following manner : take an ounce of pearl-aſhes, and diſſolve them in a pint of water ; or take two pounds of wood-aſhes, and ſtir them well in three quarts of water, once or twice in an hour for half a day. Then pour off the clear fluid, and evaporate it to a quart or three pints ; waſh the painting well with a ſpunge dipped in either of theſe leys, and rub gently any foul ſpots with a linen cloth till they diſappear. If this method fail, recourſe muſt be had firſt to ſpirit of wine, then to oil of turpentine, and if theſe are ineffectual, the eſſence of lemons ; with either of which the foul ſpots ſhould be ſlightly moiſtened, and the part immediately rubbed gently with a linen cloth. After a little rubbing, if oil of turpentine or eſſence of lemon has been applied, olive oil ſhould be put upon the ſpot ;

ſpot ; and water, if ſpirit of wine has been uſed ; which ſhould be taken off with a woollen cloth ; repeating the operation till the foulneſs be removed. When paintings appear to have been varniſhed with thoſe ſubſtances that will not diſſolve in water, and after the uſe of the above means retain their foulneſs, the following method will ſucceed : place the picture or painting in a horizontal ſituation ; and moiſten, or rather flood, by means of a ſpunge, the ſurface with very ſtrong rectified ſpirit of wine : keep the painting thus moiſtened, by adding freſh quantities of the ſpirit, for ſome minutes ; then flood the whole ſurface copiouſly with cold water ; waſh off the whole without rubbing ; and when the painting is dry, repeat the operation till the whole varniſh is taken off. Handm. to the Arts, vol. i. p. 224. 245.

PICTURES, or *Paintings, in Oil, Method of taking off*, &c. The art of removing paintings in oil, from the cloth or wood on which they are originally done, and transferring them to new grounds of either kinds of ſubſtance, is of great uſe. For thoſe on cloth or canvas, the method is as follows : let the decayed picture be cleanſed of all greaſe that may be on its ſurface, by rubbing it very gently with crumb of ſtale bread, and then wiping it with a very fine ſoft linen cloth. It muſt then be laid, with the face downwards, on a ſmooth table covered with fan-paper, or the India-paper ; and the cloth on the reverſe muſt be well ſoaked with boiling water, ſpread upon it with a ſponge, till it appears perfectly ſoft and pliable. Turn the picture with the face upwards, and having ſtretched it evenly on the table, pin it down with nails at the edges. Having melted a quantity of glue and ſtrained it through a flannel cloth, ſpread part of it, when a little ſtiffened, on a linen cloth of the ſize of the painting, and when this is ſet and dry, lay another coat over it ; when this becomes ſtiff, ſpread ſome of the glue, moderately heated, over the face of the picture, and lay over it the linen cloth already prepared in the moſt even manner, and nail it down to the picture and table. Then expoſe the whole apparatus to the heat of the ſun, in a place where it may be ſecured from rain, till the glue be perfectly dry and hard ; when this is the caſe, remove the picture and linen cloth from the table. Turn the picture with the face downwards, and let it be ſtretched and nailed to the table as before ; then raiſe round its edge a border of wax, as in the etching of copper-plates, forming a kind of ſhallow trough with the ſurface of the picture ; into which pour a proper corroding fluid, as oil of vitriol, aqua fortis, or ſpirit of ſalt, but the laſt is to be preferred : dilute either of theſe with water to ſuch a degree, determined by previous trials, that they may deſtroy the threads of the original canvas or cloth of the picture, without diſcolouring it. When the corroding fluid has anſwered this purpoſe, drain it off through a paſſage made at one end of the border of wax, and waſh away the remaining part by repeatedly pouring quantities of freſh water on the cloth. The threads of the cloth muſt be then carefully picked out till the whole be taken away. The reverſe ſurface of the painting, being thus wholly freed from the old cloth, muſt be well waſhed with water by means of a ſponge, and left to dry. In the mean time prepare a new piece of canvas of the ſize of the painting ; and having ſpread ſome hot glue, purified as before, and melted with a little brandy or ſpirit of wine over the reverſe of the painting, lay the new canvas evenly upon it while the glue is hot, and compreſs them together with thick plates of lead or flat pieces of poliſhed marble. When the glue is ſet, remove theſe weights, let the cloth remain till the glue is become perfectly dry and hard. Then the whole muſt be again turned with the other ſide upwards, and the border of wax being replaced, the linen cloth on the face of the painting muſt be deſtroyed by means of the corroding fluid ; particular care is neceſſary in this part of the operation ; becauſe the face of the painting is defended only by the coat of glue which cemented the linen cloth to it. The painting muſt then be freed from the glue by waſhing it with hot water, ſpread and rubbed on the ſurface by a ſponge. The painting may afterwards be varniſhed as a new picture ; and if the operation be well conducted, it will be transferred to the new cloth in a perfect ſtate.

When the painting is originally on wood, it muſt firſt be detached from the ceiling or wainſcot where it was fixed ; and the ſurface of it covered with a linen cloth, cemented to it by means of glue, as already directed. A proper table being then provided, and overſpread with a blanket, or thinner woollen cloth, laid on in ſeveral doubles ; the painting muſt be laid upon it with the face downwards, and fixed ſteady ; and the board or wood on which it was done muſt be planed away, till the ſhell remains as thin as it can be made, without damaging the paint under it. The proceſs is afterwards the ſame as that in the caſe of paintings on canvas, till the painting on wood be in like manner transferred to a cloth or canvas. Doſſie's Handm. to the Arts, vol. ii. p. 417, &c.

PICTURE, *Magical*. See MAGICAL.

PICTURESQUE BEAUTY, according to a late elegant writer, refers to "ſuch beautiful objects as are ſuited to the pencil." This epithet is chiefly applied to the works of nature, though it will often apply to works of art alſo. Thoſe objects are moſt properly denominated pictureſque, which are diſpoſed by the hand of nature with a mixture of *varied rudeneſs*, *ſimplicity*, and *grandeur*. A plain neat garden with little variation in its plan, and no ſtriking grandeur in its poſition, diſplays too much of art, deſign, and uniformity, to be called pictureſque. "The idea of *neat* and *ſmooth* (ſays Mr. Gilpin), inſtead of being pictureſque, in fact diſqualify the object in which they reſide from any pretenſions to pictureſque beauty. Nay, farther, we do not ſcruple to aſſert, that roughneſs forms the moſt eſſential point of difference between the beautiful and the pictureſque ; as it ſeems to be that particular quality which makes objects chiefly pleaſing in painting. I uſe the general term *roughneſs* ; but, properly ſpeaking, roughneſs relates only to the ſurfaces of bodies : when we ſpeak of their delineation, we uſe the word *ruggedneſs*. Both ideas, however, equally enter into the pictureſque, and both are obſervable in the ſmaller as well as in the larger parts of nature ; in the outline and bark of a tree, as in the rude ſummits and craggy ſides of a mountain.

" Let us then examine our theory by an appeal to experience, and try how far theſe qualities enter into the idea of pictureſque beauty, and how far they mark that difference among objects which is the ground of our inquiry.

" A piece of Palladian architecture may be elegant in the laſt degree ; the proportion of its parts, the propriety of its ornaments, and the ſymmetry of the whole, may be highly pleaſing ; but if we introduce it in a picture, it immediately becomes a formal object, and ceaſes to pleaſe. Should we wiſh to give it pictureſque beauty, we muſt uſe the mallet inſtead of the chiſſel ; we muſt beat down one-half of it, deface the other, and throw the mutilated members around in heaps ; in ſhort, from a ſmooth building we muſt turn it into a rough ruin. No painter who had the choice of the two objects would heſitate a moment.

" Again, why does an elegant piece of garden-ground make no figure on canvas ? The ſhape is pleaſing, the combination of the objects harmonious, and the winding of the walk in the very line of beauty. All this is true ; but the ſmoothneſs of the whole, though right and as it ſhould be in nature, offends in picture. Turn the lawn into a piece of broken ground, plant rugged oaks inſtead of flowering ſhrubs, break the edges of the walk, give it the rudeneſs of a road, mark it with wheel tracks, and ſcatter around a few ſtones and bruſhwood : in a word, inſtead of making the whole ſmooth, make it rough, and you make it alſo pictureſque. All the other ingredients of beauty it already poſſeſſed." On the whole, pictureſque compoſition conſiſts in uniting in one whole, a variety of parts, and theſe parts can only be obtained from rough objects.

It is poſſible, therefore, to find pictureſque objects among works of art, and it is poſſible to make objects ſo ; but the grand ſcene of pictureſque beauty is nature in all its original variety, and in all its irregular grandeur. "We ſeek it (ſays our author) among all the ingredients of landſcape, trees, rocks, broken grounds, woods, rivers, lakes, plains, valleys, mountains, and diſtances. Theſe objects in themſelves produce infinite variety ; no two rocks or trees are exactly the ſame ; they are varied a ſecond time by combination ; and almoſt as much a third time by different lights and ſhades and other aerial effects. Sometimes we find among them the exhibition of a whole, but oftener we find only beautiful parts."

Sublimity or grandeur alone cannot make an object pictureſque : for, as our author remarks, "however grand the mountain or the rock may be, it has no claim to this epithet, unleſs its form, its colour, or its accompaniments, have ſome degree of beauty. Nothing can be more ſublime than the ocean ; but wholly unaccompanied, it has little of the pictureſque. When we talk, therefore, of a ſublime object, we always underſtand that it is alſo beautiful ; and we call it ſublime or beautiful only as the ideas of ſublimity or ſimple beauty prevail. But it is not only the form and the compoſition of the objects of landſcape which the pictureſque eye examines, it connects them with the atmoſphere, and ſeeks for all thoſe various effects which are produced from that vaſt and wonderful ſtorehouſe of nature. Nor is there in travelling a greater pleaſure than when a ſcene of grandeur burſts unexpectedly upon the eye, accompanied with ſome accidental circumſtance of the atmoſphere which harmonizes with it, and gives it double value."

There are few places ſo barren as to afford no pictureſque ſcence.

> " ——————Believe the muſe,
> She does not know that inauſpicious ſpot
> Where beauty is thus niggard of her ſtore.
> Believe the muſe, through this terreſtrial waſte
> The ſeeds of grace are ſown, profuſely ſown,
> Even where we leaſt may hope."

Mr. Gilpin mentions the great military road between Newcaſtle and Carliſle as the moſt barren tract of country in England ; and yet there, he ſays, there is "always ſomething to amuſe the eye. The interchangeable patches of heath and green-ſward make an agreeable variety. Often, too, on theſe vaſt tracts of interſecting grounds we ſee beautiful lights, ſoftening off along the ſides of hills ; and often we ſee them adorned with cattle, flocks of ſheep, heath-cocks, grous, plover, and flights of other wild-fowl. A group of cattle ſtanding in the ſhade on the edge of a dark hill, and relieved by a lighter diſtance beyond them, will often make a complete picture without any other accompaniment. In many other ſituations alſo we find them wonderfully pleaſing, and capable of making pictures amidſt all the deficiencies of landſcape. Even a winding road itſelf is an object of beauty ; while the richneſs of the heath on each ſide, with the little hillocks and crumbling earth, give many an excellent leſſon for a fore-ground. When we have no opportunity of examining the grand ſcenery of nature, we have every where at leaſt the means of obſerving with what a multiplicity of parts, and yet with what general ſimplicity, ſhe covers every ſurface.

"But if we let the imagination looſe, even ſcenes like theſe adminiſter great amuſement. The imagination can plant hills ; can form rivers and lakes in valleys ; can build caſtles and abbeys ; and if it find no other amuſement, can dilate itſelf in vaſt ideas of ſpace."

Mr. Gilpin, after deſcribing ſuch objects as may be called pictureſque, proceeds to conſider their ſources of amuſement. We cannot follow our ingenious author through the whole of this conſideration, and ſhall therefore finiſh our article with a ſhort quotation from the beginning of it. "We might begin," ſays he, "in moral ſtyle, and conſider the objects of nature in a higher light than merely as amuſement. We might obſerve, that a ſearch after beauty ſhould naturally lead the mind to the great origin of all beauty ; to the

> " ——— firſt good, firſt perfect, and firſt fair."

But though in the theory this ſeems a natural climax, we inſiſt the leſs upon it, as in fact we have ſcarce ground to hope that every admirer of pictureſque beauty is an admirer alſo of the beauty of virtue , and that every lover of nature reflects, that

> " Nature is but a name for an *effect*,
> Whoſe *cauſe* is God."

If, however, the admirer of nature can turn his amuſements to a higher purpoſe ; if its great ſcenes can inſpire him with religious awe, or its tranquil ſcenes with that complacency of mind which is ſo nearly allied to benevolence, it is certainly the better. "Apponat lucro." It is ſo much into the bargain ; for we dare not promiſe him more from pictureſque travel than a rational and agreeable amuſement. Yet even this may be of ſome uſe in an age teeming with licentious pleaſure ; and may in this light at leaſt be conſidered as having a moral tendency."

PICUCULI *de Cayenne*, in *Ornithology*. See GRACULA *Cayennenſis*

PICUIPINIMA. See COLUMBA *Paſſerina*.

PICUS, in *Ornithology*, a genus of birds of the order Picæ ; the generic character is as follows : bill angular, ſtraight, wedged at the tip ; noſtrils covered with recumbent ſetaceous feathers ; tongue round, worm-ſhaped, very long, bony, miſſile, daggered, beſet at the point with briſtles bent back ; it has ten tail-feathers, which are hard, rigid, and pointed ; the feet are formed for climbing. The birds of this genus live principally upon inſects, to obtain which they climb trees, and are perpetually in ſearch of thoſe crevices in which their food is lodged. Theſe inſects they transfix with their miſſile and daggered tongue, which, when it has obtained its purpoſe, is, by an almoſt inviſible motion, withdrawn wholly into the mouth. This proceſs is almoſt inceſſantly repeated throughout the whole day, with the utmoſt preciſion and celerity. Doomed to this perpetual occupation, wood-peckers avoid ſociety, even that of their own ſpecies, and appear to poſſeſs none of the animation of cheerfulneſs, or vigour of courage. They have no notes but ſuch as are expreſſive of pain and ſadneſs, and they ſeem to lead a life of labour and reſtleſsneſs. There are nearly ſixty ſpecies mentioned in Gmelin's laſt edition of Linnæus.

Species.

* Martius, or Great black Wood-pecker. The ſpecific character is black; cap vermilion. This bird inhabits many parts of Europe, as well as our own country; it is alſo a native in Siberia and Chili; it is found chiefly in the poplar tree; it builds a large deep neſt, and lays two or three eggs; it feeds principally on bees and ants, and is about ſeventeen or eighteen inches long. This bird ſpeedily excavates trees, ſo as to expoſe them to be blown down by winds which would not otherwiſe have affected them. Under the hole made by it, ſaw-duſt and pieces of wood may ſometimes be found in pecks.

Lignarius; White-bellied Wood-pecker. Cap vermilion; body barred with white. This is found chiefly in Chili, and is ſomewhat leſs than a blackbird.

Principalis; White-billed Wood-pecker. Black; creſt ſcarlet; a line on each ſide the neck and ſecondary quill-feathers is white. It inhabits America, from New Jerſey to Brazil; is about ſixteen inches long, and makes ſpiral holes in the trees.

Pileatus; Pileated Wood-pecker. Black; creſt red, temples and wings ſpotted with white. It inhabits the woods of North America, and is eighteen inches long; the female of this ſpecies has a brown front. There is a variety of which the belly is obſcurely barred with white.

Lineatus; Lineated Wood-pecker. This ſpecies is black; creſt is ſcarlet; it has a white line from the bill down the neck, and as far as the middle of the back. It inhabits Cayenne, as does the next, and is nearly fourteen inches long.

Rubricollis; Red-necked Wood-pecker. Brown, beneath tawny; creſted head and neck blood-red.

Melanoleucos; Buff-creſted Wood-pecker. Black; body beneath, line on each ſide the neck, nape and rump white; the hind part of the creſt browniſh-yellow. It is found in Surinam.

Hirundinaceus; Leſſer black Wood-pecker. Black; cap ſcarlet; ſhoulders dotted with white. It inhabits North America, and is about five inches and a half long. Two varieties of this ſpecies inhabit Cayenne. 1. Middle of the breaſt red; belly varied with black and grey. 2. Crown with a red ſpot; area of the eyes is white; the hind-head is golden. Of this laſt variety the whole head of the female is black; the eye-lids are white.

Passerinus; Paſſerine Wood-pecker. Yellowiſh-olive, beneath barred with brown and whitiſh; is about ſix inches long, and is found in St. Domingo.

Striatus; Rayed Wood-pecker. Black ſtreaked with olive, beneath olive; front, cheeks, chin, throat, and breaſt grey; crown, hind-head, rump, and upper tail-coverts red. There is a variety that has a black crown; it is nine inches long, and is found in St. Domingo.

Melanochloros; Gold-creſted Wood-pecker. Variegated with black and yellow; the creſt is gold; tail is black. It inhabits Cayenne, and is about thirteen inches long. There is a variety that has a black crown; a red creſt; the middle tail-feathers are black, the lateral ones are barred with tawny and black.

Flavescens; Yellow-creſted Wood-pecker. Black barred with yellow; pendent creſt, chin, cheeks, and neck yellow. It is found in Brazil, and is about the ſize of a jay.

Cayanensis. This, as its name imports, is found in Cayenne, and is not quite eight inches long. It is olive-coloured; the feathers towards the tip are marked with a black ſpot; the crown, chin, and tail are black; the hind-head is red; the cheeks are whitiſh; the belly is yellowiſh.

Flavicans; Yellow Wood-pecker. Yellowiſh, creſted; quill-feathers brown; tail black. It inhabits Cayenne, as do the next two. The male bird has a maxillary band.

Cinnamomeus; Ferruginous Wood-pecker. Cinnamon colour, with a few yellowiſh ſpots; the creſt and lower part of the back yellow; the tail is black.

Multicolor; Black-breaſted Wood-pecker. This ſpecies is creſted; rufous; beneath pale ruſty; head, chin, and neck orange; nape, throat, breaſt, and ſpots on the wings black.

Erythrocephalus; Red-headed Wood-pecker. Head wholly red; wings and tail black; the belly is white. It is found in North America, and is nine inches and a half long; it migrates and feeds on acorns, fruit, and Indian corn. From the viſits of this bird, the natives are enabled in a meaſure to foretell the rigour or clemency of the approaching winter. This ſpecies is extremely deſtructive to maize fields and orchards. During winter they are very tame, and ſometimes come into houſes, as the robin does with us. They are found chiefly in old trees, and the noiſe which they make with their bills, may, when the air is calm and ſtill, be heard at the diſtance of a mile and more.

Ruber; the Red-breaſted Wood-pecker. Head, neck, and breaſt red; back and wings black; belly ochre. It is found at Cayenne.

Obscurus; White-rumped Wood-pecker. Duſky, ſtreaked and waved with whitiſh; beneath it is white; firſt quill-feathers black, ſecondary white, with two black bars. It inhabits Long iſland, and is nine inches long.

Fasciatus; Striped-bellied Wood-pecker. The colour of this ſpecies is black; the crown, lores, and ſub-maxillary band are ſcarlet; the belly is ſtreaked white and black; tail-feathers white at the tip.

Aurantius; Orange Wood-pecker. Above orange; nape, rump, and tail black; is about ten inches long, and is found at the Cape of Good Hope.

Senegalensis; Gold-backed Wood-pecker. Front and cheeks are brown; cap red; back and quill-feathers reddiſh-gold; body beneath grey, undulate with brown and white. It is found in Senegal, and is ſcarcely larger than a ſparrow.

Capensis; Cape Wood-pecker. This, as its name ſignifies, is found in the Cape of Good Hope, and is leſs than our lark; it is grey; the back, neck, and breaſt are olive; the quill-feathers are duſky; rump and upper tail-coverts red; tail-feathers black. There is a variety that has its back and wings olive-brown; cap, rump, and belly red.

Auratus; Gold-winged Wood-pecker. Striated tranſverſely with black and grey; the chin and breaſt black; the nape is red, and the rump is white. It is found in North America, and is almoſt continually on the ground; it feeds on worms and inſects, and when theſe are not to be had, on berries and graſs. When fat it is eſteemed excellent food. It migrates to Hudſon's Bay, and it does not climb trees.

Cafer; Gold-winged Wood-pecker. Above brown, beneath claret, dotted with black; wings beneath, and ſhafts of the wings and tail, vermilion. It is found at the Cape of Good Hope.

Olivaceus; Crimſon-breaſted Wood-pecker. This ſpecies is olive; neck beneath, breaſt and rump pale red; chin, throat, quill-feathers and vent duſky brown; the tail above is black.

Carolinus; Carolina Wood-pecker. Cap and nape red; back with black bands; middle tail-feathers white, dotted with black, the reſt black. There are three varieties of this ſpecies. 1. Front and cheeks pale brown; belly pale yellowiſh-brown. 2. Spots on the chin and under the eyes red. 3. Black and white; cap, nape, and belly red; front and neck beneath yellow-grey; ſides of the neck from the mouth with a black line.

Undatus; Red-cheeked Wood-pecker. Teſtaceous waved with black; temples blood-red. It inhabits Guiana and Surinam, as do the two following.

Rufus; Rufous Wood-pecker. Rufous waved with black; wings, tail, and body beneath deeper. A variety has a black breaſt; and under the eyes a black ſpot.

Chlorocephalus; Yellow-headed Wood-pecker. Olive, beneath ſpotted with white; neck and ſubcreſted head yellow; crown red. This is ſix inches long.

Miniatus; Red-winged Wood-pecker. Creſted, red, beneath white; throat roſy; bill and tail blue; tail-coverts green. This is nine inches long, and is found in Java.

Malaccensis; Malacca Wood-pecker. Creſted head and ſhoulders ſcarlet; chin and throat rufous yellow; body beneath barred with black and white; the tail is black. It is found in Malacca, as its name imports.

Pitiu. Brown dotted with white; the tail is ſhort. It inhabits Chili; has the appearance of a pigeon, and builds, not in the hollows of trees, but on the banks of rivers and declivities of mountains; it lays uſually four eggs.

* Viridis; Green Wood-pecker. Green; crown crimſon. This is the largeſt ſpecies found in England, and is full thirteen inches long. Theſe birds are frequently ſeen on the ground, particularly where ant-hills abound, the population of which they extirpate by their inceſſant efforts. This bird will occaſionally not be contented with darting its tongue at them ſingly, but by the combined exertion of its bill and feet lays open the whole neſt, and commits the moſt wholeſale ravage upon the ants and their eggs. There is a variety found in Mexico, full thirteen inches long; of which the upper part of the head and ſpots beneath the ears are deep red; the rump is of a pale yellow. It makes a circular hole in the dead part of trees for its neſt, and lays five or ſix greeniſh coloured eggs ſpotted with black; it is remarkably fond of bees.

Bengalensis; Bengal Wood-pecker. Green; creſt red; nape black; front and throat variegated white and black; body beneath white. It is eight inches and a half long, and is found in Bengal. A variety of this ſpecies is a little larger, and inhabits Ceylon and China. Its head is marked with numerous white ſpots; the back is black, and ſcarlet in the middle.

Quadrimaculatus; Blue-throated Wood-pecker. Green; beneath blueiſh; crown and rump yellow; throat, quill and tail-feathers black. This is the ſize of the Viridis, and is found in Ceylon.

Philippinarum; Philippine Wood-pecker. The ſize of the laſt, and found in Manila. It is brown-green; creſted; beneath ſpotted with white and black; the rump is red; the tail-feathers have two white ſpots.

Goensis; Goa Wood-pecker. Green, beneath whitiſh; crown and creſted hind-head red; tail and fillet reaching from the eyes to the wings black; the wings are golden. It is found in Goa, and is very ſimilar to the Bengalenſis.

Manillensis; Manila green Wood-pecker. Dirty-green; crown covered with grey; wings and tail blackiſh; upper tail-coverts red. It is found in Manila.

Gartan; Crimſon-rumped Wood-pecker. Above grey-brown, beneath yellowiſh-grey; wings with dirty ſpots; crown and rump red. It is found in Senegal, and is a good deal leſs than the Viridis.

Canus; Grey-headed green Wood-pecker. Cinereous, front obſcurely ſpotted with red; back, ſhoulders, wing and tail-coverts green; rump yellow; wings and tail brown; chin whitiſh. It inhabits Norway, Ruſſia, and Siberia.

Persicus; Perſian Wood-pecker. Pale yellow; body above, tips of the quill-feathers, and area of the eyes, ferruginous. It is a native of Perſia.

Semirostris; Half-billed Wood-pecker. Brown-aſh, beneath white; head brown, ſpotted with yellowiſh; upper mandible ſhorter. It is only of the ſize of a martin.

Pubescens; Downy Wood-pecker. Back longitudinally downy; outer tail-feathers white, with four black ſpots. The male bird has the hind-head red. It is found in Carolina, Virginia, and other parts of North America, and is a very daring bird, and particularly miſchievous to fruit-trees in orchards. As ſoon as it has pecked one hole in a tree, it makes another cloſe to the firſt, in a horizontal direction, proceeding till it has made a circle of holes quite round the trunk, ſo that the tree frequently dries up and decays.

Villosus; Hairy Wood-pecker. Back ſomewhat downy, in a longitudinal direction; the outer tail-feathers are entirely white. It is from nine to twelve inches long. Like the Pubeſcens, it is a ſad peſt to orchards. It inhabits North America, from Hudſon's Bay to Carolina, and it has been ſeen in the north of England.

* Major; Greater ſpotted Wood-pecker. Variegated with black and white; the vent and hind-head are red. This is alſo called the witwall, is nine inches long, and ſtrikes with far greater comparative force againſt the trees than any of the tribe. It creeps with facility over the branches in every direction; and when any perſon attempts to obſerve it on one ſide of a branch, it paſſes to the oppoſite with extreme celerity, repeating this change in correſpondence with every renewed effort of the enemy. It inhabits many parts of Europe, as well as England; here indeed it is leſs frequent than the Viridis, to which it is cloſely allied in manners and habits, except that it rarely deſcends to the ground in ſearch of food. It lays four or five gloſſy eggs in the decayed wood, without any formal preparation of a neſt.

* Medius; Middle ſpotted Wood-pecker. Variegated with white and black, the vent and cap are red. It is doubted if this be a diſtinct ſpecies, or whether it be not the young of the Major juſt deſcribed.

* Minor; Leſſer ſpotted Wood-pecker. This ſpecies is alſo variegated with white and black; the crown is red, and the vent teſtaceous. It is found in divers parts of Europe and Aſia. It has the habits of the Major, but is much more rarely ſeen. There are two varieties; 1. Crown, nape and ſcrag black-grey; body beneath yellowiſh, ſpotted with black. This is a native of Panay. 2. Hind-head ſubcreſted; crown with a crimſon ſpot; front, cheeks, and body beneath white. It is found in Ceylon.

Tricolor; Varied Wood-pecker. Black, with white tranſverſe ſtreaks; breaſt and belly red. It inhabits New Spain.

Canadensis; Canada ſpotted Wood-pecker. White; crown, back, ſhoulders, and the two middle tail-feathers black, the other tail-feathers and wings varied with black and white. It is a native of Canada, and nine inches long.

Varius; Yellow-bellied Wood-pecker. Variegated black and white; crown red; vent white, barred with brown. It inhabits North America; nine inches long; it is a very numerous tribe, and extremely deſtructive to corn and fruits.

Flavipes; Yellow-legged Wood-pecker. Black, beneath white; legs yellow.

Bicolor; the Encenada Wood-pecker. Varied with

Strahan and Preſton,
New-Street Square, London.

grey and white; ſides of the creſted head white; quill-feathers brown, ſpotted with white. The female bird is totally brown, with a creſt.

Cardinalis; Cardinalis Wood-pecker. Black, beneath white, ſpotted with black; the crown and hind-head red. Found in Luzonia; and is the ſize of the Viridis.

Nubicus; Nubian Wood-pecker. Variegated with white, rufous, and brown; crown black, ſpotted with white; hind-head ſubcreſted; red breaſt, whitiſh, with black dots; tail with rufous brown lines. It is found in Nubia, and is ſeven inches and a half long.

Moluccensis; Brown Wood-pecker. Black, waved with white; beneath whitiſh, arrow-ſtreaked with brown; quill and tail-feathers brown, ſpotted with white. It inhabits the Molucca iſlands. There is a variety black-brown, ſpotted with white; beneath and head white; crown and ſpot beneath the eyes brown. It inhabits India, and is five inches long.

Minutus; Minute Wood-pecker. This, the leaſt of all the tribe, is found in Cayenne. It is cheſnut-grey; beneath whitiſh waved with brown; crown red; hind-head black, ſpotted with white.

Tridactylus; Three-toed Wood-pecker. Variegated black and white; three-toed; a variety is alſo variegated black and white; and white beneath. The *firſt* inhabits America, Europe, and Sicily: the *ſecond* is found in Cayenne.

Picus *Cinereus*. See Sitta *Europæa*, S. *jamaicenſis*, and S. *major*.

Picus *Imbrifactus*, or *Picus Principalis* of Linnæus, the name of an American bird, deſcribed by Nieremberg, and called by the natives *quatotomimi*. It is of the ſize of the hoopoe, and is variegated with black and brown; it is of the wood-pecker kind, having a beak three fingers breadth long, with which it perforates trees: its head is ſmall and red, and has a fine red creſt; but the feathers are black on their upper ſide; it has on each ſide of the neck a broad white line, reaching to the breaſt; its legs and feet are of a blueiſh colour; it builds in high trees, and is principally found near the ſhores of the South ſea. It feeds on inſects. See Picus.

Picus *Major Leucophæus*. See Cuculus *Vetula*.

Picus *Murarius*, the name of a bird called in Engliſh the *wall-creeper*, and improperly ranked among the *pici*, as wanting many of the characters of that genus: and therefore claſſed in the Linnæan ſyſtem under the genus of *certhia*, or creeper. It is about the bigneſs of the common ſparrow; its bill is black, ſlender, and long; its head, neck, and back grey; its breaſt white, and its wings partly grey and partly red; its tail is ſhort and black; its long wing-feathers alſo, and the lower part of its belly, and its legs, are of the ſame colour; its legs are ſhort, but its feet are not placed as in the wood-pecker; but are three before and one behind; it is very common in Italy, Germany, and ſome parts of France; it is a very lively and chearful bird, and as the common wood-pecker climbs trees and feeds on the inſects in their cracks, ſo this bird runs up old walls, and feeds on what it finds in the cracks of the ſtones.

Picus *Nidum Suſpendens*, a name by which ſome authors have called the galbula; a yellow bird of the thruſh kind, very remarkable for its beauty, and for the ſtructure and manner of hanging its neſt. See Oriolus *Galbula*.

Picus *Salutiferus*, the name under which Nieremberg has deſcribed a Mexican bird, called by the natives *henquecholtototl*.

It is of the ſize of the common black-bird, and has a long and black beak: its head and a great part of its neck are red; its breaſt and belly are grey, and it has a creſt of red feathers upon its head. It is of the wood-pecker kind, and has its name from the ſuppoſed virtue of its feathers, particularly thoſe of the creſt, in curing the head-ach.

PIDAURA, in *Geography*, a town of the Morea, anciently called "Epidaurus," ſituated on the W. coaſt of the gulf of Engia; 35 miles E. of Napoli di Romania. N. lat. 37° 40′. E. long. 23° 24′.

PIDISJARVI, a town of Sweden, in the government of Ulea; 48 miles E. of Gamla Karleby.

PIE, in *Agriculture*, a provincial term applied to ſignify a receptacle for preſerving potatoes, turnips, and other roots. And when theſe are for potatoes they are uſually formed with dry earth in a dry ſituation, being made in the ridge or conical form.

Pies are likewiſe made uſe of for curing rape-ſeed, being built in the field with platted ſtraw. The form, according to Mr. Marſhall, is that of a corn buſhel, the diameter ſeven or eight feet, the height three or four feet. This large ſtraw baſket-like receptacle is filled with rough ſeed to the brim, topped up in a conical form with ſtraw, and the whole ſecured with a coat of thatch. This is moſtly done when the markets are bad at the period of thraſhing, as the ſeed may be preſerved any length of time in theſe pies, if there is a ſufficiency of pulls among it, and the quantity of ſeed depoſited in them be not too large. It is at preſent a practice ſeldom employed.

PIECE, in *Commerce*, ſignifies ſometimes a whole, and ſometimes only a part of the whole.

In the firſt ſenſe we ſay, a piece of cloth, of velvet, &c. meaning a certain quantity of yards, regulated by cuſtom, being yet entire, and not cut.

In the other ſignification we ſay, a piece of tapeſtry; meaning a diſtinct member wrought apart, which, with ſeveral others, make one hanging.

A piece of wine, of cyder, &c. is a caſk full of thoſe liquors.

Piece, *Chimney*. See Chimney.

Piece, *Detached*. See Detached.

Piece, *Eaſel*. See Easel.

Piece-*Goods*, in *Commerce*, a name given in India to the various fabrics of manufactured cotton.

Piece, *Maſter*. See Master.

Piece, in *Coinage* and *Commerce*, ſignifies ſometimes the ſame thing with *ſpecies*: as when we ſay this piece is too light, &c.

Sometimes, by adding the value of the pieces, it is uſed to expreſs ſuch as have no other particular name: as a piece of eight rials, a piece of twenty-five ſols, &c.

In England, the piece, abſolutely, is ſometimes uſed for twenty ſhillings ſterling, and ſometimes for a guinea.

By 6 Geo. II. cap. 25. broad-pieces, of five-and-twenty, or three-and-twenty ſhillings value, or any halves or quarters thereof, are called in. And all perſons are forbid to receive or utter them in payment by tale.

Piece *of Eight* denotes the Spaniſh dollar or peſo, which in foreign exchanges is valued at 8 reals of old plate or 15 reals 2 maravedis vellon: but in commercial tranſactions within the country, it is reckoned at 15 reals vellon.

As a ſilver coin, the dollar, or peſo duro, ſince the coinage of 1772, paſſes for 20 reals vellon, and the half dollar, or eſcudo vellon, for 10. This dollar contains 374$\frac{7}{8}$ troy grains of fine ſilver, or 405$\frac{2}{3}$ grains of Engliſh ſtandard ſilver; and therefore its value in Engliſh ſilver coin is 4*s*. 4$\frac{1}{2}$*d*.; and the half dollar in proportion. The value of the peſo of plate, or dollar of exchange, in Engliſh ſilver coin, is 39$\frac{1}{2}$*d*.; but if allowance be made for remedy in coinage, it muſt be valued in the dollar at $\frac{1}{2}$ ſterling. By the aſſay at the London mint, the weight of the dollar is 17 dwt. 8 gr., and its fineneſs 8 dwt. worſe than Engliſh ſtandard: hence its value in Engliſh ſilver coin is 4*s.* 3¾*d.*

The average weight of 1000 dollars at the Bank of England is found to be 866 ounces troy.

The Spaniſh dollars coined ſince 1772 have the following impreſſions: head of the reigning king, with his name and DEI GRATIA; reverſe, arms of Spain; which, on pieces coined at Mexico, ſtand between two pillars with NE PLUS ULTRA: legend round the piece, HISPAN. ET IND. REX, with an M. for Mexico; 8 R. for eight reals, and the initials of the moneyer's name: theſe are commonly called Pillar dollars; but thoſe coined in Europe have no pillars; and the legend is only, HISPANIARUM REX. The initials are not at the end of the legend, but by the ſide of the eſcutcheon in place of the pillars. The diviſions of the dollar bear the ſame impreſſions; but the half dollar is marked 4 R.

In the Daniſh iſlands, St. Thomas, St. John, and Santa Cruz, accounts are kept in piaſtres or rix-dollars current (alſo called pieces of eight), each rix-dollar being divided into eight ſchillings or bits, and each bit into ſix ſtivers. Accounts are alſo kept in dollars of 100 cents, as in America. The Spaniſh dollar paſſes here for 12½ bits, and each bit for 6¾ ſtivers. Kelly's Univerſal Cambiſt. See COIN and EXCHANGE.

PIECE is alſo a kind of money of account, or rather a manner of accounting, uſed among the negroes on the coaſt of Angola, in Africa.

The price of ſlaves, and other commodities here negotiated, as alſo the duties paid the petty kings, are eſtimated on both ſides in pieces. Thus thoſe barbarians requiring ten pieces for a ſlave, the Europeans, in like manner, value the money, or merchandize, to be given in exchange, in pieces.

PIECE, in *Heraldry*, denotes an ordinary, or charge.

PIECES, in the *Military Art*, include all ſorts of great guns and mortars.

Theſe are alſo called *pieces of ordnance*, or *artillery*.

PIECES, *Field*. See FIELD-*Pieces*.

PIECES, *Battery*. See *Great* GUNS.

PIECES, *Garriſon*. See GARRISON.

PIECE, *Poiſoning a*. See POISON.

PIECE, *Soldier's*. See FIRELOCK.

PIECE, *Elevation of a*. See ELEVATION.

PIECE, *Quadrating of*. See QUADRATING.

PIECE-*Work*, in *Rural Economy*, that ſort which is done by the great or piece. It is ſometimes called taſk-work. This mode of working is becoming more general and neceſſary daily on account of the increaſing price of labour; but in letting it, it requires that the farmer ſhould be well acquainted with its nature, and the time it will take in performing it, or he will be liable to much impoſition: he ſhould likewiſe be a good judge of the proper manner of performing the work. Some are of opinion that the work is never ſo well done in this way. See WORK.

PIED, *Fr.* See FOOT.

PIED, or *pied de Roi*, is the French foot in the old ſyſtem. See FOOT and MEASURE.

PIEDE, or PIETE', *La*, in *Geography*, a town of Mexico.

PIEDI OREZZA, a town of the iſland of Corſica; 12 miles E.N.E. of Corte.

PIEDICORTE, a town of Corſica; 12 miles E.S.E. of Corte.

PIEDMONT, the moſt extenſive province in the northern part of Italy, about 150 Engliſh miles in length by 100 of medial breadth. It is bounded on the N. by the Valais, on the E. by the duchies of Milan and Montferrat, on the S. by the country of Nice and the territories of the Genoeſe, and on the W. by Savoy. This principality was firſt inhabited by Umbrians, Etrurians and Ligurians, and afterwards by Gauls, upon their eſtabliſhment in Italy, under Brennus, &c. which gave occaſion to its being called "Ciſalpine Gaul," or "Gaul on this ſide of the Alps," with regard to Rome. It became in a ſubſequent period a part of Lombardy, and in the 13th century formed a portion of the gradual acquiſitions of the counts afterwards dukes of Savoy, and latterly kings of Sardinia. It is ſaid to have derived its name from its ſituation "ad pedem montium." With regard to its revenue, when that of Sardinia was eſtimated at 1,085,000*l.*, Piedmont contributed 953,750*l.*, Savoy 87,500*l.*, and Sardinia only 43,750*l.* This province is pleaſant and fruitful, and the air mild and pure: the plains produce in abundance wheat, maize, rice, with ſome olives and wine, and the paſturages feed large herds of cattle. The ſoil is a rich ſandy loam, with ſome tracts of large gravel brought down from the rivers; but the heat is exceſſive in ſummer, and the winter cold very ſevere; and yet the ſilk is eſteemed of the fineſt quality. Around Turin, and through a great part of the province, artificial irrigation, or the watering of meadows, is practiſed with great aſſiduity and ſucceſs. The ſurrounding Alps are rich in minerals, and they ſupply numerous ſtreams which fertilize the plains. In the duchy of Aoſta, the mines of copper, accompanied with antimony, arſenic, and zinc, are numerous: and in the ſuperior regions near Macuguaga, there are mines of gold, found in marcaſite and quartz; in the vale of Seſia are the gold mines of St. Maria and Cavavecchia, alſo containing ſilver. Gold is likewiſe found in the mountains of Challend near the vale of Aoſta; and the torrent Evenſon rolls down pebbles of quartz, veined with that precious metal. Not far to the E. of Mont Blanc, a rich vein of cobalt has been lately diſcovered; and plumbago or black lead has been obſerved near the baths of Binay. This principality contains a great number of cities, towns and villages, ſo that the whole country has been denominated a large city. Its capital is Turin, which is an archiepiſcopal ſee; beſides which there are eight biſhoprics. The principal rivers are the Po, the Tanaro, the Sturia, and the Doria. The chief exports conſiſt of ſilk, which are chiefly manufactured at Lyons, ſome hemp, and large herds of cattle. In the year 1802, the whole country was annexed to the French republic, and divided into ſix departments, under the names of the Po, Doria, Marengo, Sezia, Stura, and Tanaro.

PIEDOUCHE, *French*, formed from the Italian *peduccio*, *foot*, in *Architecture*, a little ſtand, or pedeſtal, either oblong or ſquare enriched with mouldings, ſerving to ſupport a buſt, or other little figure. This is called a bracket pedeſtal.

PIEDRA DE LA HYADA, in *Natural Hiſtory*, the name given by the Spaniards to a ſtone found in many parts of America, particularly in New Spain; and famous among the Indians for curing the colic on being applied to the navel. It is green, and is a ſpecies of jaſper, approaching to the nature of the lapis nephriticus, and is called by many *colicus lapis*, from its virtues.

PIEDRAHILA, in *Geography*, a town of Spain, in the province of Leon; 26 miles W.N.W. of Avila.

PIEDRAS, a river of Terra Firma, which runs into the Caribbean ſea, 40 miles E. of Cape Aguja.

PIEDROIT, in *Architecture*, a pier, or a ſquare kind of pillar, part of which is hid within a wall.

The only thing in which it differs from a pilaſter is, that the latter has a regular baſe and capital, which the other wants. See PILASTER.

Piedroit is alſo uſed for a part of the ſolid wall annexed to a door or window; comprehending the door-poſt, chambranle, tableau, leaf, &c.

PIEGAIO, in *Geography*, a town of Italy; 14 miles S.W. of Perugia.

PIELAWESI, a town of Sweden, in the government of Kuopio, ſeated on a lake; 35 miles N.W. of Kuopio.

PIELIS, a town of Sweden, in the government of Kuopio, on a large lake; 70 miles E.N.E. of Kuopio.

PIEMENTE, a town of Iſtria; 11 miles S. of Capo d'Iſtria.

PIENES, a ſmall iſland of Japan, near the harbour of Sacca.

PIENIN, a town of Poland, in the palatinate of Cracow; 36 miles N. of Cracow.

PIENO, a town of Italy, in the department of the Montagna; 18 miles N. of Lecco.

Pieno, Ital. *Full*, in *Muſic*. Sometimes it implies energy or force. See Ripieno.

PIENZA, in *Geography*, a town of Etruria, and the ſee of a biſhop; 45 miles S. of Florence. N. lat. 43° 3′. E. long. 11° 34′.

PIE-POUDER Court. See Court.

PIER, in *Building*, derived from the French *pierre, a ſtone*, denotes a maſs of ſtone, &c. oppoſed, by way of fortreſs, againſt the force of the ſea, or a great river, for the ſecurity of ſhips that lie at harbour in any haven, ſuch are the pier of Dover, deſcribed by Camden Brit. &c., the pier of Ramſgate, and the haven pier of Great Yarmouth, mentioned 22 Car. II.

Piers are alſo uſed in *Architecture* for a kind of pilaſters, or buttreſſes, raiſed for ſupport, ſtrength, and ſometimes for ornament.

Piers, *Circular*, are called *maſſive columns*, and they are with or without caps, and are frequently ſeen in Saracenic architecture.

Piers *of a Bridge*. See Bridge.

M. Belidor obſerves that, when the height of the piers is about ſix feet, and the arches are circular, it is ſufficient to make their thickneſs the ſixth part of the width of the arch, and two feet more; but when the arches become of a great ſpan, the thickneſs of the piers may be reduced to the ſixth part; but then the depreſſion of the two feet doth not take place at once; that is, in an arch of above forty-eight feet, three inches are taken off for every ſix feet of increaſe of the width of the arch. The thickneſs of the piers ſupporting elliptic arches is greater than in the former proportion: thus, in an arch of ſeventy-five feet wide, the thickneſs of the pier, whoſe height is about ſix feet, ſhould be 13.5 when the arch is circular, and fifteen feet when it is elliptical.

The ſame author makes the abutments one-ſixth part more than the piers of the largeſt arch.

Mr. Muller has calculated the following table, containing the thickneſs of the piers of bridges.

Table containing the Thickneſs of the Piers of Bridges.

	6	9	12	15	18	21	24
20	4.574	4.918	5.165	5.350	5.492	5.610	5.698
25	5.490	5.913	6.216	6.445	6.645	6.801	7.930
30	6.386	6.816	7.225	7.513	7.746	7.939	8.102
35	7.258	7.786	8.200	8.532	8.807	9.037	9.233
40	8.404	8.691	9.148	9.523	9.835	10.101	10.328
45	8.965	9.579	10.077	10.489	10.837	11.136	11.394
50	9.805	10.454	10.987	11.435	11.817	12.146	12.434
55	10.640	11.245	11.882	12.364	13.019	13.149	13.218
60	11.400	12.110	12.718	13.281	13.723	14.109	14.314
65	12.265	13.025	13.648	14.185	14.654	15.082	15.433
70	13.114	13.869	14.517	14.049	15.573	16.011	16.400
75	14.000	14.705	15.336	15.965	16.480	16.940	17.354
80	14.747	15.542	16.234	16.842	17.381	17.864	18.298
85	15.513	16.328	17.041	17.674	18.237	18.742	19.194
90	16.373	17.102	17.929	18.578	19.157	19.679	20.152
95	17.184	17.826	18.772	19.438	20.036	20.577	21.068
100	17.991	18.848	19.610	20.293	20.908	21.466	21.976

The firſt horizontal line expreſſes the height of the piers in feet, from 6 to 24 feet, each increaſing by 3: the firſt vertical column, the width of arches from 20 to 100 feet, for every 5 feet.

The other columns expreſs the thickneſs of piers in feet and decimals, according to the reſpective height at the head of the column, and the width of the arch againſt it in the firſt column.

Rectangular piers are ſeldom uſed but in bridges over ſmall rivers; in all others they project from the bridge by a triangular priſm, which preſents an edge to the ſtream, in order to divide the water more eaſily, to prevent the ice from ſheltering there, as well as veſſels from running foul againſt them. This edge is terminated by the adjacent ſurfaces at right angles to each other at Weſtminſter bridge; but thoſe of the Pont-royal, at Paris, make an acute angle of about 60°. However the French, in their later conſtructions, make this angle to terminate by two cylindric ſurfaces, whoſe baſes are arcs of 60 degrees. Muller's Pract. Fortif. part iv. ſect. 1. p. 257, &c.

PIER *Head*, in *Geography*, a cape on the north-eaſt coaſt of New Holland, and weſt point of Thirſty ſound.

PIERA, a town of Spain, in Catalonia; 16 miles N.W. of Barcelona.

PIERACO, a town of the marquiſate of Ancona; 5 miles N. of Ancona.

PIERAGE, money paid for the uſe of a pier.

PIERBACH, in *Geography*, a town of Auſtria; 8 miles N.N.W. of Grein.

PIERCE'S ISLAND, a ſmall iſland in Piſcataqua river.

PIERCEA, in *Botany*, a name of Miller's, moſt unfortunately conſtructed, though well intended, to honour the late duke of Northumberland; ſo that it ought to have been *Percya* or *Percæa*. That great patron of Botany, and diſtinguiſhed cultivator, to whom the ſcience is ſo much indebted, has certainly long merited ſuch a compliment, in preference to a cloud of names, in every reſpect far inferior; but Miller's ſuppoſed genus is not in any reſpect different from RIVINA. See that article.

PIERCED, PERCE', in *Heraldry*, is when an ordinary is perforated, or ſtruck through; ſhewing, as it were, a hole in it.

This piercing is ſaid to be expreſſed in blazon as to its ſhape: thus if a croſs have a ſquare hole, or perforation in the centre, it is blazoned, *ſquare-pierced*, which is more proper than *quarter-pierced*, as Leigh expreſſes it; and accordingly the French call it *percé en quarré*. When the hole or perforation is round, it muſt be expreſſed *round-pierced;* which Gibbon in Latin calls *perforata;* becauſe all holes made with pierces, or augers, are round. If the hole in the centre be in the ſhape of a lozenge, it is expreſſed *pierced lozenge-ways*.

All piercings muſt be of the colour of the field, becauſe piercing implies the ſhewing of what is under the ordinary, or bearing. And when ſuch figures appear on the centre of a croſs, &c. of another colour, the croſs is not to be ſuppoſed pierced, but that the figure on it is a charge, and muſt be accordingly blazoned.

PIERCED *Iſland*, in *Geography*, a ſmall iſland or rock, in the gulf of St. Lawrence, pierced with two natural arches, through which the ſea paſſes; 15 miles S. of Cape Gaſpe.

PIERCING, among *Farriers*. *To pierce a horſe's ſhoe lean,* is to pierce it too near the edge of the iron. *To pierce it fat,* is to pierce it farther in.

PIERCY, in *Geography*, a town of America, in N. Hampſhire, and county of Coos, containing 211 inhabitants.

PIERCY *Iſland*, a ſmall iſland near the eaſt coaſt of New Zealand; eaſt of Cape Brett.

PIERIA, in *Ancient Geography*, a country of Syria, in the Seleucide territory. This country derived its name from mount Pierius or Pieria, which the Macedonians ſo called after mount Pierius in their own country. It was the moſt ſouthern country, and touched on Theſſaly, from which it was ſeparated by mountains.—Alſo, a town of Macedonia. —Alſo, a mountain of Syria, which, according to Strabo, extended from the ſouth to the north, and joined with mount Amanus. This mountain took its name from that of Greece. —Alſo, a town of Greece, in Bœotia, afterwards called Lyncos.

PIERIDES, among the *Ancients*, an epithet given to the Muſes, upon account of their having been born in that part of the country of Macedon which was called *Pieria*.

PIERIUS MONS, in *Ancient Geography*, a mountain of Aſia, in Syria, on the coaſt of the Mediterranean ſea, between the gulf Iſſicus to the north and the mouth of the river Orontes; about lat. 36° 15′.

PIERMONT, in *Geography*, a town of America, in the ſtate of N. Hampſhire, and county of Grafton, containing 877 inhabitants.

PIEROUGAMIS, a tribe of Indians in Canada, who inhabit the weſt bank of the lake of St. John.

PIERRE, a town of France, in the department of the Saone and Loire, and chief place of a canton, in the diſtrict of Louhans; 15 miles N. of Louhans. The place contains 1510, and the canton 12,408 inhabitants, upon a territory of 255 kiliometres, in 18 communes.

PIERRE *Buſſiere*, a town of France, in the department of the Upper Vienne, and chief place of a canton, in the diſtrict of Limoges; 9 miles S.S.E. of Limoges. The place contains 813, and the canton 8093 inhabitants, on a territory of 217½ kiliometres, in 10 communes.

PIERRE *a l'Oiſſeau*, a ſmall iſland in the Engliſh channel, near the coaſt of France. N. lat. 48° 54′. W. long. 3° 24′.

PIERRE *Pertuis*, a paſs in mount Jura, cut out of a rock; 8 miles N.W. of Bienne.

PIERRE *d'Albigny, St.*, a town of France, in the department of Mont Blanc, and chief place of a canton, in the diſtrict of Chambery. The place contains 2714, and the canton 6943 inhabitants, on a territory of 70 kiliometres, in 6 communes.

PIERRE-*Egliſe, St.*, a town of France, in the department of the Channel, and chief place of a canton, in the diſtrict of Valognes. The place contains 1619, and the canton 13,342 inhabitants, on a territory of 170 kiliometres, in 20 communes.

PIERRE *d'Oleron, St.*, a town of France, in the department of the Lower Charente, and chief place of a canton, in the diſtrict of Marennes. The place contains 4249, and the canton 9653 inhabitants, on a territory of 135 kiliometres, in 3 communes.

PIERRE-*Lette*, a town of France, in the department of the Drome, and chief place of a canton, in the diſtrict of Montelimart. The place contains 2536, and the canton 12,534 inhabitants, on a territory of 327½ kiliometres, in 14 communes.

PIERRE-*le-Moutier, St.*, a town of France, in the department of the Nievre, and chief place of a canton, in the diſtrict of Nevers. The place contains 1969, and the canton 8615 inhabitants, on a territory of 310 kiliometres, in 10 communes.

PIERRE *ſur Dives, St.*, a town of France, in the department of the Calvados, and chief place of a canton, in the diſtrict of Liſieux. The place contains 1499, and the canton 9287 inhabitants, on a territory of 145 kiliometres, in 28 communes.

PIERRE *d'Automne*, a French name tranſlated from the

Chineſe. It is the name of a medicinal ſtone, famous throughout the Eaſt for curing all diſorders of the lungs. Many people ſuppoſe it had its name of the *autumn-ſtone*, from its being only to be made at that ſeaſon of the year; but it may be made equally at all times, and the origin of the name is to be farther ſearched into.

The Chineſe chemiſts, like thoſe of all other nations, delight in a ſort of gibberiſh. A part of this is, the referring the ſeveral parts of the body to the ſeveral ſeaſons of the year. The lungs are in this ſcheme referred to autumn. This appears in their writings; and thus the ſtone for diſeaſes of the lungs came to be called *autumn-ſtone*.

It is a tedious preparation of human urine, and made as follows: they put thirty pints of the urine of a ſtrong and healthy young man into a large iron pot, and ſet it over a gentle fire; and when it begins to boil, they add to it, drop by drop, about a large tea-cup full of rape-oil; it is then left on the fire till the whole is evaporated to a thick ſubſtance reſembling black mud; they then take it out of the pot, and laying it on a flat iron, they dry it ſo that it may be powdered very fine.

This powder they moiſten with freſh oil, and put the maſs into a double crucible, ſurrounded with coals, where it ſtands till thoroughly dried again. They finally powder this again, and putting it into a china-veſſel, covered with ſilk cloth and a double paper, they pour on boiling water, which makes its way, drop by drop, through theſe coverings, till ſo much is got in as is ſufficient to reduce it to a paſte. This paſte is well mixed together in the veſſel it is kept in, and this is put into a veſſel of water, and the whole ſet over the fire. The matter thus becomes again dried in balneo Mariæ, and is then finiſhed. Obſerv. ſur les Coût. de l'Aſie, p. 258.

PIERRE *de Cayenne*, in *Ornithology*. See PHASIANUS *Pauxi*.

PIERREFITTE, in *Geography*, a town of France, in the department of the Meuſe, and chief place of a canton, in the diſtrict of Commercy; 7 miles W. of St. Michael. The place contains 660, and the canton 9249 inhabitants, on a territory of 357½ kiliometres, in 27 communes.

PIERREFONTAINE, a town of France, in the department of the Doubs, and chief place of a canton, in the diſtrict of Baume. The place contains 1110, and the canton 7889 inhabitants, on a territory of 272½ kiliometres, in 21 communes.

PIERREFORT, a town of France, in the department of the Cantal, and chief place of a canton, in the diſtrict of St. Flour. The place contains 1266, and the canton 8905 inhabitants, on a territory of 287½ kiliometres, in 11 communes.

PIERRES SONORES, ſtones that have a metalline ſound, of which muſical inſtruments of percuſſion are made in China. See CHINESE *Muſic*.

PIERREVILLE, ST., in *Geography*, a town of France, in the department of the Ardêche, and chief place of a canton, in the diſtrict of Privas. The place contains 1471, and the canton 7856 inhabitants, on a territory of 147½ kiliometres, in 7 communes.

PIERSZAIE, a town of Lithuania, in the palatinate of Wilna; 60 miles E. of Lida.

PIERUS, or PEIRUS, in *Ancient Geography*, a river of the Peloponneſus, in Achaia Propria, which traverſed the territory of the town Pharæ. Strabo ſays that it diſcharged itſelf into the Achelous.—Alſo, a lake of Theſſaly.—Alſo, a mountain of Macedonia. It is ſaid that a perſon, named Pierus, eſtabliſhed on this mountain the worſhip of the Muſes, whence they were denominated "Pierides."

PIES, in our *Ancient Law-Books*. Freres Pies were a ſort of monks, ſo called becauſe they wore black and white garments, like magpies; the ſame, we ſuppoſe, with thoſe ſince called Carmelites, who, for a like reaſon, were anciently called by the French Freres Barrez.

They are mentioned by Walſingham, p. 124. "In quodam veteri cœmeterio, quod fuerat quondam fratrnm, quos Freres Pies veteres appellabant."

PIESKE, in *Geography*, a town of Lithuania, in the palatinate of Novogrodek; 40 miles W.S.W. of Novogrodek.

PIESMA, a word uſed by the ancients to expreſs the remaining maſs, after the expreſſion of any fluid ſubſtance from among its moſt ſolid parts. Thus the cake remaining in the bag, after the expreſſion of oils, is called by this name; but there are inſtances of authors calling the expreſſed juice, inſtead of the reſiduum, by this name. Thus Dioſcorides calls the expreſſed juice of the bay-berries, the *pieſma laurinum;* and others, the expreſſed juice of roſes, *pieſma roſarum*, paying no regard to the roſe-cake left behind.

PIESTER, the name uſed by the ancients for the preſs which they employed in preparing the ſeveral juices of plants, &c.: hence the word *pieſma;* which ſee.

PIESTRON, a word uſed by Hippocrates to expreſs a ſort of forceps, which he recommends to be uſed in difficult labours, to break the bones of the cranium of the fœtus, when its head is too large to ſuffer it to paſs whole. It was alſo called *embryothlaſtes*.

PIETANTIA, or PITTANCE, a portion of victuals diſtributed to the members of a college, or other community, upon ſome great feſtivals.

PIETANTIARIUS. See PITANCIARIUS.

PIETERMAN, in *Ichthyology*, the name uſed by ſome for a fiſh of the cuculus kind, approaching to the nature of the *draco marinus*, or weaver; and more uſually called among authors by its Braſilian name, *niqui*.

PIETISTS, in *Eccleſiaſtical Hiſtory*, a religious ſect that ſprung up towards the cloſe of the 17th century, among the Proteſtants of Germany; ſeeming to be a kind of mean between the Quakers of England, and the Quietiſts of the Romiſh church.

This ſect originated in the zeal of certain perſons, who, with the beſt intentions, endeavoured to ſtem the torrent of vice and corruption, and to reform the licentious manners both of the clergy and of the people. However, many, deluded by the ſuggeſtions of an irregular imagination, and an ill-informed underſtanding, or guided by principles and views of a more criminal nature, ſpread abroad new and ſingular opinions, falſe viſions, unintelligible maxims, auſtere precepts, and imprudent clamours againſt the diſcipline of the church: all which excited the moſt dreadful tumults, and kindled the flames of contention and diſcord.

The learned Spener was at the head of the firſt reformers, who, by the private ſocieties he formed at Frankfort, with a deſign to promote vital religion, rouſed the luke-warm from their indifference, and excited a ſpirit of vigour and reſolution in thoſe who had been ſatisfied to lament in ſilence the progreſs of impiety. With this view he publiſhed a book, entitled "Pious Deſires," in which he repreſented in an affecting manner the diſorders of the church, and propoſed the remedies that were proper to heal them. The religious meetings above-mentioned, or colleges of piety as they were called, however well deſigned in their original eſtabliſhment, tended in many places to kindle in the breaſts of the multitude the flames of a blind and intemperate zeal, whoſe effects were impetuous and violent : ſo that theſe inſtitutions of pietiſm became objects of reproach and occaſions of complaint.

The tumult this produced was farther promoted by the commotions that aroſe at Leipſic in the year 1689, when certain pious and learned profeſſors of philoſophy undertook to explain the ſcriptures in their colleges, with a view of forming candidates for the miniſtry into a more accurate acquaintance with theſe ſources of religious knowledge. The novelty of this method of inſtruction excited attention, and the lectures that were delivered to this purpoſe were much frequented. Suſpicions and rumours of an unfavourable kind were ſoon induſtriouſly propagated, and the profeſſors were prohibited from purſuing the plan of religious inſtruction which they had undertaken. During theſe troubles and diviſions, the invidious denomination of Pietiſts was firſt invented ; or at leaſt before this period it was not commonly known. It was originally applied by ſome inconſiderate perſons to thoſe who frequented the biblical colleges, and lived in a manner ſuitable to the inſtructions and exhortations that were there addreſſed to them ; and afterwards it was uſed to characteriſe all who were diſtinguiſhed by the exceſſive auſterity of their manners, or who, regardleſs of truth and opinion, were only intent upon practice, and turned the whole vigour of their efforts towards the attainment of religious feelings and habits. At this time the denomination was alſo ſometimes applied to perſons whoſe motley characters exhibited an enormous mixture of profligacy and enthuſiaſm, and who better deſerved the title of delirious fanatics. The conteſt, thus begun, very ſoon ſpread through all the Lutheran churches in the different ſtates and kingdoms of Europe. Many perſons of various ranks and profeſſions, of both ſexes, learned and illiterate, pretended a divine impulſe for pulling up iniquity by the root, and reſtoring to its primitive luſtre the declining cauſe of piety and virtue, and for eſtabliſhing a better diſcipline in the Chriſtian church. Aſſemblies, ſimilar to thoſe eſtabliſhed by Spener, were introduced for this purpoſe into Leipſic and other places : but they were not all conducted with prudence and order. Into theſe aſſemblies there were introduced ſeveral extravagant and hot-headed fanatics, who foretold the deſtruction of Babel, *i. e.* the Lutheran church ; who terrified the populace with fictitious viſions, aſſumed the authority of prophets honoured with a divine commiſſion, revived doctrines that had long before been exploded and condemned, declared the approach of the millennium, and were guilty of many outrages againſt order and peace. The governors of the church and of the ſtate were alarmed at the progreſs of the diviſions which theſe enthuſiaſts produced, and many ſevere laws were enacted againſt the Pietiſts. Theſe revivers of piety were of two kinds : one ſect, at the head of which was Spener, propoſed to carry on their plan without introducing any change into the doctrine, diſcipline, or form of government in the Lutheran church : the other party were for introducing conſiderable alterations both in doctrine and eccleſiaſtical polity. Many miſtakes have been occaſioned by confounding theſe two parties ; the former of which were zealouſly intent upon a very important object, the revival of piety, and, with this view, the reformation of public ſeminaries, where miniſters were educated, both as to the mode of inſtruction and the extent of diſcipline : but the latter were, for the moſt part, totally deſtitute of reaſon and judgment ; their errors were the reveries of a diſordered brain ; and they were rather to be conſidered as lunatics than as heretics. Some among them were leſs extravagant, and tempered the ſingular notions they had derived from reading or meditation, with a certain mixture of the important truths and doctrines of religion. They were moſtly, however, of the myſtic kind. For a more particular account we muſt refer to Moſheim's Eccl. Hiſt. vol. iv. 8vo.

Many groſs errors are charged on the Pietiſts, in a book intitled "Manipulus Obſervationum Antipietiſticarum ;" but they have too much the ſeverity of polemical exaggeration ; at leaſt it is certainly ſo with regard to a great part of them.

In effect, there are Pietiſts of ſeveral kinds : ſome run into groſs illuſions, and carry their errors to the overturning a great part of the Chriſtian doctrine ; others are only viſionaries ; and others very honeſt and good people, who, diſguſted with the coldneſs and formality of other churches, and charmed with the fervent piety of the Pietiſts, are attached to their party, without giving in to the groſſeſt of their errors.

PIETISTS, otherwiſe called the "Brethren and Siſters of the Pious and Chriſtian Schools," a ſociety formed in the year 1678, by Nicholas Barre, and obliged, by their engagements, to devote themſelves to the education of poor children of both ſexes.

PIETOSA, in the *Italian Muſic*, ſignifies to play or ſing in a ſoft manner, fit to move pity or compaſſion.

PIETRA CASTELLO, in *Geography*, a town of Naples, in Capitanata ; 6 miles N.W. of Volturara.—P. *Corbara*, a town of Corſica ; 11 miles N. of Baſtia.—P. *Galla*, a town of Naples, in Baſilicata ; 2 miles S.S.W. of Acerenza.—P. *Mala*, a town of Naples, in Calabria Citra ; 11 miles S. of Coſenza.—P. *Malera*, a town of Naples, in Lavora ; 7 miles N. of Capua.—P. *Maura*, a town of Naples, in Capitanata ; 4 miles N.W. of Leſina.—P. *Paula*, a town of Naples, in Calabria Citra ; 4 miles W.N.W. of Cariati Vecchia.—P. *Pertoſa*, a town of Naples, in Baſilicata ; 12 miles S.E. of Potenza.—P. *Prezia*, a town of Sicily, in the valley of Noto ; 10 miles S.W. of Caſtro Giovanni.—P. *Pugno*, a town of Corſica, in the department of Corté.—P. *Pulcina*, a town of Naples, in Principato Ultra ; 3 miles N. of Benevento.—P. *Pulema*, a town of Naples, in Principato Ultra ; 9 miles N.N.E. of Benevento.—P. *di Roma*, a town of Sicily, in the valley of Demona, on the N. coaſt ; 18 miles W. of Pati.—P. *Sama*, a town of the republic of Lucca ; 12 miles W. of Lucca.—P. *Santa*, a town of Etruria ; 6 miles S.E. of Meſſa.—P. *Vairan*, a town of Naples, in Lavora ; 11 miles E. of Sezza.

PIETRA *Mala*, a mountain that riſes in the middle of the Apennines on the road to Bologna, about 40 miles from Florence. This mountain is rendered remarkable by a flame that ſpreads over a ſmall part of its ſurface, and burns almoſt continually without producing any of thoſe deſtructive effects which accompany volcanic exploſions. A ſimilar phenomenon is obſerved on the ſide of a mountain about four miles from Cavigliano : here the flame, which ſhews itſelf low down on the declivity of the mountain, covers a ſpace of about 140 feet ; and it runs along in crevices, and burns much ſtronger in ſome places than in others. Its colour is either bright yellow, or blue, like ſpirits of wine, and it riſes little more than half a foot from the ſurface ; but in rainy weather, and particularly in winter, it is ſaid to increaſe conſiderably, and mount to the height of ſix or ſeven feet. It was extinguiſhed in ſome places by waving hats ſtrongly over it, and reproduced by firing a piſtol into a ſmall train of gunpowder, and ſometimes by merely throwing a lighted paper upon the ſpot where it had diſappeared. It emits a ſtrong odour, reſembling that of ether. Naturaliſts are divided in their opinions as to the cauſe of this phenomenon: ſome ſuppoſe it to be electric, others phoſphoric, and others again volcanic. In favour of this latter opinion, it is alleged that there are veſtiges of ancient eruptions in the neighbourhood; that ſhocks of earthquakes frequently agitate the ſurrounding mountains; and that ſulphureous bubbles are perceivable in the vicinity, which are ſo inflammable as to take fire at the approach of a torch, &c. But on the other hand, it is ſaid, that if the flames of Pietra Mala proceeded from any ſuch cauſe, the ground over which they hover muſt be heated, and its heat increaſe if opened, becauſe it would be nearer the ſubterranean furnace. On the contrary, the flame in this mountain communicates but little heat when burning, and when extinguiſhed leaves the ground cold, and without the uſual veſtiges of fire. Hence others have been led to aſcribe it to a ſort of oily ſubſtance or petroleum, with which they ſuppoſe the adjacent earth to be impregnated. But if this were the cauſe, it is ſaid, that the flames, inſtead of being increaſed, would be diminiſhed or extinguiſhed by the rains and tempeſts of winter, and the crevices which emit the flame muſt exhibit ſome traces of this oily vapour; but the flame glows with the greateſt vivacity in winter, and the ſoil manifeſts no appearance of any oily or bituminous ſubſtance. The firſt of theſe facts is equally deciſive againſt the operation of the electric fluid and phoſphoric exhalations. Whatever be its cauſe, the flame illuminates the whole tract around it, and baniſhes the horror of night from one of the moſt dreary ſolitudes of the Apennines. Similar phenomena were obſerved in or near the ſame region anciently, as Pliny the elder (lib. xi. cap. 3.) notices the appearances of flames in the territory of Mutina, which includes the neighbouring Apennines.

Pietra *Emboſcata*, in *Natural Hiſtory*, a name given by the Italians to the Florentine marble, ſo remarkable for its delineations.

This marble is found in thin ſtrata, and is full of cracks: in theſe cracks there is uſually found a black mineral matter, which, getting into the ſubſtance of the ſtone a little way on each ſide of the crack, forms there various delineations, or the figures of pieces of moſs, buſhes, and the like: the paler pieces of the marble uſually have theſe delineations; the darker coloured having the forms of trees and houſes, or the ruins of old buildings.

PIETRAFEZA, in *Geography*, a town of Naples, in Baſilicata; 7 miles S.W. of Potenza.

PIETRAGRUA, Carlo Luigi, of Florence, in *Biography*, a maſter of conſiderable reputation in his day, compoſed two operas for Venice; "Il Paſtor Fido," in 1721; and "Romolo e Tazio," in 1722. Profeſſors ſpeak of Pietragrua in ſuch terms as remove all doubt of his merit.

PIETRALBO, or Petralbo, in *Geography*, a town of the iſland of Corſica; 10 miles S. of St. Fiorenzo.

PIETY, *Mounts of*. See Mount.

PIEVE, in *Geography*, a town of Genoa; 2 miles N.W. of Albenga.

Pieve, *La*, a town of Italy, in the department of the Lower Po, on the Reno, ſurrounded with an earthen rampart and a ditch.

Pieve *del Duca*, a town of Italy, in the department of the Rubicon; 4 miles W. of Rimini.

Pieve *del Mona*, a town of Italy, in the department of the Upper Po; 5 miles E.N.E. of Cremona.

Pieve *St. Giacomo*, a town of Italy, in the department of the Upper Po; 7 miles E. of Cremona.

Pieve *a Sieve*, a town of Etruria; 10 miles E. of Florence.

Pieve *di Cadora*. See Cadora.

Pieve *di Sacco*, a town of Italy, in the Paduan, on a canal called Fiumcello, containing 5100 inhabitants; 10 miles E. of Padua.

Pieve *de St. Mauritio*, a town of Italy, in the department of the Upper Po; 12 miles E. of Cremona.

Pieve *St. Stefano*, a town of Etruria, on the Tiber; 15 miles N. of Arezzo.

PIEUX, Les, a town of France, in the department of the Channel, and chief place of a canton, in the diſtrict of Valognes; 12 miles W. of Valognes. The place contains 1398, and the canton 10,420 inhabitants, on a territory of 170 kiliometres, in 15 communes.

PIEXE-Gallo, in *Ichthyology*, a name given by the Portugueſe to a fiſh caught about the ſhores of the Braſils, and much reſembling our *doree* or *faber piſcis;* more uſually known among authors by its Braſilian name, *abacatuaia*.

Piexe-*Porco*, a name by which ſome authors have called the *monoceros*, or unicorn-fiſh of Cluſius. The name is Portugueſe, and ſignifies hog-fiſh, this little creature having a mouth like a hog.

PIEXMAHL, in *Geography*, a town of Sweden, in the government of Kuopio; 39 miles S.S.W. of Kuopio.

PIFENDEL, in *Biography*, an eminent performer on the violin, in the ſervice of Auguſtus II., king of Poland. According to Quantz, Piſendel had in his youth received inſtructions in ſinging from Piſtocchi, and on the violin from Tofelli. Quantz is very warm in his praiſes, calling him a profound theoriſt, a great performer, and a truly honeſt man. It was from this worthy concert-maſter, ſays he, that I learnt to play an adagio, and to compoſe in many parts.

Piſendel had in his youth travelled through France and Italy, where he had acquired the peculiarities in the taſte of both countries, and ſo blended them together as to form a third genus, a mixed ſtyle of writing and playing, which was half French and half Italian. Influenced by his example, Quantz declares that he always preferred this compound ſtyle to that of Italy, France, or the national ſtyle of his own country.

PIFFERO, Ital. a flute, fife, or flageolet.

PIG, a ſmall animal of the hog or ſwine kind. See Hog, and Swine.

Pig, *Guinea*. See Cavia *Cobaya*.

Pig-*Nut*, or *Earth-nut*, in *Botany*. See Bunium.

Pig-*Nut*. See Walnut-*Tree*.

Pig-*Caſe*, in *Agriculture*, a ſort of narrow caſe or ſtall, in which an animal of this kind is confined while it is undergoing the proceſs of fattening, ſo as not to be able to turn itſelf completely round, by which it is ſuppoſed to fatten better and more expeditiouſly, as well as with a leſs quantity of food in proportion to that which is uſed for equal ſized animals fed in other methods.

Theſe caſes are conſtructed in ſeparate diviſions, in ſuch a manner, that each of them may contain a pig, and fit him as nearly as poſſible when he is in it; but he muſt not be able to turn himſelf round; there is, however, a ſpace left at the bottom of each of them, by which he is enabled to lie down at pleaſure, in which caſe his feet paſs through the ſpace left. Upon one ſide of ſuch buildings there is uſually a range of ſmall troughs in the walls or boardings, and on the other a row of ſliders, which ſhut the pigs in. The paving in the bottoms of theſe diviſions ſlopes gently backwards to prevent wetneſs, and no litter is ever employed in them, but they are kept clean and ſweet by the uſe of a hoe and broom.

Pig-caſes of this ſort are ſometimes raiſed from foundations laid in the ground, and at others erected upon wheels in a kind of wooden building, ſo as to move about on graſs-land. They are frequently met with in the neighbourhood of Maldon in Eſſex, and will be more fully noticed in ſpeaking of ſwine. See Swine.

Pig-*Stie*, in *Rural Economy*, the name of the place where hogs are kept. Buildings of this kind ſhould always be large and commodious. See Hog-*Stie*.

Pig-*Tail*, in *Agriculture*, a provincial term ſometimes applied to a ſmall ſtrip of ground generally in the ſtate of graſs.

Pig *of Lead*, the eighth part of a fother; amounting to about 250lb. weight.

Pig *Creek*, in *Geography*, a river of Virginia, which runs into the Staunton, N. lat. 36° 52′. W. long. 79° 42′.

Pig *Iron*, in the *Iron Works*. Thoſe maſſes of iron which reſult from the firſt proceſs of extracting from the ore, are called *pigs*, and in this ſtate it is called *pig iron*. It is principally uſed to diſtinguiſh it from bar iron, which is malleable, and nearly pure iron. Pig iron is of various qualities, according to the quantity of carbon it contains. The higheſt carburet is called N° 1, the next N° 2, and ſo on. That containing the loweſt doſe of carbon, which is known by its white fracture, and greater hardneſs, is called *forge pig*, becauſe it has been thought the moſt fitted for making malleable iron. See the article Iron.

PIGALLE, John Baptist, in *Biography*, an eminent French ſculptor, was born at Paris in 1714. He was the ſon of a carpenter employed about the royal buildings, and ſhewed an early fondneſs for modelling, which at length gave him a deſire for excelling in the art of ſculpture. He ſpent three years at Rome in copying after the antique, and on his return ſtopt at Lyons, where he met with employment which occupied him a year and a half. Here he finiſhed his model of the ſtatue of Mercury, which he brought with him to Paris, where it was greatly admired. It was ſome time before he met with encouragement; but at length he excited the attention of the miniſter, and of Mad. Pompadour, who obtained for him many commiſſions. He was admitted into the academy of painting and ſculpture in 1744, and having executed his Mercury in marble, he made a Venus for its companion, which was equally the ſubject of praiſe. Both theſe ſtatues were preſented by the king to Frederic of Pruſſia. Pigalle was employed, in 1756, to execute a mauſoleum for marſhal Saxe, which was ſaid to be the grandeſt compoſition in ſculpture that exiſts. This cauſed him to be employed for the monument erected in 1765, by the city of Rheims, to the glory of Lewis XV. In 1780 he was employed on a grand monument for the count d'Harcourt. His concluding piece was the figure of a young girl taking a thorn out of her foot, which was greatly admired for its beauty and delicacy. He died in 1785, being then rector and chancellor of the academy. As an artiſt he was entirely indebted to ſtudy and application: his ſkill was rather talent than genius, and his ideas were rather juſt than extenſive.

PIGAYA, in *Natural Hiſtory*. See Pygaya.

PIGEON, in *Ornithology*. See Columba.

Pigeon, in *Rural Economy*, a well-known domeſtic bird. There are only two diſtinct ſorts of pigeons, the wild and the tame; and the tame rough-footed ones differ not much from the wild, only they are ſomewhat bigger, and more familiar: the wild uſually perch upon trees, being more ſeldom ſeen on the ground. They are ſuch as breed in woods, ſea-rocks, &c. and the tame ſuch as are bred in dove-houſes.

But the varieties in the tame ſort are numerous, and diſtinguiſhed by a variety of different names, as carriers, croppers, powters, horſemen, runts, jacobins, turbits, helmets, nuns, tumblers, barbs, petits, owls, ſpots, trumpeters, ſhakers, turners, finikins, &c. from which, when differently paired, are bred baſtard pigeons, ſuch as are called from the cropper or powter, and the carrier, powting horſemen; from the tumbler and the horſemen, dragoons. Theſe, however, deſerve little attention, being only kept for fancy, and not profit, though the ſame method is uſed in breeding them.

And there are different ſorts of runts, one called Spaniſh runt; generally of a blood-red or mottled colour: they are very looſe feathered, and large bodied, but breed not ſo often as the ſmaller ſorts.

The horſemen are excellent breeders, and are not eaſily took; the common Engliſh runt is alſo a good ſized pigeon, and breeds well.

Alſo the pigeon called the Leghorn is a ſort of runt, only diſtinguiſhed by a little wattle over his noſtril: he is a full bodied pigeon, whoſe feathers lie cloſe to the body, and is an excellent breeder, and generally of a grizzled colour, ermined round the neck.

It may be noticed that thoſe who keep pigeons for the purpoſe of breeding, ſhould have baſtard bred pigeons, ſuch as powting horſemen, powting dragoons, from a powter or cropper, and a Leghorn; as ſuch pigeons will breed nine or ten pair of young ones in the year; and when they have young ones they feed them well.

But of thoſe kinds which are bred in pigeon-houſes, the grey pigeon, inclining to aſh colour and black, is the beſt; and generally ſhews fruitfulneſs by the redneſs of the eyes and feet, and by the ring of gold colour which is about the neck.

In reſpect to the time of ſtocking there are two ſeaſons in the year at which the pigeon-houſe may be ſupplied: the firſt is May; for the pigeons having much ſtrengthened themſelves during the winter, are in a condition ſoon to yield profit to the buyer. Secondly, in Auguſt, when there are a great number of young pigeons that have been well fed with corn, from the harveſt in that ſeaſon. In general pigeons will live about eight years, but they are only prolific for the firſt four years; afterwards they are worth nothing, for when they are once paſt that age all they do is, to prevent the profit that might be reaped by others that are younger. It is ſomething difficult to know how to diſtinguiſh their age, and requires experience.

And the runts may be diſtinguiſhed again into greater or ſmaller: thoſe which are called the Spaniſh runts are much eſteemed, being the largeſt ſort of pigeon, but are ſluggiſh and more ſlow of flight than the ſmaller ſorts of runts: but the ſmaller runts are better breeders, and quicker of flight, for which they are eſteemed. As for the colours of their feathers, they are uncertain, ſo that a judgment cannot be made of the ſort by them.

The next ſort which makes the largeſt figure, but is not, in reality, the largeſt bird, is the cropper, ſo called, becauſe they uſually, by attracting the air, blow up their crops to an extraordinary bigneſs, even ſo as to be ſometimes as large as their bodies. This ſort is the moſt valued, according as it can ſwell up its crop. The bodies of this ſort are about the bigneſs of the ſmaller runts, but are ſomewhat more ſlender: this ſort alſo is of various colours in the feathers.

The ſhakers are of two ſorts, *viz.* the broad-tailed ſhaker, and the narrow-tailed ſhaker: theſe are ſo called, becauſe they are almoſt conſtantly wagging their heads and necks up and down; the broad are diſtinguiſhed from the narrow, in that the broad-tailed ſort abounds with tail-feathers about twenty-ſix in number; but the narrow-tail ſhakers have not ſo many. Theſe, when they walk, carry their tail-feathers and creſt ſpread abroad like a turkey-cock : they have likewiſe a diverſity of feathers.

The jacobins, or cappers, are ſo called on account of certain feathers which turn up about the back part of the head : ſome of this ſort are rough-footed ; they are ſhort billed, the iris of their eye of a pearl colour, and the head is commonly white.

The turbit, which ſome ſuppoſe to be a corruption of the word corbeck, or curtbeke, as they are called by the Dutch, which ſeems to be derived from the French, courtbeck, and ſignifies a ſhort bill, for which this pigeon is remarkable ; has the head flat, and the feathers on the breaſt ſpread both ways ; theſe are much of the ſame ſize with the jacobines.

The carriers are thoſe pigeons which are ſaid to have been employed ſometimes in carrying letters, &c. They are about the ſize of common pigeons, and of a dark blue or blackiſh colour, which is one way of diſtinguiſhing them from other ſorts : they are alſo remarkable for having their eyes compaſſed about with a broad circle of naked ſpongy ſkin, and for having the upper chap of their beak covered more than half from the head, with a double cruſt of the like naked fungous body. The bill, or beak, is moderately long, and black.

The barb, or Barbary pigeon, is another ſort, whoſe bill is like that of the turbit, ſhort, and thick, having a broad and naked circle of a ſpongy white ſubſtance round about the eye, like that of the carrier pigeon ; the iris of the eye is white, if the feathers of the pinion are inclinable to a darker colour, but if red they are white, as it is obſerved in other birds.

The ſmiters are ſuppoſed to be the ſame the Dutch call dragors : theſe ſhake their wings as they fly, and riſe commonly in a circular manner in their flight, the males, for the moſt part, riſing higher than the females, and frequently falling and flapping with their wings, which makes a great noiſe that may be heard a great way off, which often is the cauſe of their breaking or ſhattering their quill-feathers. Theſe very much reſemble the tumbler pigeon ; the difference chiefly is, that the tumbler is ſomewhat ſmaller, and in its flight will tumble itſelf backward over its head ; the diverſity of colours in the feathers makes no difference.

The helmet pigeon is diſtinguiſhed from the others, becauſe it has the head, the quill-feathers, and the tail-feathers, always of one colour, ſometimes black, ſometimes white, or red, or blue, or yellow, but the other feathers of the body are of a different colour.

The light horſeman ; this is ſuppoſed to be a croſs between a cock cropper and a hen of the carrier breed : becauſe they ſeem to partake of both, as appears from the excreſcence of fleſh upon their bills and the ſwellings of their crops : theſe are not inclined to leave the place of their birth, or the houſe that they have been uſed to.

The baſtard-bill pigeon is ſomething bigger than the Barbary pigeon ; they have ſhort bills, and are generally ſaid to have red eyes, though probably thoſe coloured eyes belong only to thoſe that have white feathers.

There is a pigeon called the turner, which is ſaid to have a tuft of feathers hanging backwards on the head which parts like a horſe's mane.

There is alſo a pigeon of the ſmaller ſort, called the finnikin, but in other reſpects like the former.

There is another pigeon called the ſpot, ſuppoſed to take its name from a ſpot on the forehead, juſt above the bill ; and the feather of its tail is always of the ſame colour with the ſpots, and all the other feathers are white.

The Mahomet, or mawmet pigeon, ſuppoſed to be brought from Turkey, is ſingular for its large black eyes, but the other parts are like thoſe of the Barbary pigeon.

It is neceſſary to obſerve that great care muſt be taken to make convenient places to breed in ; each pair of pigeons muſt have two neſts, thoſe with baſkets in them are beſt, as before one pair can go out of the neſt, or feed themſelves, the old ones will be ſitting again. When the young ones are taken, clean out the neſt, or put in a clean baſket, for cleanlineſs is a circumſtance of great conſequence to the raiſing of pigeons.

Many ſuppoſe that, notwithſtanding pigeon-houſes are common on many farms, it is, in very few inſtances, that this kind of ſtock, when the various diſadvantages of it are conſidered, can be converted to much profit by the farmer. And it has been well remarked by Mr. Pitt, in his Corrected Report of Staffordſhire, that the increaſe of pigeons beyond a certain degree muſt, doubtleſs, be injurious to the cultivation of grain ; within due bounds they do little harm ; but increaſed beyond it, they prove pernicious vermin, both to the new ſown crops, and the early part of harveſt. They are particularly voracious in early peas ; therefore, the advantages ariſing from their increaſe for conſumption as food are more than counterbalanced by the miſchief occaſioned by their depredations. Mr. Kent alſo ſtates that, in Norfolk, pigeons are much fewer than formerly, as many of the pigeon-houſes have been dropped, on account of the injury which the pigeons do to thatched buildings. And the ſame is the caſe in Kent and other counties. They are particularly injurious to the grain crops firſt at the time of harveſt, by ſettling in large flights upon the ſtanding corn, and in this way doing more miſchief by beating it down than by the quantity they conſume, as Mr. Parkinſon has noticed in his Experienced Farmer. It is ſtated, that where this ſort of ſtock is kept warm ſheltered, ſunny ſituations are the moſt advantageous, as the pigeon delights in warmth, and in being expoſed to the full influence of the ſun. See PIGEON-*Houſe*.

And it is alſo of importance in the economy of theſe birds that the floor of the houſe be nearly upon a level with the holes where they enter, and that theſe holes be not too large nor too numerous ; the holes where they form their neſts ſhould not be much encloſed, as pigeons delight in being at liberty. Salts and ſtrong ſcents, ſuch as aſſafœtida, are ſaid to be agreeable to theſe birds, ſo as frequently to attach them to their habitations, when they would not under other circumſtances.

Birds of this kind ſeldom lay more than two eggs at one laying, ſitting about twenty days, the male and female alternately. They are capable of breeding frequently, but in general only produce two or three broods or flights in the year. Of all the ſeveral ſorts the common blue pigeon is probably the moſt productive. The tumblers are ſmall but very domeſtic. The writer of the Experienced Farmer, after recommending the harveſt flight as the moſt proper for the purpoſe of ſtock, as being the ſtrongeſt to withſtand the winter ſeaſon, gives the following directions on the management of them ; in regard to feeding them, it is adviſed as only neceſſary during the ſeaſon between ſeed time and harveſt, when it ſhould be done by three or four o'clock in the morning, as they riſe early. If you ſerve them much later, they will keep hovering about home, and be prevented taking their neceſſary exerciſe. If fed the year round, they will not feed near ſo well as if forced to ſeek their own food, for they pick up in the fields what is pleaſant and healthy to them, and from the beginning of the harveſt to the end of ſeed time they find plenty. They may be fed with tares, grain, or ſeeds of any kind. He directs us to be cautious of not letting the firſt flight fly to increaſe the ſtock, but let every one of them be taken; as theſe will come in, in what is called benting time, that is, between ſeed time and harveſt. It is then that pigeons are the ſcarceſt; and many of the young ones would pine to death through weakneſs during that ſeaſon, and that, at the latter end of every flight, care ſhould be taken to deſtroy all thoſe eggs which were not laid in a proper time. The proper time for the ſpring flight is in April and May. After the harveſt flight cold weather begins to come on, which injures the old pigeon much if ſhe ſits late; and the young will be good for nothing if hatched.

And it is very neceſſary to pay attention to cleanlineſs in the management of the dove-cote, as already noticed. Before breeding time the holes ought to be carefully examined and cleaned, for if any of the young die in the holes in the ſummer time, maggots are ſoon bred in them; they become putrid, and emit a putrid and unwholeſome ſtench, very injurious to the inhabitants of the dove-cote. Pigeons are tenacious of their neſts, as appears from the conduct of the wood-pigeon, which will breed for years in the ſame tree, and the mother forſakes her neſt with regret; but, unable to endure the filth and ſtench of her dead offspring, ſhe is obliged to quit the eggs ſhe has laid for a ſecond brood, and the prime of the ſeaſon is loſt. Every ſummer, immediately after the firſt flight, the neſts ſhould be all cleaned out, and the dung totally taken away, as it breeds filth. But remember to do this buſineſs early in the morning. The remaining eggs ought likewiſe to be deſtroyed, and a perfectly clean habitation made for the harveſt flight of theſe birds. It is directed never to go into a dove-cote later than mid-day, but as early in a morning as convenient. Whatever repairs are neceſſary, either to the building or to the neſts, ſhould be done before noon; for if you diſturb the pigeons in the afternoon, they will not reſt contentedly the whole night; and the greateſt part perhaps will not enter the cote until the next day, but will ſit moping on the ground; and if in breeding time, either a number of eggs may be ſpoiled, or ſeveral young ones ſtarved to death. It is added, that pigeons are ſuppoſed to be more productive from the breeds being croſſed; in proof of which, a few tame pigeons were put into a dove-cote; and the conſequence was, that a more early, and a more numerous hatch of young were produced than in any of the neighbouring cotes at the ſame ſeaſon. It is alſo farther ſtated that theſe birds have a great antipathy to owls, which find their way ſometimes into dove-cotes; and there is no getting rid of ſuch troubleſome gueſts but by deſtroying them. Rats are terrible enemies to pigeons, and will ſoon deſtroy a whole dove-cote. Cats, weaſels, and ſquirrels will do the ſame. It will be neceſſary, therefore, to examine the dove-cote once every week at leaſt, very minutely, to ſee that there are none of theſe intruders in the houſes where they are kept.

In ſome caſes, in order to catch and deſtroy pigeons, where they become troubleſome to the farmer, it has been directed to take a good number of ſmall twigs, and bird-lime them well, laying them on the ground where pigeons, &c. frequent, and they will ſoon be entangled with them; and, in order to allure them to the twigs, two or three pigeons may be tied to the ground, among the twigs. And another mode is to cut ſome ſheets of thick brown paper, each into about eight parts, making them up into the ſhape of a ſugar-loaf, and bird-liming the inſide of them three or four days before intending to uſe them; putting into each paper, near the bottom, three or four grains of corn, and laying theſe papers up and down the ground, as much as you can, under clods of earth, early in the morning before the pigeons, &c. come to feed. When the pigeons come to feed on the corn, by thruſting in their heads to reach it, they get hood-winked by the paper ſticking to their heads, which occaſions them to take wing, and fly upright till they have ſpent themſelves, when they tumble down and may be eaſily taken. But the gun is probably the beſt method in ſuch inſtances.

PIGEON, *Barbary*. See BARB.

PIGEON, *Helmet*. See HELMET.

PIGEON, *Laughing*. See LAUGHER.

PIGEON, *Mahomet*. See MAHOMET.

PIGEON-*Dung*, in *Agriculture*, a manure of the bird dung kind, which is ſuppoſed to poſſeſs many valuable properties. It is ſometimes turned in like other light ſubſtances in the ſpring, and coſts about one ſhilling a buſhel, heaped, in ſome diſtricts, and about a halfpenny a buſhel more bringing to the land; it is uſed alſo as malt duſt, and anſwers in all ſeaſons. See MANURE, and TOP-DRESSINGS.

PIGEON-*Houſe*, in *Rural Economy*, a building, or houſe, erected for the purpoſe of keeping and breeding of pigeons, &c. It is ſometimes called a dove-cote. In order to erect a pigeon-houſe to advantage, it is neceſſary, in the firſt place, to pitch upon a convenient ſituation, of which none is more proper than the middle of a ſpacious court-yard, when it is ſheltered, and has a ſouthern aſpect. With regard to the ſize, it muſt depend entirely upon the number of birds intended to be kept; but it is better to have it too large than too ſmall; and as to its form, the round ſhould be preferred to the ſquare, becauſe rats cannot ſo eaſily come at them in the former as in the latter. It is alſo much more commodious; as, by means of a ladder turning upon an axis, it is poſſible to viſit all the neſts in the houſe, without the leaſt difficulty; which cannot be ſo eaſily done in a houſe of the ſquare form. And in order to hinder rats from climbing up the outſide of it, the wall ſhould be covered with tin plates to a certain height, as about a foot and a half; which ſhould project out three or four inches at the top, to prevent their getting up more effectually. It ſhould be placed at no great diſtance from water, that the pigeons may carry it to their young ones, in a proper ſtate and more conveniently. Where the houſe is covered with boards, they ſhould be well joined together, ſo that no rain may penetrate through. And the whole building ſhould be covered with hard plaſter, and white-waſhed within and without. There muſt be no window or other opening in the pigeon-houſe to the eaſtward; theſe ſhould always face the ſouth; for pigeons are very fond of the ſun, eſpecially in winter. Other coverings are better than boards, as will be ſeen below. In regard to the neſts or covers, they may conſiſt of ſquare holes made in the walls of a ſufficient ſize to admit the cock and hen to ſtand in them; the firſt range of theſe neſts being placed at a proper diſtance from the ground; and theſe neſts ſhould be placed in quincunx order, and not directly over one another. Neſts may likewiſe be formed in other ways, as will be ſeen below.

It may be noticed that any lord of a manor may build a pigeon-houſe on his land, but a tenant cannot do it without the lord's licence. And that when perſons ſhoot at or kill pigeons within a certain diſtance of the pigeon-houſe, they are liable to pay a forfeiture.

And it has been remarked in a late practical work, that where pigeons are bred for the purpoſe of deriving profit from them, the pigeon-houſe ſhould not only be large and roomy, but be placed in ſuch a ſituation that the pigeons may be fed with convenience, and without being diſturbed by the different operations that are conſtantly going on about the farm-houſe. The form of the houſe is probably not a matter of much conſequence, provided it be not made too deep in the inſide; pigeons diſliking to have their neſts low down. The floor ſhould be cloſely laid, and the ſides well plaſtered, to keep out vermin. The roof may be covered by any convenient and ſuitable material, but tiles and ſlates are by much the beſt; thatch, being warm in winter and cool in ſummer, may alſo afford a very good covering. The great objection to thatch for dove-cotes is, that the pigeons are apt to ſcratch it off; but when the ridge is ſecured by ridge-tiles, and very light hurdles are laid on each ſide of it, that inconvenience may be prevented. The whole muſt be made perfectly ſecure againſt the entrance of rats and other vermin. Where buildings of this ſort are quite detached from the other offices, it is, perhaps, the beſt and cheapeſt method to erect them on pillars of brick or ſtone, or ſtrong poſts of wood, about ſix or ſeven feet high from the ground. In the latter caſe the upper parts of the houſe may likewiſe be principally compoſed of wood; and the under part will ſerve as a ſhed for various uſeful purpoſes. If a ſtable or cow-houſe the better, as it will have a tendency to keep the pigeons warmer in winter, which is material to their breeding early in the ſpring, when they are of moſt value in the market. The chief objection againſt wood cotes are, their being too cold in the winter, and too hot in the ſummer months. It is further ſtated, that the apertures or openings for the entrance of the pigeons, ſhould always have a ſouthern aſpect, as they delight in a ſunny ſituation, as obſerved above, and they ought not to be too large; the common ſize is larger by much than is neceſſary. The number of holes muſt be regulated by the quantity of birds that are intended to be kept; it is better, however, to have too few than too many; as a great number of holes renders the dove-houſe cold, and in any caſe but few are made uſe of by the pigeons. Above theſe holes a piece of weather boarding, ſufficiently large for keeping off the wet, ſhould conſtantly be fixed up. Theſe boards are generally made ſo ſmall that they do not keep off the wet effectually from the pigeons. And though it is the general practice to makes ſquare holes of board for the pigeons to lay and breed in; a neater method is that of employing ſmall wicker baſkets open at the top for this purpoſe; theſe baſkets may either be compoſed of finer or coarſer materials according to the inclination of the builder, or the expence he wiſhes to be at. Neſts made in this way take up but little room, and are readily removed, whenever it is neceſſary to clean them, eſpecially if they be fixed up in a convenient method for the purpoſe. Convenience ſhould always be particularly attended to in buildings of this kind.

Pigeon-*Holes*, in *Brick-making*. See Brick.

Pigeon-*Pea*, in *Botany*. See Cytisus.

Pigeon *Creek*, in *Geography*, a river of America, which runs into the Ohio, N. lat. 37° 44′. W. long. 88° 6′.

Pigeon *Houſe*, a name given by Capt. Cook to a mountain of New Zealand, from a ſuppoſed reſemblance. N. lat. 35° 19′. W. long. 209° 42′.

Pigeon *Iſland*, an iſland in Duſky bay, New Zealand, S. of Facile harbour.—Alſo, a ſmall iſland in the bay of Bengal, near the coaſt of Cicacole. N. lat. 17° 34′. E. long, 83° 23′.—Alſo, a ſmall iſland in the Eaſt Indian ſea, near the coaſt of Canara. N. lat. 14° 2′. E. long. 74° 5′.—Alſo, a fortified iſland in Port Royal bay, Martinico.—Alſo, an iſland near the E. coaſt of Ceylon; 10 miles N.N.W. of Trincomaly.

Pigeon *River*, a river of the ſtate of Tenneſſee, which runs into the French Broad river, N. lat. 35° 46′. W. long. 82° 56′.

PIGER Henricus, ſlothful Harry, a fantaſtical name for a ſlow diſtilling chemical furnace; called alſo an *athanor*.

PIGGERY, in *Rural Economy*, a term applied to the place where hogs or ſwine are lodged.

In *Plate* XL. *fig.* 1. on *Agriculture*, is ſeen the plan of one-half of the duke of Bedford's piggery at Woburn Abbey: *a, a, a, a, a, a,* ſties; *b, b, b, b, b, b,* troughs; ſeparated by ſtrips of wood generally into ſix diviſions, but occaſionally into a greater number when the pigs are ſmall; *c, c, c, c, c, c,* gates which ſeparate the ſties and ſhut them up, as ſhewn by the dotted curved lines, when cleaned, &c.; *d, d, d, d, d, d,* gutters which convey the urine and liquid filth into the receptacles *e, e*; *f*, a boiler for potatoes, meal, &c.; *g, g, g,* cheſts for peas, meal, &c. *Fig.* 2. a ſection through the dotted line A B. The doors in cold weather are partially cloſed by hatches which turn down on hinges; one of them is ſhewn in that ſtate at *k*; *l* the boiler. *Fig.* 3. is a ſection through the dotted line C D; *m, m,* troughs; *n,* one of the gates; that on the other ſide is ſuppoſed taken off to ſhew the door *o*; *p, p,* gutters. *Fig.* 4. a ſection of one of the troughs on a larger ſcale; *q, q,* the hatches, as turned up in mild weather.

This form of piggery is very neat and convenient for many different purpoſes in the rearing and keeping of ſwine. See Hog-*ſtie* and Swine.

PIGGIN, a provincial term applied to a little pail or tub with an erect handle, for milking in, and other uſes. See Pail.

PIGHIUS, Stephen-Vinand, in *Biography*, a learned antiquary, was born in 1520, at Campen, in Overyſſel. He was maternal nephew of Albert Pighius, whoſe family name he aſſumed. A reſidence of eight years at Rome gave him an accurate knowledge of the remains of antiquity in that capital. On his return to Germany he attached himſelf to cardinal Granvelle, whom he ſerved in the character of ſecretary for fourteen years, and finally became a canon regular in his own country, and died in 1604. He obtained a high reputation for antiquarian knowledge, and the purity of his Latin ſtyle. He compoſed two Roman calendars from fragments in the Capitol, and wrote commentaries on the Faſti. He alſo publiſhed "Hercules Prodicius," containing the hiſtory and travels of Charles, duke of Cleves, propoſing it as a kind of model of the education of a young prince. Some pieces of his writing are inſerted in the collection of Gronovius. Moreri.

PIGHTLE, in *Rural Economy*, a provincial term applied to a ſmall incloſure or croft.

PIGMATHA, in *Geography*, a town of Ruſſia, in the government of Olonetz, on the N. coaſt of lake Onerſkoe; 16 miles S. of Povenetz.

PIGMENTS, Pigmenta, preparations in a ſolid form, uſed by painters, dyers, &c. to impart colours to bodies, or to imitate particular colours.

Theſe require to be mixed with ſome fluid, as a vehicle, before they can be employed as paints, except in the caſe of crayons, where they are uſed dry.

When glaſs is ſtained, or coloured, as in painting on glaſs, or for counterfeiting gems, or precious ſtones, the pigment is always of a metalline, or a mineral nature.

In the gilding of wood, pigments approaching as near as may be to the colour of gold itſelf are both laid under the gold, and uſed alſo for the colouring of depreſſed parts, where gold-leaf cannot be conveniently applied. The ſubſtance chiefly employed for this purpoſe is yellow ochre, the colour of which may be improved by a ſmall addition of vermilion or other red powders. See Gilding.

PIGMY, or Pygmy. See Pygmy.

PIGNATA, in *Commerce*, a meaſure for oil at Naples; 320 pignate being = 16 ſtaja = 1 ſalma = 325 lb. avoirdupois.

PIGNE, in *Geography*, a town of France, in the department of the Maritime Alps, and chief place of a canton, in the diſtrict of Monaco; 20 miles N.E. of Nice. The place contains 2285, and the canton 2285 inhabitants, on a territory of 52½ kiliometres, in 1 commune.

PIGNE, in *Botany*. See PINEA.

PIGNEROLA, or PINEROLA, in *Geography*, a town of France, in the department of the Po, late capital of the province of the Four Vallies in Piedmont, near the Cluſon, the key of Italy, and fortified; 16 miles S.W. of Turin.

PIGNOLETTI, in *Ichthyology*, a name uſed by many for the *aphyæ cobites*, a ſmall fiſh of the gobius or ſea-gudgeon kind, common in the Mediterranean, and brought to the markets of Rome and Venice. See GOBIUS *Minutus*.

PIGNORIA, LORENZO, in *Biography*, a learned antiquary, was born at Padua in 1591. He was brought up among the Jeſuits, and became confeſſor to a nunnery, and pariſh prieſt of St. Lorenzo. A canonry of Treviſo was alſo conferred upon him by cardinal Fr. Barberini. He was in habits of intimacy with many of the moſt illuſtrious men of his time, and collected a valuable library and cabinet of antiquities. He died of the plague in 1631. His works are highly eſteemed; the chief are, "De ſervis et eorum apud Veteres Miniſteriis;" "Menſa Iſiaca," which is an elaborate commentary upon a famous relic, and three Latin letters to the ſenator Domenico Molino. Moreri.

PIGRIN, in *Geography*, a Ruſſian ſettlement, on the W. coaſt of America, in Beering's ſtrait. N. lat. 65° 54′. E. long 191° 40′.

PIGRITIA, in *Zoology*. See BRADYPUS *Tridactylus*.

PIGUS, in *Ichthyology*, the name of a ſpecies of leather-mouthed fiſh, very much approaching to the nature of the carp.

It is of the ſame ſhape and ſize with the common carp, and its eyes, fins, and fleſhy palate wholly the ſame; from the gills to the tail there runs a crooked dotted line; its back and ſides are blueiſh, and its belly reddiſh; it is covered with large ſcales, from the middle of every one of which there riſes a fine, pellucid, and very ſharp prickle.

It is a finer fiſh than the carp for the table, and is in ſeaſon in the months of March and April. It is caught in lakes in ſome parts of Italy, and is mentioned by Pliny, though without a name.

It is a ſpecies of cyprinus, according to Artedi, and is diſtinguiſhed by that author under the name of the cyprinus called *piclo* and *pigus*. He adds, that the tail is forked, and the ſcales large; and that in ſpring and autumn there grow out of them white pyramidal prickles, which remain about five or ſix weeks, and then fall off; the back is of a blackiſh-blue, and the belly white, with a faint caſt of red. It never grows to more than five or ſix pounds; the fleſh is well taſted. It is found in the lakes in the northern nations.

PIGWAKKET, in *Geography*, a town of America, in Maine, which runs into the Saco; 5 miles S. of Pigwakket.—Alſo, a town of America, in Maine; 27 miles N.W. of Portland.

PIHLAIS, a town of Sweden, in the government of Waſa; 83 miles S.E. of Waſa.

PIHTIPUDAS, a town of Sweden, in the government of Waſa; 105 miles E. of Waſa.

PIISKER, in *Ichthyology*, the name of a fiſh of the muſtela kind, uſually called the *muſtela foſſilis*, or *piſcis foſſilis*, the foſſile fiſh. See COBITIS *Foſſilis*.

This ſeems very much of the kind of the fiſgum fiſh, and poſſibly is no other than the ſame ſpecies; and poſſibly alſo the pæcilia of Schonefeldt is the ſame.

PIKE, an offenſive weapon, conſiſting of a ſhaft of wood, twelve or fourteen feet long; headed with a flat-pointed ſteel, called the *ſpear*. The general length fixed for the pike by moſt princes and ſtates was, according to ſir James Turner, in his "Pallas Armata," written in 1670 and 1671, 18 feet; but he obſerves that few exceeded 15.

The name pike is ſaid to be derived from a bird called by the French *pic*, by us wood-pecker; whoſe bill is ſaid to be ſo ſharp as to pierce wood like an auger. Du Cange derives it from the baſe Latin *pica*, or *picca;* which Turnebus ſuppoſes to have been ſo called, *quaſi ſpica*, becauſe reſembling an ear of corn: Octavio Ferraro derives it *à ſpicula*. M. Fauchet ſays, it was the pike that gave name to the Picards, and to Picardy; which he will have to be modern, and to have been framed on occaſion of that people's renewing the uſe of the pike; the etymology whereof he fetches from the French *piquer*, *to prick*. But others will have the name *Picard* to have been given that people by reaſon of their readineſs to pick quarrels; called in French *piques*.

The pike was a long time in uſe in the infantry, to enable them to ſuſtain the attack of the cavalry: but it is now taken from them, and the bayonet, which is fixed to the muzzle of the firelock, is ſubſtituted in its place.

It is ſtill uſed by ſome officers of infantry under the name of ſpontoon.

Pliny ſays, the Lacedæmonians were the inventors of the pike. The Macedonian phalanx was evidently a battalion of pike-men.

Father Daniel ſays, that pikes are not mentioned in the hiſtories of France before the reign of Lewis XI. Pikes were introduced into France by the Switzers. The uſe of the pike was aboliſhed in France by a royal ordonnance, iſſued in the year 1703; and though the exact period when pikes were laid aſide in England has not been aſcertained, it appears by the "Gentleman's Dictionary," publiſhed in 1705, that the alteration of the pike for the muſket muſt have taken place ſome time between the years 1690 and 1705.

PIKE, *Half*, in the *Military Art*, is the weapon carried by an officer of foot. It differs from a pike, becauſe it is but eight or nine feet long, and the ſpear is ſmaller and narrower. See SPONTOON.

PIKE, in *Ichthyology*, a name given by us to the fiſh called by authors the *lucius* and *eſox*, and by the old Greek writers *oxyrinchus*. See ESOX *Lucius*.

It is ſaid, that the pike was introduced into England in the reign of Henry VIII. in 1537, when a pike was ſold for double the price of a houſe-lamb in February. Beſides fiſh and frogs, which are its uſual food, it will devour the water-rat and young ducks. It is very fierce and voracious. This fiſh is very remarkable for its longevity: we read of one that was ninety years old, and of another, that was not leſs than 267 years old. See *Feeding of* FISH, *Pike*-FISHING, and HUXING.

PIKE, *Land*. See LUCIUS *Terreſtris*.

PIKE-*Pearch*. See LUCIO-*perca*.

PIKE, *Sea*. See MERLUCIUS and SUDIS.

PIKE, a provincial word ſignifying a ſort of ſtacklet or load cock of hay, &c.

PIKE, a name given in ſome counties to a prong, or what is generally called a fork, uſed for carrying ſtraw, &c. from the barn, cocking of hay, &c.

PIKE, a term in the midland diſtricts ſignifying to glean.

Pike-*fork*, a fork of the ſame kind. It is ſometimes written *pitch-fork*. See Pitch-*fork*.

Pike, in *Commerce*. To treat at the pike, or pike's end, *à la pique*, denotes a kind of commerce, which the Europeans hold with ſavage nations, wherein they are to keep on their guard, and, as it were, ſword in hand.

Treating at the pike alſo denotes a kind of prohibited traffic which the Engliſh, French, and Dutch, maintain in ſeveral parts in the Spaniſh Weſt Indies, near the colonies which thoſe nations have in the Caribbee iſlands.

Perhaps it ſhould rather be called *treating at pike*, *i. e.* with the veſſel at anchor; in regard this commerce, which is prohibited on pain of death, is only practiſed in roads where veſſels lie at anchor, waiting for the Spaniſh merchants, who ſometimes by ſtealth, though more frequently with the connivance of the governors, &c. come to exchange their gold, pieces of eight, cochineal, &c. for the European merchandizes.

Others will have it treating at the pike, *i. e.* at a *pike's length*, or *diſtance;* by reaſon of the diſtance ſtrangers are obliged to keep at.

PIKELAND, in *Geography*, a town of America, in Pennſylvania and county of Cheſter, containing 1001 inhabitants.

PIKE-RUN, a townſhip of America, in Cheſter county, Pennſylvania, containing 1693 inhabitants.

PIKESWARI, in *Mythology*, a name of the Hindoo goddeſs Parvati, conſort of Mahadeva or Siva. The name is derived from the bird pika, of the cuckoo tribe, into which, in one of the extravagant fables of the Puranas, Parvati was metamorphoſed, in conſequence of an anathema denounced againſt her by her offended lord. Parvati, it is related, had become incarnated in the perſon of a daughter of Dakſha, for the purpoſe of aſſociating with her lord in one of his avataras, or deſcents. She was on this occaſion named Sati, or the pure. (See Sati.) On ſome grand occaſion Dakſha, performing a ſolemn ſacrifice, invited all the gods except his ſon-in-law, which ſo enraged his daughter that ſhe flung herſelf into the ſacrificial fire, thereby defiling and hindering the ſacrifice. Siva, in his rage at ſo great an offence, curſed her, and ſhe was doomed in conſequence to a tranſmigration of a thouſand years into the degraded form above-mentioned. To appeaſe her, however, Siva aſſumed the form of the male bird, and accompanied her. Under this form he is called Pikeſwara.

This outline of the tale is very ridiculous; but ſome learned and ingenious men have diſcovered in its details and accompaniments, which are numerous and complicated, and frequently adverted to in Hindoo books, a correſpondence with ſeveral of the relations of our ſacred writings. In the violent death of Dakſha, that of Abel is thought to have been kept in view. Others find him connected with the hiſtory of Noah. Others, again, think Dakſha bears a ſtrong reſemblance to Atlas. In the 2d, 5th, 6th, and 8th vols. of the Aſiat. Reſ. theſe ſpeculations are purſued; but it is not neceſſary to introduce the reſults in this place. As an aſtronomical character, Dakſha's name occurs under the articles Kasyapa, Nakshatra, and Rishi of this work.

PILA. See Pile.

Pila, *Pier*, in *Building*, a maſs of maſon's work, in manner of a pillar; uſually hexagonal. See Pier.

The word comes from the Latin *pila*, uſed in the ſame ſenſe by Vitruvius; and this, probably, from πιλοω, *cogo*, *coarcto*.

Evelyn obſerves, that pilæ and their quadras, as we ſee them in ancient altars and monuments, were uſed for inſcriptions; but the ſhorter and more maſſy ſerved for arches and buttreſſes to ſolid work. They are ſometimes made ſemicircular; but the ancients preferred thoſe pointed at right angles, as beſt able to reſiſt the current.

Pila *Marina*, the *ſea-ball*, in *Natural Hiſtory*, the name of a ſubſtance very common on the ſhores of the Mediterranean and in ſome other places. It is uſually found in form of a ball, about the ſize of the balls of horſe-dung, and compoſed of a multitude of fibrillæ, irregularly complicated.

Its origin has been very variouſly gueſſed at by different authors. John Bauhin ſays, that it conſiſts of ſmall hairy fibres, and ſtraws, ſuch as are found about the ſea-plant called *alga vitriariorum;* but he does not pretend to aſcertain what plant it owes its origin to. Imperatus judged it to conſiſt of the exuviæ both of vegetable and animal bodies. Mercatus doubts whether it be a congeries of the fibrillæ of plants, wound up into a ball by the motion of the ſea-water; or whether it be not the workmanſhip of ſome ſort of beetle living about the ſea-ſhore, and analogous to our common dung-beetles ball, which it elaborates from dung for the reception of its progeny. Schreckius will have it compoſed of the filaments of ſome plant of the reed kind: and Welchius ſuppoſes it compoſed of the pappoſe part of the flowers of the reed. Maurice Hoffmann thinks it the excrement of the hippopotamus: and others think it that of the phoca, or ſea-calf.

But Klein, who had thoroughly examined as well the bodies themſelves, as what authors had conjectured concerning them, is of opinion, that they are only owing to, and entirely compoſed of, the capillaments which the leaves growing to the woody ſtalk of the *alga vitriariorum* have, when they wither and decay. Theſe leaves, in their natural ſtate, are about the thickneſs of a wheat ſtraw, and they are placed ſo thick about the tops and extremities of the ſtalks, that they enfold, embrace, and lie over one another; and from the middle of theſe cluſters of leaves, and, indeed, from the woody ſubſtance of the plant itſelf, there ariſe ſeveral other very long, flat, ſmooth, and brittle leaves: theſe are uſually four from each tuft of the other leaves, and they have ever a common vagina, which is membranaceous and very thin. This is the ſtyle of the plant, and the *pila marina* ſeems a cluſter of the fibres of the leaves of this plant, which cover the whole ſtalk, divided into their conſtituent fibres; and by the motion of the waves, firſt broken and worn into ſhort ſhreds, and afterwards wound up together into a roundiſh or longiſh ball. Klein, de Tabul. Marin. p. 22.

PILAR, El, in *Geography*, a town of New Granada; 29 miles E.N.E. of Tunja.

PILARETI, a town of Georgia, in the province of Carduel; 54 miles S.S.W. of Teflis.

PILARIS, or Pilaris *Turdus*, in *Ornithology*, the name by which authors in general call the field-fare. See Turdus *Pilaris*.

PILASTER, in *Architecture*, a ſquare column, ſometimes inſulated, but more frequently let within a wall, and only projecting with a fourth or fifth part of its thickneſs.

The pilaſter is different in different orders; it borrows the name of each order, and has the ſame proportions, and the ſame capitals, members, and ornaments with the columns themſelves.

The pilaſters in the Attic order are ſometimes at equal diſtances, and ſometimes coupled; but this depends on the intercolumniation of the order below. If the Attic order is ſtraight, and immediately over it, it muſt partake of the ſame diſtances, and ſtand over the column in the lower order.

Pilaſters are made uſually without either ſwelling or diminution, as broad at top as at the bottom; though ſome of the modern architects, as M. Manſard, &c. diminiſh them at top, and even make them ſwell in the middle, like columns; particularly when placed behind columns.

Pilaſters, M. Perrault obſerves, like columns, become of different kinds, according to the different manner in which they are applied to the wall. Some are wholly detached, called by Vitruvius *paraſtatæ;* others have three faces clear out of the wall; and others two; and others only one: theſe are all called by Vitruvius *antæ*.

Inſulate pilaſters are but rarely found in the antique. The chief uſe they made of pilaſters was at the extremities of porticoes, to give the greater ſtrength to the corners.

There are four principal things to be regarded in pilaſters; *viz.* their projecture out of the wall, the diminution, the diſpoſition of the entablature when it happens to be common to them and to a column, and their flutings and capitals.

1. The projecture of pilaſters, which have only one face out of the wall, is to be one-eighth of their breadth; at moſt, not above one-ſixth. When they receive impoſts againſt their ſides, their projecture may be a quarter of their diameter.

They are made to project in different proportions to their diameters, as one-eighth, one-fourth, one-half, and three-fourths; but are never uſed gracefully quite a ſquare, except at angles; and then only in maſſive buildings, as the portico of St. Paul's Covent Garden.

2. Pilaſters are but ſeldom diminiſhed, when they have only one face out of the wall. Indeed where they ſtand in the ſame line with columns, and the entablature is continued over both, without any break, the pilaſters are to have the ſame diminution with the columns; that is to ſay, on the face reſpecting the column; the ſides being left without any diminution.

When they are diminiſhed, they have an ill effect: where it becomes neceſſary to make them correſpond with the lines of the columns at top, as is ſometimes the caſe in porticoes and returns, then it is better for the architect to make them entirely of the ſmalleſt diameter of the column to which they are oppoſed.

3. Pilaſters are ſometimes fluted, though the columns they accompany be not ſo; and, on the other hand, the columns are ſometimes fluted, when the pilaſters that accompany them are not.

The flutings of pilaſters are always odd in number, except in half pilaſters, meeting at inward angles; where four flutings are made for three, &c.

4. The proportions of the capitals of pilaſters are the ſame as to height with thoſe of columns, but they differ in width, the leaves of the former being much wider; becauſe pilaſters, though of equal extent, have only the ſame number of leaves for their girt, *viz.* eight. Their uſual diſpoſition is to have two in each face in the lower row, and in the upper row one in the middle, and two halves in the angles, in the turns whereof they meet. Add to this, that the rim of the vaſe, or tambour, is not ſtraight, as the lower part is, but a little circular, and prominent in the middle.

In pilaſters that ſupport arches, the proportions, Palladio ſhews, muſt be regulated by the light they let in; and at angles, by the weight they are to ſuſtain. For which reaſon, ſays ſir Henry Wotton, a ruſtic ſuperficies beſt becomes them.

Pilaster, *Demi*, called alſo *membretto*, is a pilaſter that bears up an arch: it generally ſtands againſt a pier or column.

Pilasters, in *Ship-building*, flat columns as ornaments, made of deal, are fluted or reeded, with moulded caps and baſes, and are placed in the middle of the munions, which parts the lights of the ſtern and quarter-galleries; alſo on the munions of the bulkheads of the captain's-cabin, &c.

PILATE, Pontius, in *Biography*, governor and procurator of Judea, which office he occupied in the 15th year of the reign of Tiberius Cæſar (Luke, iii. 1, 2.), that is, the 15th year of Tiberius's proconſular empire, or the 12th of his ſole empire, A.U. 778, A.D. 25; on the ſuppoſition that Tiberius's proconſular empire began about three years before Auguſtus died, on the 28th of Auguſt, A.U. 764, A.D. 11; or, ſuppoſing the commencement of the proconſular empire to have taken place about two years before the death of Auguſtus, in A.U. 765, A.D. 12, the 15th of the reign of Tiberius began in A.U. 779, A.D. 26. He continued in office ten years, or till after the crucifixion of Jeſus at the paſſover of the 15th of Tiberius's ſole empire, when the two Gemini were conſuls of Rome, A.D. 29; in which he concurred, as he, like the other governors of provinces, is ſuppoſed to have had the power of life and death in Judea. But in the exerciſe of his government he had provoked the Jews, by dedicating ſhields at Jeruſalem; and his general conduct had been ſo corrupt and oppreſſive, that he feared leſt they ſhould ſend an embaſſy to Rome, and diſcover to the emperor Tiberius, whoſe will it was that none of their laws and cuſtoms ſhould be violated, the many crimes of his adminiſtration, his taking of bribes, his extortions, his murders of innocent and uncondemned perſons, and other cruelties with which he was chargeable. Accordingly, after having ſpent ten years in Judea, he was commanded by Vitellius, preſident of Syria, in conſequence of complaints preferred againſt him by the ſenate of the Samaritans, to go to Rome, in order to anſwer to the emperor for thoſe things of which he was accuſed by the Jews; Marcellus, the friend of Vitellius, ſuperſeding him in his adminiſtration. As he durſt not refuſe compliance with the orders of Vitellius, he haſtened away to Rome; but before he arrived, Tiberius was dead. Joſephus ſays, that Pilate ſpent ten years in Judea, and therefore he muſt have come thither about October, A.D. 25, or at leaſt before the paſſover, A.D. 26, in the 12th year of Tiberius's ſole empire; which 12th year began the 19th of Auguſt, A.D. 25. And as he was removed before the paſſover, A.D. 36, and probably about five or ſix months before it, *i. e.* about September or October, A.D. 35, about 1½ year before the death of Tiberius, many circumſtances concurred to occaſion the delay of his appearing before the emperor, to anſwer the complaints alleged againſt him, and to reconcile this delay with the account given by Joſephus of his haſtening to Rome, &c. Euſebius aſſures us (Chron. p. 75.), that ſoon after being deprived of his government, he made away with himſelf, out of vexation for his many misfortunes. Lardner's Works, vol. i.

Pilate, in *Geography*, a town of the iſland of Hiſpaniola; 30 miles S.S.E. of Port Paix..

PILATIA Pass, a mountainous road in Hindooſtan, leading from the Carnatic into the circar of Cuddapa; 17 miles S. of Udegherri.

PILATIO, a word uſed by the ancients to expreſs a minute fiſſure in the cranium, when not larger than a ſingle hair of the head.

PILATRO, or Pilatro *di Levante*, a ſalt uſed in the glaſs trade, in ſome particular caſes. It is extracted from the froth of the ſea, coagulated by heat in the hot countries.

PILAYA, in *Geography*, a town of Peru, in the juriſdiction of Pilaya and Paſpaya, under the viceroyalty of Buenos Ayres; 50 miles S. of La Plata.

PILCHARD, in *Ichthyology*, a fiſh much approaching to the nature of the common herring, but ſmaller, and differing in ſeveral other particulars. It is a ſpecies of CLUPEA ; which ſee.

The diſtinguiſhing characters of it are theſe : the body of the pilchard is leſs compreſſed than that of the herring, being thicker and rounder ; the noſe is ſhorter in proportion, and turns up ; the under jaw is ſhorter ; the back is more elevated ; the belly leſs ſharp ; the dorſal fin of the pilchard is placed exactly in the centre of gravity, ſo that when taken up by it, the body preſerves an equilibrium, whereas that of the herring dips at the head ; the ſcales of the pilchard adhere very cloſely, whereas thoſe of the herring very eaſily drop off. Pennant.

It is generally found ſwimming in vaſt ſhoals, and is caught in many parts of the Engliſh ſhores. Its fleſh is better taſted than that of the herring. See *Pilchard* FISHERY.

PILCHOWITZ, in *Geography*, a town of Sileſia, in the principality of Oppeln ; 36 miles S.E. of Oppeln. N. lat. 50° 10′. E. long. 18° 30′.

PILCO MAYO, a town of Peru ; 25 miles N.E. of Potoſi.—Alſo, a river of South America, which, after a ſouth-eaſt courſe of about 600 miles, runs into the Parana, by two mouths, between S. lat. 25° 40′ and 26° 20′.

PILE, in *Antiquity*, a pyramid built of wood, whereon were laid the bodies of the deceaſed, to be burnt.

PILES, in *Hydraulic Architecture*, are beams of timber, or ſtakes of wood, driven firmly into the ground, for various purpoſes ; as, for forming a firſt foundation for buildings, piers of bridges, &c. ; in which caſes they are driven quite down into the ground, or are cut off level with its ſurface, with a view of obtaining a ſolid bearing for the weight of the ſtructure which is to be raiſed.

Amſterdam, and ſome other cities, are wholly built upon piles. The ſtoppage of the breach in the banks of the Thames at Dagenham, was effected by dove-tail piles ; that is, by piles mortiſed into one another by a dove-tail joint.

Piles are not employed for foundations unleſs the ground is ſuſpected to be unſound, or when the weight to be borne is exceedingly great. They act to make the foundation ſolid, by reaching deep into the earth, down to a more ſubſtantial ſtratum than that of the ſurface. Indeed, the manner of fixing the piles, by driving them by repeated blows of a powerful machine till they will go no farther, enſures that they come to a good bearing. There are inſtances of piles being driven down twenty-five feet, before they were thought ſufficiently firm.

Piles are alſo uſed for making the faces of wharfs, banks of rivers, piers for the ſea, &c. For theſe purpoſes they are driven in rows, but only a ſufficient depth in the earth to make them ſtand firm, and ſupport the planking or framing which is fixed againſt them. Theſe piles are uſually driven rather in an inclined poſition. For temporary defence againſt the water, in laying the foundation of bridges, &c. piles are always required. They are employed in different ways to form an encloſure, or water-tight wall, called a coffer-dam, round the area where the work is to be laid, and from which ſpace the water is drawn by pumps. This is the moſt difficult of all kinds of piling ; becauſe it muſt ſtand a great height above the ground, have ſufficient ſtrength to reſiſt the preſſure of water, and be perfectly cloſe and tight. In navigable rivers detached piles are driven, and very firmly fixed, to mark the encloſures where barges are to lay, and to fender off others from them, as well as to moor them to.

Piles are in general formed of a ſquare timber, tapering if the tree happens to be ſo, cut to a ſharp point at one end, and ſhod with iron to enter the ground. The other end was bound by a ſtrong iron hoop, to prevent the pile head ſplitting by the violence of the blows which drive it down. When they are to be driven quite below ground, ſmall trees, if ſufficiently ſtraight, may be uſed without ſquaring; but for coffer-dams ſquare piles are always uſed, except that for filling up a row between ſuch ſquare piles. When they are to touch each other, flat ones, called pile planks, are uſed ; they are three or four inches thick, according to the depth of water, and have grooves formed in their adjacent edges, to receive tongues or ſlips of wood, which make the joints quite tight. To encloſe an area for a coffer-dam, two rows or walls of piles are uſually driven one within the other, at a diſtance uſually equal to the depth of water they are driven in, or if the current is rapid, once and a half. The ſpace between theſe is filled with clay, ſo as to form a mound or rampart of clay, defended on the outſide and inſide by wooden walls of piles. To make theſe walls, large ſquare piles are firſt driven at a diſtance of ten or twelve feet aſunder, in the line of the intended range of the dam ; horizontal tye beams are then extended from one pile to the next, on the inſide, each tye being notched into the piles, ſo that its outer edge is in a line with the inſide of the groove for the plank piles, which are to be driven down to fill up the ſpaces between the piles, and will be guided by theſe tyes to ſtand exactly vertical, and in a ſtraight line. The firſt plank piles are begun to be fixed adjacent to the main piles, and thus they proceed from both ends of the ſpace between the piles, till the planks meet in the centre, where the laſt plank is inſerted, and being formed rather wedge-like, makes all the reſt tight. The pile planks are cut inclined, or wedge-like on one ſide only, to form the point, by which means the point is the line of one of the edges of the plank. When a plank pile is to be driven adjacent to another, this edge is applied to the one already fixed, and then as it is driven, the inclined or wedge-like edge entering the ground, cauſes the pile to approach, and preſs very cloſe to its neighbour, and it is chiefly by this means they are made to fit water-tight. The fillets are made by ſpiking a ledge or ruler of wood faſt upon the edge of one plank, and a groove of correſponding depth and width is ploughed in the edge of the adjacent plank to receive it. Many different machines are uſed to drive piles into the ground ; ſome of them are worked by a great number of men, who raiſe a heavy weight a ſmall height, and let it fall upon the pile, till, by reiterated blows, they drive it to the required depth. The machine employed is extremely ſimple. A long thick plank of wood is fixed up cloſe to the pile, having a mortiſe through the upper end, in which a pulley is fitted ; a rope goes over this to ſuſpend the rammer, which is a large block of hard wood, properly hooped, to prevent it from ſplitting. In riſing and falling, it ſlides againſt the face of the plank, and is guided by irons, which are fixed to the ram, and are bent round the edges of the plank in the manner of hooks. The plank, when placed upright, is ſecured by guy ropes, in the manner of the maſt of a ſhip ; the end of the great rope which ſuſpends the ram, has ten or twelve ſmall ropes ſpliced into it, for as many men to take hold, and work it by ; they raiſe the ram up two or three feet by pulling the ropes all together, and then letting them go, the ram falls upon the pile head. When the pile becomes firm enough to cauſe the ram to rebound, they take care to pull the ropes inſtantly after the blow, that they may avail themſelves of the leap it makes.

This is the ſimpleſt form of the machine. Others, inſtead of a plank, have two upright beams attached together, at ſuch a diſtance aſunder, as to leave an opening between them, for the reception of a piece of wood which is affixed to the ram, and by this means it is guided. Inſtead of guy ropes, theſe are uſually fixed upon a baſe, conſiſting of a triangular frame, upon one angle of which the uprights are erected; and from the other two angles, braces ariſe, which are ſo inclined as to reach the uprights at half or two-thirds of their height to ſteady them. This plan is very convenient for driving piles in corners; but for driving rows, it is more advantageous to have the uprights fixed at the middle of one ſide of the triangular baſe, and have ſtays from all the three angles. A machine of this kind, with a ram of beech four feet long and one foot ſquare, may be worked by ten or twelve men, at the rate of twenty-four blows *per* minute, and fixes the pile very quickly.

To eſtimate the force of the rammer made uſe of to drive piles, its weight ought to be multiplied into the velocity it acquires in falling. Thus, if a rammer which weighs 500lb. be let fall from four feet, it will fall that height in half a ſecond, and have at the time of percuſſion a velocity capable to carry it uniformly eight feet in half a ſecond, without any farther help from gravity; ſo that we muſt multiply 500 by 16, or its weight by the number of feet it would fall in a ſecond, and the product 8000 gives the momentum of the ſtroke. If a capſtan, pullies, or windlaſs, be made to raiſe the rammer to a conſiderable height, and then, by an eaſy contrivance, looſen it at once from its hook, the momentum of the ſtroke will always be as the ſquare root of the height from which the rammer fell.

Notwithſtanding the momentum, or force of a body in motion, is as the weight multiplied by the velocity, or ſimply as its velocity, when the weight is given or conſtant; yet the effect of the blow will be nearly as the ſquare of that velocity; the effect being the quantity the pile is driven into the ground by the ſtroke. For the force of the blow, which is transferred to the pile, being deſtroyed in ſome certain definite time by the friction of the part which is within the earth, which is nearly a conſtant quantity, and the ſpaces in conſtant forces being as the ſquares of the velocities; therefore, the effects which are thoſe ſpaces ſunk, are nearly as the ſquare of the velocities, or, which is the ſame thing, nearly as the heights fallen by the ram or hammer to the head of the pile. See upon this ſubject Leopold, Belidor, alſo Deſaguliers's Exper. Philoſ. vol. i. p. 336, and vol. ii. p. 417, and Philoſ. Tranſ. 1779, p. 120.

For large works, ſuch as bridges, &c., the piles are driven by a different kind of machine: this has a very heavy iron ram, with mechanical powers, by which it is raiſed to a conſiderable height, and then let fall, inſtead of continually repeating ſmall blows. Theſe are ſometimes worked by horſes, or ſteam-engines: ſee elevations of one, in *figs.* 1. and 2, *Plate* XXXV. *Mechanics.* A, A, are the uprights, erected on the frame B, and ſupported by the braces C; they are connected by the croſs feet *a* at bottom, and the piece D at top; in this the pulley *b* for the rope *d* is fitted. Fillets of iron are fixed withinſide the uprights A, A, and enter grooves made in the edges of the great iron ram E, which is thereby guided as it riſes and falls: F is a piece, called the follower, (ſee *figs.* 3 and 4.); it is a wooden block, ſliding between the uprights, and mortiſed to receive the iron tongs *e*, which take hold of an eye upon the top of the caſt iron ram: the rope is attached to the follower by an iron loop *f*, through which the centre pin of the tongs paſſes. On the baſe, *a* B, of the machine an iron frame is bolted, to contain the windlaſs G, on which the rope *d* winds. On the end of the windlaſs a cog-wheel, *g*, is fixed, and a pinion upon the axis, *h*, engages its teeth. Motion is given to the ſpindle *h* by the winches *k*, fixed on each end of it, and the fly-wheel, *l*, regulates its motion, when turned by two men at each handle. The pile is of courſe included in the ſpace between the two uprights, A, A, before it is driven down; and the ram, being engaged by the tongs *e*, is drawn up by turning the handle, *k*, till the tails, *n*, of the tongs come to the inclined planes *m*, *fig.* 1: by theſe they are cloſed together, which opens the lower ends, diſengages them from the eye of the ram, and it falls upon the head of the pile immediately. The men at the handles ſhift the ſpindle *h* endways, which diſunites the pinion from the wheel, and then the weight of the follower, F, runs back the windlaſs G, and deſcends till its tongs take hold of the ram, ready to take it up again. The inclined planes, *m*, are not fixed to the uprights A, A, but are connected together by pieces of wood, which embrace the uprights, and theſe have holes through them to receive iron bolts, which alſo paſs through the uprights. By this means the inclined planes can be ſhifted, to ſet them at any required height, that they may, by diſcharging the ram at the proper height, give a blow proportioned to the pile which is to be driven by it. The tongs are ſometimes made with rollers in the ends *n*, *n*, as ſhewn in *fig.* 12, that they may act more eaſily in the inclined planes. Other machines have a kind of latch, ſhewn in *fig.* 11, inſtead of the tongs; in this *f* repreſents the iron loop for the rope; the centre pin of it paſſes through the latch *r s t*, which catches the eye of the ram by the hook *t*, and is diſcharged by the line *r*, when the men ſnatch it. The weight *s* is to cauſe the hook to catch; the loop *f* is attached to a wooden follower, which guides it between the uprights.

Machines of this kind are frequently actuated by ſteam-engines. A pulley, which is fixed on the end of the ſpindle *h*, in place of the handle *k*, receives an endleſs rope from ſome wheel put in motion by the engine; one man then attends it, to throw the ſpindle endways at the proper time, to permit the deſcent of the follower; but we have ſeen one in which levers, and a connecting rod from the inclined plane, *m*, were uſed to diſengage the ſpindle the moment after the follower diſcharges the ram; by adopting theſe means much expence of labour would be ſaved, as the ſame ſteam-engine which is afterwards to be employed in pumping out the water of the coffer-dams, would drive the piles for them and the foundations.

The piles of the works of Weſtminſter-bridge, whilſt it was building, were driven by a horſe-machine invented by Mr. Valoue. A pair of the uprights, ſuch as repreſented at *figs.* 1 and 2, but thirty feet high, were erected at one end of a frame, which ſupported a vertical ſhaft, turned round by the horſes, and the framing was of courſe large enough to admit a circular walk of ſufficient ſize for them to work in, when they drew the ends of arms or levers projecting from the vertical ſhaft. The whole was erected upon a platform, which was built over a barge in the manner of a deck. The vertical ſhaft had a wheel or drum upon it, to wind up the rope of the follower, and it was in the conſtruction of this part that the invention lay. A ſection of the upper part of the vertical ſhaft and drum is given in *fig.* 8, and a plan in *fig.* 9. Here A is the great upright ſhaft, or axle, turned by the horſes attached to the levers, which are not ſhewn. The cog-wheel, B, turns the pinion X, having a fly, O, at the top to regulate the motion, and to act againſt the horſes, and keep them from falling, when the heavy ram is diſengaged to drive the pile down into the earth in the bottom of the river. The drum, C, is looſe upon the axle of the ſhaft A, but is locked to the wheel, B, by the bolt Y. On this drum the great rope, H, is wound, one end of it being fixed to the drum, and the other to the follower, paſſing over proper pulleys. In the follower are contained the tongs, which take hold of the ram, by the ſtaple for drawing it up, in the ſame manner as deſcribed in *fig.* 2;

D is a ſpiral, or fuſee fixed to the drum C, on which winds the ſmall rope T: it goes over a pulley, and has a ſmall counterpoiſe hung to the end of it, which hinders the follower from accelerating as it goes down to take hold of the ram; for as the follower tends to acquire velocity in its deſcent, the line, T, winds downwards upon the fuſee on a larger and larger radius, by which means the counterpoiſe acts ſtronger and ſtronger againſt it; and ſo allows it to come down with only a moderate and uniform velocity. The bolt, Y, locks the drum to the great wheel, being puſhed upwards by the ſmall lever 3, which paſſes through a mortiſe on the ſhaft A, and turns upon a pin; the lower end of the bolt is guided by paſſing through a piece of wood, 6, fixed into the great ſhaft, and the upper paſſes through an arm of the wheel; the lever, 3, has a weight, 4, which always tends to puſh up the bolt, Y, through the wheel into the drum; G L is the great lever, turning on the centre *m*, and reſting its end, G, upon the forcing bar 5, which goes down through a hollow in the ſhaft A, and bears upon the little lever 3. The other end of the lever, L, is long enough to reach to the uprights, and has there a ſmall rope, extended from the end of it up to the inclined planes, ſo that the follower, when drawn up to the higheſt, draws this rope, and raiſes the long end, L, of the lever, depreſſing the other, and the forcing bar 5. By the horſes going round, the great rope, H, is wound about the drum C, and the ram is drawn up by the tongs in the follower, till they come between the inclined planes, which, by ſhutting the tongs at the top, open them below, and ſo diſcharge the ram, which falls down between the uprights upon the pile, and drives it by a few ſtrokes as far into the ground as it can go, or as is deſired; after which the top part is ſawed off cloſe to the mud, by an engine for that purpoſe. Immediately after the ram is diſcharged, a piece upon the follower takes hold of the rope, which raiſes the end, L, of the lever L G, and cauſe its end, G, to deſcend, and preſs down the forcing-bar, 5, upon the little lever, 3, which by drawing down the bolt Y, unlocks the drum, C, from the great wheel B; and then the follower being at liberty, comes down by its own weight to the ram; and the lower ends of the tongs ſlip over the eye of the ram, the weight of their heads cauſing them to fall outwards, and faſten upon it; then the weight, 4, puſhes up the bolt, Y, into the drum, which locks it to the great wheel, and ſo the ram is drawn up as before.

As the follower comes down, it cauſes the drum, C, to turn backward, and unwinds the rope from it, while the horſes, the great wheel, pinion X, and fly, go on with an uninterrupted motion; and as the drum is turning backward, the counterpoiſe is drawn up by its rope, T, winding upon the ſpiral fuſee D.

There are ſeveral holes in the under ſide of the drum, and the bolt, Y, always takes the firſt one that it finds, when the drum ſtops by the falling of the follower upon the ram, till which ſtoppage the bolt has not time to ſlip into any of the holes. But the ſame effect is more certainly produced by a crooked lever, *t*, *fig.* 9, fixed on the framing R, over the end of the vertical ſhaft; one end of this has a roller, which is preſſed upon by the great rope, H, the other end holds down the catch, 5, of the forcing-bar, but as ſoon as the great rope ſlackens, it retires, and gives liberty to the ſmall lever, 3, to puſh up the bolt. As long as the great rope has a tenſion upon it, to ſupport the weight of the ram or follower, the crooked lever is kept in cloſe contact with the forcing-bar, and when that is depreſſed, (to diſcharge the bolt Y,) by locking over its catch, 5, the crooked lever keeps it down, till the follower touches the ram; the great rope then ſlackens, and the ſpring, *v* H, diſcharges the crooked lever from the catch of the forcing bar, and gives liberty to the ſmall lever, 4, to puſh up the great bolt, and to lock the drum to the great wheel, and the ram is drawn up again as before.

The peculiar advantages of this engine are, that the weight of the ram, or hammer, may be raiſed with the force of horſes inſtead of men; that when it is raiſed to a proper height, it readily diſengages itſelf, and falls with the utmoſt freedom; that the forceps or tongs are lowered down ſpeedily, and inſtantly of themſelves again lay hold of the ram, and lift it up; on which account this machine will drive the greateſt number of piles in the leaſt time, and with the feweſt labourers.

The piles at Weſtminſter bridge, when driven by the above machine till they were quite firm, were cut off, under water, by a machine, to be level with the ſurface of the ground to found the piers upon. This machine conſiſted of a framing which was adapted to fit upon the upper part of the pile, and could be fixed faſt thereto. The lower part of this frame formed guides for the ſaw, which reciprocated horizontally at a certain depth beneath the top of the pile, and had weights to cauſe it to advance up to the cut. The ſaw was put in motion by ropes from each end, which were conducted, over proper pullies, to two men ſtanding on a float or raft at the ſurface. After fixing the machine, before the ſawing was begun, the whole machine was ſuſpended by a tackle, which therefore took up the top part of the pile with the machine as ſoon as it was cut off. This was the invention of Mr. Etheridge, carpenter to the works at Weſtminſter bridge; it was very effective, as the time employed in cutting off a fir pile of 14 or 16 inches ſquare, in ten feet depth of water, was ſeldom more, and often leſs, than a minute and a half. A machine, more convenient than this in its application, and not leſs effective, has been ſince invented by Mr. Foulds, to whom the Society of Arts preſented a gold medal for the invention; ſee *figs.* 5 and 7. A A B is the external frame, conſiſting of four parallel rails A, framed into two others, B, at right angles, with proper croſs pieces to unite them, and inclined to ſtrengthen the whole; within this frame a ſecond, or internal frame, D E, is ſituated; like the other, it has four parallel pieces, D and E, connected together into one frame by croſs pieces; at the top it has two pieces *a*, *a*, which reſt upon the beam B, and ſuſpend its weight, and on theſe it is capable of ſliding backwards and forwards between B B, always preſerving its paralleliſm, becauſe it is moved by the racks, *d*, *d*, affixed to it, one at top, and the other at the bottom; the pinions for both are fixed on a vertical axis *e*, ſupported in the external frame; therefore, by turning the handle *r*, the internal frame with the ſaw is advanced to the pile, as at K, *fig.* 6. The ſaw itſelf is ſuſtained in a frame L, *fig.* 7, which fits, in the manner of a ſaſh frame, between the two beams, D, of the internal frame, and has racks, *f*, *f*, (dotted) behind it, which work in pinions on an axis *g*, extended acroſs the frame, and by the handle, *y*, of this it is capable of being drawn up and let down, or detained at any height by a ratchet-wheel and click *x*; the ſaw, *m*, is fixed upon a ſpindle N, ſupported in bearings on the frame L, and turned by the handle, R, at the top; the ſaw is connected with the ſpindle by a piece of iron *p*, having a mortiſe through it for the reception of the ſpindle, to which it is faſtened by a nut beneath: by this means the ſaw's edge may be advanced as the work goes on.

In uſing this machine, the beams, B, are fixed acroſs a barge, which is ballaſted till they are horizontal, and the ſpindle of the ſaw is therefore vertical in this ſtate; it is moored with her ſide againſt the pile, K, to be cut off, as ſhewn by the dotted line V, *fig.* 6; then by the rack and pinion *f g*, the ſaw is adjuſted in height to the level where the pile is to be cut; by the handle *r* it is advanced to the pile K, whilſt by the other handle, R, the ſaw is kept in continual motion backwards and forwards, till the pile is cut through, and the piece is taken into the barge, which proceeds to cut off the next by the ſame means. By this machine temporary piles, which are uſed in coffer-dams, may be cut off level with the bottom, when the work is finiſhed, which is a very ſuperior method to drawing them up out of the ground, as is the uſual practice, becauſe this muſt neceſſarily make a deep ditch or trench all round the pier or foundation, and tend to looſen the ground. To draw piles out of the ground when they have been driven faſt, requires a very great force. There are different methods of exerting this force: one for drawing them in water, is by having a very ſtrong barge, with a windlaſs at one end to receive a ſtrong chain, which is paſſed ſeveral times round the head of the pile, and made faſt to the barge; two long beams are laid upon the barge to form a railway for a ſmall waggon to run upon from one end of the barge to the other, and it is loaded with ſtones of ſeveral tons weight; when this is wheeled to one end of the barge, it will of courſe depreſs it in the water, elevating the other; then, in this ſtate, the loweſt end of the barge is chained to the pile by putting a very large bolt through it, and paſſing a chain round the pile under this bolt a great many times; the carriage is then wheeled to the other end of the barge by a windlaſs and rope; this tends to raiſe the end to which the pile is fixed; and when the carriage is ſo far advanced that it exerts a ſufficient power, it will draw up the pile if the chain is properly fixed: the carriage is now returned to draw another pile.

A plan has been adopted at the new bridge now building acroſs the Thames at the Strand, for drawing the uſeleſs piles by one of Mr. Bramah's hydroſtatic cylinders. This is repreſented in *fig.* 10, where A is ſuppoſed to be the top of a range of piles forming the coffer-dam, and B the pile which is to be drawn. A chain, *a*, is made faſt to the pile, and carried many times round a large beam C D, the end, D, of which reſts upon a fulcrum, or ſupport E, conſiſting of a block, ſupported on the head of a neighbouring pile, &c. F is a block of wood, ſcrewed together in two places, and incloſing between them a caſt iron cylinder *b*, into which is fitted the piſton, or cylinder *d*, the joining being made tight by a collar of leather; *e* is a ſmall copper pipe, communicating with the cylinder, and alſo with a ſmall forcing pump, the piſton, *f*, of which, is actuated by the lever *g h*; the pump is fixed upon the top of a ſmall ciſtern, *k*, to contain water. Now by working the lever of the pump, water is injected into the cylinder *b*, and protrudes the piſton, *d*, from it with a force proportioned to the force exerted upon the lever, in the ſame degree as the areas of the pump to that of the cylinder multiplied by the proportions of the lever *h*. (See this principle more fully illuſtrated under MACHINERY, and PRESS, *Hydroſtatic*.) By this means the power of one or two men is increaſed to ſuch a degree, as to draw up the largeſt pile; the copper pipe, *e*, is made to unſcrew at ſeveral joints, which are provided with leather, to make them tight; by this means the pump is ſeparated when the machine is to be removed. As it has no connection with the beam or lever D, the cylinder is frequently employed in the manner of a hand jack, for any purpoſes where enormous weights are to be lifted for a ſmall ſpace; the collars of leather are the ſame as are uſed in the preſſes. The ſame figure alſo ſhews a very complete way of catching faſt hold of the pile, inſtead of putting a bolt through the pile head to ſtop the chain under: it is ſimply a ſtrong iron ring, *l*, large enough to drop over the pile looſely, and having a ſtrong ſhank or eye, *m*, projecting from it to run the chain through; and when this is drawn, the ring jambs ſo forcibly upon the wood of the pile, as to draw it out of the ground rather than ſlip off, for it holds faſter in proportion to the force.

The theory of Mr. Valoue's engine depends on the following principles, *viz.* 1. If the reſiſtance of the ground, and the maſſes of the piles be equal, the depths to which they will be driven with a ſingle blow will be as the product of the weight of the ram into the height through which it falls.

2. If the maſſes of the ram, and heights through which it falls are both equal, the depths to which the piles will be driven, will be in the inverſe ratios of the maſſes of the piles into the ſuperficies of that part of them which is already immerſed in the earth.

3. If all theſe things be unequal, the depths will be in a ratio compounded of the direct ratio of the heights through which the ram falls into its maſs, and the inverſe ratio of the maſs of the pile into its immerſed ſuperficies.

4. If the weights of the ram be equal, and alſo the weights of the piles, the depths to which they will be driven will be as the heights through which the ram falls directly, and the immerſed ſuperficies of the piles. Or, becauſe the immerſed ſuperficies of the piles are as the depths through which they are already driven into the earth, theſe depths are ſimply as the ſquare roots of the heights through which the ram falls.

Theſe principles are founded on the general ſuppoſition that the ſpace through which the weight falls is eſtimated by the product of its maſs into the ſquare of its velocity, or into the height through which it falls.

Hence it is inferred, that the diſtance through which a pile will be driven by each ſucceeding blow will be leſs and leſs, as the ſuperficies of that part of the pile which is immerſed in the ground increaſes; and, conſequently, that there is a certain depth, beyond which a pile of a given maſs and ſcantling cannot be driven; the maſs of the ram and the height through which it falls at firſt being aſſigned. It appears alſo, that the loading the pile with weights, and thereby increaſing its maſs, will be ſo far from accelerating its deſcent, that it will abſolutely retard it. See ſome curious obſervations on the ſtructure and operation of this engine by Mr. Bugge, profeſſor of aſtronomy and mathematics in the academy of Copenhagen, &c. in the Phil. Tranſ. for 1779, vol. lxix. part i. art. 12.

PILE is alſo uſed, among *Architects*, for a maſs or body of building.

PILE, in *Artillery*, denotes a collection or heap of ſhot or ſhells, which are uſually piled up by horizontal courſes into a pyramidal form, the baſe being either an equilateral triangle, a ſquare, or a rectangle. In the triangle and ſquare, the pile terminates in a ſingle ball; but in a rectangle, in a ſingle row of balls. In the triangle and ſquare piles, the number of horizontal rows, or the number counted on one of the angles from the bottom to the top, is always equal to the number counted on one ſide, in the bottom row. In triangular piles, each horizontal courſe is a triangular number, produced by taking the ſucceſſive ſums of the numbers 1 and 2; 1, 2, and 3; 1, 2, 3, and 4, &c.; and the number of ſhot in a triangular pile is the ſum of all the triangular numbers taken as far, or to as many terms, as the number in one ſide of the bottom courſe. In order to obtain the number in a triangular pile, count the number in the bottom row, and multiply that number more two by that number more one; and the product multiplied by one-ſixth of the ſaid number will be the whole ſum required.

In ſquare piles, each horizontal courſe is a ſquare number, produced by taking the ſquare of the number in its ſide; and the number of ſhot in a ſquare pile is the ſum of all the ſquares, taken from one as far as the number in the ſides of the bottom courſe. To find the number, count the number in one ſide of the bottom courſe; to that number add one, and to its double add one; multiply the two ſums together, then their product being multiplied by one-ſixth of the ſaid number, will give the required number of ſhot in the pile.

From the exemplification of theſe rules, it would appear, that when room is wanted, it is moſt convenient to ſtow the ſhot in triangular piles; for on the equilateral triangle, which is leſs than half the area of a ſquare of one of its ſides, there can be piled a greater number than half of thoſe that can be raiſed on the ſquare: and the height of a ſquare pile is ſomewhat leſs than that of a triangular one; becauſe a ſhot will ſink lower in the ſpace between four others, than between three others, when they are of equal diameter.

In rectangular piles, each horizontal courſe is a rectangle, the upper one being one row of balls; and every ſuch oblong pile may be conſidered as conſiſting of two parts, one a ſquare pyramid, and the other a triangular priſm. To find the number of ſhot in a rectangular pile, take the difference between the number in length and breadth, in the bottom courſe; multiply the number in breadth, more one, by half the breadth; the product multiplied by the ſaid difference will give the number in the priſmatic pile; upon the ſquare of the breadth, find the number in a pyramidal pile; and the ſum of theſe two piles will give the number required. See Caliber.

To Pile *Arms*, in *Military Language*, is to place three muſkets with fixed bayonets in ſuch a poſition with regard to one another, that the butts ſhall remain firm in the ground, and the muzzles lie cloſe together in an oblique direction. This method has been adopted to prevent the injury which was formerly done to muſketry, when the cuſtom of grounding the firelock prevailed. Every recruit ſhould be taught how to pile arms before he is diſmiſſed the drill.

Pile, *Pila*, in *Coinage*, denotes a kind of puncheon, which, in the old way of coining, with the hammer, contained the arms, croſs, or other figure and inſcription, to be ſtruck for the reverſe of the ſpecies.

Accordingly, we ſtill call the arms-ſide of a piece of money the *pile*, and the head the *croſs*; becauſe, in the ancient monies, a croſs uſually took the place of the head in our's.

Hence alſo the game of *croſs* and *pile*.

Some will have it called *pile*, *pila*, becauſe on this ſide, in our ancient coins, there was an impreſſion of a church built on piles. Scaliger, with more probability, derives it from the old French word *pile*, *a ſhip*. Vide prima Scaligerana, in voc. Nummus Raticus, p. 115.

In ſome ancient writings, *pila* is uſed to ſignify the particular figure, or impreſſion of money. Thus Fleta: he who brings an appeal of robbery, or theft, againſt another, muſt ſhew the certain quantity, quality, price, weight, number, meaſures, value, and pile.

Pile, in *Heraldry*, is an ordinary, in form of a point inverted, or a ſtake ſharpened; contracting from the chief, and terminating in a point towards the bottom of the ſhield, ſomewhat in manner of a wedge.

It is formed, probably, in imitation of the Roman pilum, which was a tapering dart, about five feet long, and ſharpened at the point with ſteel.

The pile is borne inverted, engrailed, &c. like other ordinaries; and iſſues indifferently from any point of the verge of the eſcutcheon. He beareth a pile gules, by the name of Chandois.

Pile, in *Rural Economy*, a ſharpened piece of wood driven down into the ground, to protect the banks of rivers, or other ſimilar purpoſes. It ſhould be ſtrong, and well driven in. See Pile, *ſupra*.

Pile, a provincial word applied to the breaking off the awns of threſhed barley.

Pile *of Graſs*, a blade or ſmall bit of graſs.

Pile-*Planks*, are planks whoſe ends are ſharpened, to drive into any canal or water, cloſe to each other, in order to form a ſtank, by which the water may be ſtopped and diſcharged. See *Plate* IV. *Canals*, *fig.* 30.

Pile-*Sheeting* is the ſame with *dove-tail piling*.

Pile-*Worms*, are a kind of worms found in the piles of the ſea-dikes in Holland. Theſe worms are of various ſizes: ſome of the young ones are not above an inch or two in length; but others have been found thirteen or fourteen inches long.

The heads of theſe creatures were covered with two hard ſhells or hemicrania, which together form a figure reſembling an auger, and with which they bore the wood. The beſt remedy againſt them is, to perforate the piles with many ſmall holes, about an inch aſunder; then it muſt be done over with a varniſh in the hotteſt ſun; and while the varniſh is hot, brick-duſt muſt be ſtrewed over it; and this being ſeveral times repeated, the pile will be covered with a ſtrong cruſt, impenetrable to all inſects. See a farther account of theſe creatures in Phil. Tranſ. N° 455, ſect. 5.

PILEÆ, a name given by ſome authors to a genus of echinodermata.

PILENTUM, among the Romans, an eaſy kind of chariot, uſed by the Roman ladies at games and religious proceſſions.

PILES, in *Surgery*. See Hemorrhoids.

Piles, *Liniment for the*. See Liniment.

PILESGROVE, in *Geography*, a town of America, in New Jerſey, and county of Salem, containing 1756 inhabitants.

PILETTUS, in our *Ancient Foreſt Laws*, an arrow which had a round knob a little above the head, to hinder it from going far into the mark.

From the Latin *pila*, which ſignifies any round thing like a ball. "Et quod foreſtarii ſui non portabunt ſagittas barbatas, ſed pilettos." Charta Rogeri de Quincy.

PILEUS, in *Roman Antiquity*, was the ordinary cap or hat worn at public ſhows and ſacrifices, and by the freed-men.

It was one of the common rewards aſſigned to ſuch gladiators as were ſlaves, in token of their obtaining their freedom. See Rudis.

Pileus *Preſbyteri*, in *Botany*, a name given by ſome writers to the euonymus or fuſanus, a ſhrub which grows in our hedges, and bears a ſquare fruit, ſomewhat reſembling the cap worn by ſome orders of prieſts.

PILEWORT. See Ranunculus.

PILFUNTE, in *Geography*, a town of Abaſeia, on the Black ſea; 16 miles S.S.W. of Anakopia.

PILGERRUN, or Pilgrim's *Reſt*, a Moravian town of Pennſylvania; 140 miles N.W. of Pittſburg.

PILGRAM, or Peldrzimow, a town of Bohemia, in the circle of Bechin. N. lat. 49° 28′. E. long. 15° 7′.

PILGRIM, one who travels through foreign countries to viſit holy places, and to pay his devotion to the relics of dead ſaints.

Th

The word is formed from the Flemiſh *pelgrim*, or Italian *pelegrino*, which ſignifies the ſame; and theſe originally from the Latin *peregrinus*, a *ſtranger*, or *traveller*.

The humour of going on pilgrimage anciently prevailed exceedingly, particularly about the time of the croiſades. Pilgrimages were moſt in vogue after the end of the eleventh century, when every one was for viſiting places of devotion, not excepting kings and princes themſelves; and even biſhops made no difficulty of being abſent from their churches on the ſame account. The places moſt viſited were Jeruſalem, Rome, Compoſtella, and Tours; but the greateſt numbers reſorted to Loretto, in order to viſit the chamber of the bleſſed Virgin, in which ſhe was born, and brought up her ſon Jeſus, till he was twelve years of age.

This chamber, it is pretended, was carried by angels into Dalmatia, about the year 1291, and afterwards in the ſame manner tranſported to Loretto, where a magnificent cathedral is built over it. In this chamber is the image of the bleſſed Virgin, almoſt covered with pearls and diamonds; and round the ſtatue there is a kind of rainbow, formed of precious ſtones of various colours. Five hundred thouſand pilgrims have ſometimes reſorted to this houſe in one year, in order to pay their devotions before this glorious image.

Several of the principal orders of knighthood were eſtabliſhed in favour of pilgrims going to the Holy Land, to ſecure them from the violences and inſults of the Saracens and Arabs, &c.

Such were the orders of the knights Templars, the knights Hoſpitalers, knights of Malta, &c.

The Mahometans are commanded in the Koran (chap. 2, 3. 22.) to perform a pilgrimage to Mecca. This is one of the capital points of their religion, and therefore a prodigious cavalcade of pilgrims annually goes thither, in the company of thoſe who are ſent with the grand ſeignior's preſents to the tomb of Mahomet.

So ſtrictly is this duty enjoined, and ſo neceſſary is the performance of it, that, according to a tradition of Mahomet, he who dies without performing it may as well die a Jew, or a Chriſtian. For an account of theſe pilgrimages, ſee Caaba, Caravan, and Mecca.

PILHANNAW, in *Ornithology*, a name given by the Indians to a bird found in the foreſts, on the back of ſome of our American plantations.

It is a bird of prey, very large and bold. It is deſcribed by Joſſelin as four times as big as our goſhawk, and having a remarkable large head. All the birds are terrified at its approach; but it principally feeds on quadrupeds, as young fawns, and the like.

PILIATCHIN, in *Geography*, a cape on the eaſt coaſt of Ruſſia, in the Penzinſkoi ſea; 272 miles E.N.E. of Ochotſk. N. lat. 60° 10′. E. long. 155° 14′.

PILIMICTIO, a word uſed by ſeveral authors to expreſs a diſcharge of ſmall and long filaments, which reſemble hairs, among the urine.

PILING. See Pallification.

Piling-*Iron*, a name provincially applied to a tool uſed in breaking off the awns of barley, and ſometimes the tails of oats; an operation which with the farmers is called piling barley, and ſometimes faultering it.

PILIO, in *Geography*, a town of Thibet; 67 miles N. of Tourfan Hotun.

PILIS, a town of Hungary; 8 miles S.E. of Gran.

PILKALLEN, a town of Pruſſian Lithuania; 64 miles E. of Königſberg. N. lat. 54° 45′. E. long. 22° 57′.

PILKOPEN, a town of Pruſſia, in the province of Samland, ſeated on a mountain, where the ancients placed an idol, called "Pilkob," which they worſhipped; 30 miles N. of Königſberg.

PILKINGTON, a townſhip of England, in Lancaſhire, containing 5786 inhabitants, including 3824 employed in trade and manufactures; 3 miles S. of Bury.

PILL, or Crockern *Pill*, a town, or rather village, of England, in the county of Somerſet, on a point of land at the mouth of the Avon, where it joins the Severn at Kingroad, inhabited chiefly by mariners and pilots, who are employed in navigating veſſels up the river, and down the Briſtol Channel; 12 miles below Briſtol.

Pill, *Pilula*, in *Pharmacy*, a form of medicine, taken dry, reſembling a little ball; invented in favour of ſuch as cannot well take ill-taſted medicinal draughts; as alſo to keep in readineſs for occaſional uſe without decaying.

Extracts, when not too hard, may be formed into pills, without any addition; but they are more generally compoſed of either vegetable, or earthy, or metallic powders, combined by means of ſyrup into a coherent maſs. Salts may alſo be formed into pills, thoſe that are deliqueſcent excepted; and when effloreſcent ſalts are uſed, they ſhould be firſt freed from the water of cryſtallization; becauſe the pills formed with uneffloreſced ſalts, which are apt to effloreſce, fall into powder as they dry. The maſſes, which are kept prepared for the formation of pills, ſhould be preſerved in covered pots, wrapped in bladders, and occaſionally moiſtened.

No medicine that is intended to operate quickly ought to be made into pills, as they often lie for a conſiderable time in the ſtomach before they are diſſolved, ſo as to produce any effect.

Pills are of various kinds, anodyne, ſomniferous, laxative, aperitive, hyſteric, antinephritic, &c.; but they are principally cathartic.

The baſis of cathartic pills is uſually aloes; with which are mixed agaric, turbith, hermodactyls, ſenna, rhubarb, colocynth. See Extractum *Catharticum*.

Pills are uſually wrapped up in leaf-gold, wafer-paper, or the like, to prevent their ill taſte being perceived; but as ſimple dry powders, as ſubcarbonate of magneſia or ſtarch, anſwer all the purpoſes of this covering, it is now laid aſide.

Pills, *Compound Aloetic*, are to be prepared, according to the directions of the London diſpenſatory, by beating together, into an uniform maſs, one ounce of extract of ſpiked aloes, half an ounce of extract of gentian, 40 minims of oil of carraway, and a ſufficient quantity of ſyrup. The aloetic pills of the Edinburgh Pharmacopeia conſiſt of equal parts of Socotorine aloes in powder and ſoap, beaten with ſimple ſyrup into a proper maſs for pills. The pills of aloes and ginger of the Dublin Pharmacopeia are compoſed of an ounce of hepatic aloes, a dram of ginger-root in powder, half an ounce of ſoap, and half a dram of eſſential oil of peppermint: the aloes and the ginger are rubbed together into a powder, and then the ſoap and oil are added, ſo as to form a maſs. Theſe are uſeful pills, and adminiſtered with advantage for obviating the habitual coſtiveneſs of the ſedentary, and of leucophlegmatic habits. The doſe is from grs. x to grs. xv, or more.

Pills *of Aloes and Aſſafœtida* of the Edinb. Ph., conſiſt of equal parts of Socotorine aloes in powder, aſſafœtida, and ſoap, beaten into a maſs with mucilage of gum arabic. Theſe pills are anodyne and cathartic, and have been found uſeful in dyſpepſia, attended with flatulence. The doſe is grs. x, given twice a day.

Pills *of Aloes with Myrrh*, are formed, according to the Lond. Ph., of two ounces of extract of ſpiked aloes, of an ounce of ſaffron, and the ſame quantity of myrrh, and a ſufficient quantity of ſyrup: the aloes and the myrrh are rubbed into powder ſeparately, and then all the ingredients are beaten together into an uniform maſs. According to the Dub. Ph., half an ounce of myrrh and an ounce of hepatic aloes are pulveriſed ſeparately; then two drams of ſaffron and half a dram of oil of carraway being added to them, all the ingredients are beaten together into a maſs. The ſame pills of the Edinb. Ph. are compoſed of four parts of Socotorine aloes, two parts of myrrh, and one part of ſaffron, beaten into a maſs with ſimple ſyrup. Theſe pills have been long uſed to ſtimulate and open the bowels in chlorotic, hypochondriacal, and cachectic habits. The doſe is from grs. x to ℈j, given twice a day.

Pills of this kind are deſcribed by Rhazis, the Arabian, who aſcribes the original form to Rufus, after whom they were firſt named, *viz.* "pilula Ruſi."

Pills *of Ammoniaret of Copper*, of the Edinb. Ph., conſiſt of ſixteen grains of ammoniaret of copper rubbed to fine powder, four ſcruples of crumb of bread, and a ſufficient quantity of water of carbonate of ammonia, beaten into a maſs, and divided into 32 equal pills. Theſe pills are given in epilepſy, and other ſpaſmodic diſeaſes: at firſt, one pill night and morning is ſufficient, but the number may be gradually increaſed till five be taken for a doſe.

Pills *of Gamboge, Compound*, are directed by the Lond. Ph. to be prepared by mixing together gamboge in powder, extract of ſpiked aloes in powder, compound powder of cinnamon, of each a dram, and then adding two drams of hard ſoap, and beating the whole together into an uniform maſs. This preparation is much more active than the aloetic pills; the doſe is from grs. x to ℈j, given at bed-time in obſtinate coſtiveneſs.

Pills *of Iron with Myrrh*, are compoſed, according to the Lond. Ph., of two drams of myrrh in powder, and ſubcarbonate of ſoda, ſulphate of iron, and ſugar, of each a dram: the myrrh is rubbed with the ſubcarbonate of ſoda, then, after having added the ſulphate of iron, rubbed again, and then the whole is beaten into a maſs. This is an uſeful emmenagogue pill; the doſe is from grs. x to ℈j, given twice or thrice a day.

Pills *of Galbanum, Compound*, of the Lond. Ph., conſiſt of galbanum, an ounce; myrrh and ſagapenum, of each an ounce and a half; aſſafœtida, half an ounce; and a ſufficient quantity of ſyrup; beaten together into an uniform maſs.

Pills, *Compound Aſſafœtida*, of the Edinb. Ph., are compoſed of aſſafœtida, galbanum, and myrrh, of each eight parts, and of purified oil of amber one part; beaten into a maſs, with ſimple ſyrup.

Pills *of Myrrh, Compound*, of the Dubl. Ph., conſiſt of aſſafœtida, myrrh in powder, and galbanum, of each an ounce, and of oil of amber half a dram; rubbed together, and made into a maſs with ſimple ſyrup.

Theſe preparations are uſeful antiſpaſmodics and emmenagogues, and are given with advantage in chloroſis, hyſteria, and hypochondriaſis. The doſe is from grs. x to ℈j, taken every night at bed-time.

Pills, *Mercurial, Pilulæ hydrargyri*, often from their colour called the *blue pills*, are prepared, according to the directions of the London and Dublin Pharmacopeias, by rubbing two drams of purified mercury with three drams of confection of red roſes, until the globules diſappear; then adding a dram of liquorice root in powder; and beating the whole into an uniform maſs. The Edinburgh Pharmacopeia directs them to be prepared by rubbing an ounce of purified mercury with the ſame quantity of the conſerve of red roſes, in a glaſs mortar, until the globules entirely diſappear, adding, if neceſſary, a little mucilage of gum arabic; then adding two ounces of ſtarch, and beating, with a little water, the whole into a maſs, which is to be directly divided into 180 pills of equal ſizes. N.B. One grain of mercury is contained in four grains of the maſs, prepared by the London and Dublin formulæ, and in three grains according to that of Edinburgh. Theſe pills are ſtimulant and antiſyphilitic, and are the moſt common form of preparation under which mercury is exhibited for the cure of venereal affections, as it is much leſs liable to act on the bowels than any of the other forms. The common doſe is from gr. vi to gr. viij, or two pills, given twice a day till the mouth be affected. Larger doſes are apt to excite purging.

Pills *of Submuriate of Mercury, Pilulæ hydrargyri ſubmuriatis*, of the London Pharmacopeia, are formed by rubbing a dram of ſubmuriate of mercury (calomel) with the ſame quantity of precipitated ſulphuret of antimony, then with two drams of guaiac gum-reſin, and adding a ſufficient quantity of copaiba to give the maſs a proper conſiſtence. This combination was firſt recommended by Dr. Plummer, in the Edinburgh Medical Eſſays, and diſtinguiſhed in the Edinburgh Pharmacopeia, by the name of "Plummer's Pill." From this pharmacopeia it was afterwards expunged; but as it was much uſed in practice, it has a place in the London Pharmacopeia. It is a very uſeful alterative in lepra, in ſecondary ſyphilis affecting the ſkin, and in other cutaneous diſeaſes. The doſe is from grs. v to grs. viij, given night and morning.

Pills, *Compound Rhubarb*, of the Edinburgh Pharmacopeia, are compoſed of one ounce of rhubarb root in powder, ſix drams of Socotorine aloes, half an ounce of myrrh, and half a dram of volatile oil of peppermint, beaten into a maſs with ſyrup of orange-peel. This is a warm, ſtomachic, laxative pill, very uſeful for obviating coſtiveneſs, and at the ſame time giving tone to the bowels in dyſpepſia and hypochondriaſis. The doſe is from grs. x to ℈j, given twice a day.

Pills *of Soap and Opium* are prepared, according to the London Pharmacopeia, by beating together half an ounce of hard opium powdered, and two ounces of hard ſoap, into an uniform maſs. Five grains contain one grain of opium.

Pills, *Opiate*, formerly called *Thebaic pills*, of the Edinburgh Pharmacopeia, conſiſt of one part of opium, ſeven parts of extract of liquorice, and two parts of pimenta berries; mixing the opium and extract, ſeparately ſoftened with diluted alcohol, and beating them into a pulp: then adding the Jamaica pepper rubbed to powder, and beating the whole into a maſs. Ten grains contain one grain of opium.

Pills, *Storax*, of the Dublin Pharmacopeia, are compoſed of three drams of purified ſtorax, and ſoft purified opium and ſaffron, of each a dram; mix them well together by beating. Five grains contain one grain of opium. Theſe preparations operate as an anodyne; but the doſe is different, and muſt be regulated by the quantity of opium contained in that which is adopted.

Pills, *Compound Squill*, according to the London Pharmacopeia, are prepared by mixing together one dram of freſh ſquill-root (bulb) dried and powdered; ginger-root powdered, and hard ſoap, of each three drams, and two drams of ammoniacum powdered; and beating the mixed powders with the ſoap, adding as much ſyrup as will give them a proper conſiſtence.

Pills, *Squill*, of the Edinburgh Pharmacopeia, are prepared by beating one ſcruple of ſquill-root (bulb) dried and rubbed to a fine powder, ammoniacum, cardamom-ſeeds powdered, and extract of liquorice, one dram, with ſyrup, into a maſs.

Pills *of Squill with Ginger*, of the Dublin Pharmacopeia, are compoſed of a dram of powder of ſquill, two drams of ginger-root in powder, and ten drops of eſſential oil of aniſeed, beaten together and formed into a maſs with jelly of ſoap.

Theſe pills are uſeful expectorants in chronic catarrh, dyſpnœa, and aſthma; and combined with calomel and digitalis in hydropic affections. As the efficacy of the ſquill is much injured by keeping in either form, it is perhaps better that it ſhould be always given under the extemporaneous form, except when the tincture is uſed. The doſe is from grs. x to ℈j, given three or four times a day. Thomſon's London Diſpenſatory. London Pharmacopeia, 1809.

Pills, *Bechic*, a ſort of pills good againſt coughs, ſo call from the Greek, *βήξ*, *cough*. They are alſo called *hypoglottides*, becauſe left like lozenges to diſſolve under the tongue.

Pills *de Cochia*. See Cochia.

Pills *of Colocynth with Aloes*, *Pilulæ e colocynthide cum aloe*, a name given in the late London Pharmacopeia to the purging pill, commonly known by the name of *pilulæ cochiæ minores*.

As this is originally a preſcription of Galen, and the manner of proportioning the ingredients has been altered ſince his time; the College have ordered it to be made in this manner: take of colocynth, pulp ſliced, ſix drams; extract of ſpike aloe, powdered, one ounce and a half; ſcammony gum-reſin, powdered, half an ounce; cardamom-ſeeds, powdered, a dram; hard ſoap, three drams; and boiling water two pints. Macerate the colocynth pulp in the water for four days, in a gentle heat; ſtrain the ſolution, and add to it the aloe, ſcammony, and ſoap; then, by means of a water bath, evaporate it to a proper conſiſtence, conſtantly ſtirring, and about the end of the inſpiſſation, mix in the cardamom-ſeeds. This is the "extractum colocynthidis compoſitum," P.L. 1787; "extractum catharticum," P.L. 1745; and "pilulæ Rudii," P.L. 1720. See Colocynthis.

Pilulæ e colocynthide ſimpliciores, a name given in the late London Pharmacopeia to the purging-pill, commonly known by the name of *pil. ex duobus*. It is made of equal parts of colocynth and ſcammony, with a conſiderable proportion of oil of cloves; and is beat up to a conſiſtence with ſyrup of buckthorn.

Pills, *Compoſing*, are made by beating together ten grains of purified opium, and half a dram of Caſtile ſoap; the whole may be formed into twenty pills: and one, two, or three, may be taken as occaſion requires, when a quieting draught will not ſit upon the ſtomach.

Pills, *Fœtid*, are prepared by mixing half an ounce of aſſa foetida with any ſimple ſyrup. In hyſteric complaints, four or five pills of an ordinary ſize may be taken twice or thrice a day. They will alſo be of ſervice to perſons afflicted with the aſthma; and they may be made opening, if neceſſary, by adding a proper quantity of rhubarb, aloes, or jalap, to the above maſs.

Pills, *Hemlock*, are made by taking any quantity of the extract of hemlock, and adding to it about a fifth part its weight of the powder of the dried leaves, and forming it into pills. See Cicuta, in the *Materia Medica*.

Pills *for the Jaundice* are prepared by taking of Caſtile ſoap, Socotorine aloes, and rhubarb, of each one dram, and making them into pills, with a ſufficient quantity of ſyrup or mucilage. See Jaundice.

Pills, *Miſaubin's*, a preparation of mercurius calcinatus (oxydum hydrargyri rubrum), ſuppoſed by Mr. Cavendiſh (Phil. Tranſ. vol. lxxiv. part i. p. 141.) to be the ſame with red precipitate, though differently prepared: theſe pills being diſpoſed to occaſion gripes, it has been uſual to add a ſmall quantity of opium, and ſome warm aromatic material. The doſe is from half a grain to two grains; five or ſix grains are ſaid to vomit and purge violently.

Pills, *Perpetual*, or *Pilulæ perpetuæ*, are regulus of antimony made up in pills; thus called, becauſe being ſwallowed and voided fifty times, they will purge every time with undiminiſhed force. See Antimony.

Pills, *Plummer's*. See Plummer's *Æthiops*, and Pills *of Submuriate of Mercury*.

Pills, *Purging*. See Pills *of Aloes*, *Colocynth*, &c. ſupra.

Purging pills may be made of Socotorine aloes and Caſtile ſoap, of each two drams, and a ſufficient quantity of ſimple ſyrup. Four or five of theſe will generally prove a ſufficient purge. For keeping the body open, one may be taken night and morning. They are reckoned both deobſtruent and ſtomachic, and will be found to anſwer all the purpoſes of Dr. Anderſon's pills, the principal ingredient of which is aloes. When aloetic purges are improper, let pills be formed of extract of jalap, and vitriolated tartar, of each two drams, and a ſufficient quantity of ſyrup of ginger; which may be taken as above.

Pill, *Rudius's*. See Extractum *Catharticum*, and Pills *of Colocynth*, &c. ſupra.

Pills, *Soap*, *Pilulæ ſaponaceæ*, a form of medicine preſcribed in the late London Diſpenſatory, and ordered to be made in the following manner: take almond ſoap, four ounces; ſtrained opium, half an ounce; eſſence of lemons, a dram; ſoften the opium a little with wine, and beat that, and the ſoap with the eſſence, till it be reduced to the form of a pill. See Opium, and Pills *of Soap*, &c. ſupra.

This is intended to ſupply the place of a pill commonly called *Matthew's* pill, and is very happily corrected in regard to the taſte of the ſoap, by the addition of the eſſence of lemons.

Pills, *Stomachic*, are made of extract of gentian, two drams; powdered rhubarb and vitriolated tartar, of each one dram; oil of mint, thirty drops: and a ſufficient quantity of ſimple ſyrup. Three or four of theſe may be taken twice a day, for invigorating the ſtomach, and keeping the body gently open.

Pills, *Strengthening*, are made of ſoft extract of the bark, and ſalt of ſteel, of each half an ounce. In diſorders ariſing from exceſſive debility or relaxation of the ſolids, as the chloroſis, or green ſickneſs, two of theſe pills may be taken three times a day.

Pill, *Ward's*. See Ward's *Pill*.

PILLAGE, among *Builders*, is ſometimes uſed for a ſquare pillar, ſtanding behind a column to bear up the arches; having a round baſe and capital, as a pillar has.

Pillage *Bay*, in *Geography*, a bay on the S. coaſt of Labrador. N. lat. 50° 17′. W. long. 62° 58′.

PILLAR, in *Architecture*, a kind of irregular column, round and inſulate; but deviating from the proportions of a juſt column.

Pillars are always either too maſſive, or too ſlender, for a regular architecture. In effect, pillars are not reſtrained to any rules: their parts and proportions are arbitrary. Such, *e. gr.* are the pillars which ſupport Saracenic vaults, and other buildings, &c.

A ſquare pillar is a maſſive work, called alſo pier, or piedroit, ſerving to ſupport arches, &c. See Pier, and Piedroit.

Butting-pillar is a butment, or body of maſonry, raiſed to prop, or ſuſtain, the thruſt of a vault, arch, or other work. See Buttress.

It ſeems not impoſſible for ſtone to be caſt into the ſhape of pillars. We find mention made in the Philoſophical Tranſactions, of two pillars of ſtone at Fontevraud, in France, each about ſixty feet high, all of one ſolid piece, which are ſaid to have been run. (N° 481. p. 328. in Not.) Pillars of ſtone were anciently erected, as ſepulchral monuments, near the highways; and alſo in memory of ſome victory. We find traces of this cuſtom in Cornwall and Wales, where theſe pillars are often found, and called *meinigwir*, a ſtone for play, perhaps in memory of funeral games; and ſometimes *llech*, that is, *tabula ſaxea*. Phil. Tranſ. N° 458. p. 471.

Pompey's pillar is a famous monument of antiquity, conſtructed of red granite, and ſituated on a rock, about a mile without the walls of Alexandria, in Egypt. By the menſuration of Edward Wortley Montagu, eſq. the capital of the pillar, which is Corinthian, with palm leaves, and not indented, is nine feet ſeven inches high; the ſhaft ſixty-ſix feet one and a quarter inch; the baſe five feet nine three quarter inches; the pedeſtal ten feet five and a half inches; the height from the ground ninety-two feet: though Dr. Pococke, by the ſhadow, determined the whole height to be one hundred and fourteen feet; and its diameter nine feet and an inch. It is perfectly well poliſhed, and only a little ſhivered on the eaſtern ſide. Nothing can equal the majeſty of this monument: ſeen from a diſtance, it over-tops the town, and ſerves as a ſignal for veſſels. Approaching it near, it produces, ſays Savary, an aſtoniſhment mixed with awe. One can never be tired with admiring the beauty of the capital, the length of the ſhaft, nor the extraordinary ſimplicity of the pedeſtal. This prodigious maſs ſtands, as on a pivot, on a reverſed obeliſk; and was erected, as many have ſuppoſed, either by Pompey, or to his honour. But as no mention is made of it by Strabo, Diodorus Siculus, or any other ancient writers, Mr. Montagu concludes that it was not known before the time of Veſpaſian, and that it was erected to his honour. In proof of this opinion, he found within the circumference of the pillar a medal of Veſpaſian in fine order.

Savary, on the authority of Abulfeda, who calls it "the pillar of Severus," aſcribes it to this emperor; alleging that he viſited Egypt, gave a ſenate to Alexandria, and deſerved well of its inhabitants. Accordingly, it is ſaid, that this column was a mark of their gratitude. The Greek inſcription, half effaced, which is viſible on the weſt ſide when the ſun ſhines upon it, was legible, without doubt, in the time of Abulfeda, and preſerved the name of Severus. Nor is this the only monument erected to him by the gratitude of the Alexandrians. In the midſt of the ruins of Antinoe built by Adrian, is ſeen a magnificent pillar, the inſcription on which is ſtill remaining, dedicated to Alexander Severus.

Denon has given a drawing of this pillar, with the marked dimenſions of its various parts: he makes its whole height a fraction more than 92 feet, and the height of the ſhaft, which is of a ſingle piece, 63 feet 1.3. It acquired, as this author ſays, the name of Pompey's pillar in the 15th century. A monument, as he ſuppoſes, had been raiſed by Pompey at Alexandria, but it had diſappeared, and was thought to be recovered in this pillar or column, which has ſince been converted into a trophy erected to the memory of Septimius Severus. It is, however, placed on the ruins of the ancient city; and in the time of Septimius Severus, the city of the Ptolemies was not in a ruinous ſtate. To ſupport this column by a ſolid foundation, an obeliſk has been ſunk in the earth, on which is placed a very clumſy pedeſtal, having a fine ſhaft, and ſurmounted by a Corinthian capital of bad workmanſhip. If the ſhaft of this column, continues Denon, ſeparating it from the pedeſtal and the capital, once belonged to an ancient edifice, it is an evidence of its magnificence, and of the ſkill with which it was executed. It ought, therefore, to be ſaid, that what is called Pompey's pillar is a fine column, and not a fine monument; and that a column is not a monument. The earth about the foundation of this pillar having been cleared away by time, two fragments of an obeliſk, of white marble, the only monument of that ſubſtance ſeen by Denon in Egypt, have been added to the original baſe, to render it more ſolid. After having obſerved that the column, entitled Pompey's pillar, is very chaſte both in ſtyle and execution; that the pedeſtal and capital are not formed of the ſame granite as the ſhaft; that their workmanſhip is heavy, and appears to be merely a rough draft; and that the foundations, made up of fragments, indicate a modern conſtruction; it may be concluded, ſays our author, that this monument is not antique; and that it may have been erected either in the time of the Greek emperors, or of the caliphs; ſince, if the capital and pedeſtal are well enough wrought to belong to the former of theſe periods, they are not ſo perfect but that art may have reached ſo far in the latter. See Pococke's Deſcr. of the Eaſt, vol. i. p. 8. and Phil. Tranſ. vol. lvii. art. 42. Savary's Letters in Egypt, vol. i. Denon's Travels in Egypt, vol. i.

Pillar, in the *Manege*, ſignifies the centre of the volta, ring, or manege ground, round which a horſe turns, whether there be a wooden pillar in it or not.

There are alſo pillars in maneges on the circumference, or ſide, placed at certain diſtances, by two and two. To diſtinguiſh theſe from that of the centre, they are called the *two pillars*. When theſe latter are ſpoken of, it is uſual to ſay, *Work the horſe between the two pillars*. When the former, it is called, *Working round the pillar*. The uſe of the pillar in the centre is for regulating the extent of the ground, that the manege upon the volts may be performed with method and juſtneſs, and that they may work in a ſquare, by rule and meaſure, upon the four lines of the volts; and alſo to break unruly high-mettled horſes, without endangering the rider.

The two pillars are placed at the diſtance of two or three paces one from the other. The horſe is put between theſe, to teach him to riſe before, and yerk out behind, and put himſelf upon raiſed airs, &c. either by the aids, or chaſtiſement.

It has been ſuppoſed, that the hint of uſing pillars in the manege was taken from a contrivance of Eumenes; who, as Plutarch relates it, being beſieged at the fort of Nora, by Antigonus, and fearing leſt his horſes ſhould ſuffer for want of action, contrived a method of working them, without removing them from their ſtalls. For this purpoſe he placed a pulley over their heads in the beams of the ſtables, with which, by means of running reins, he pulled up their fore-parts, cauſing at the ſame time people to ſtand behind them, who, urging and laſhing them with whips, put them into motion, made them yerk out behind, raiſing and moving their fore-legs, and work and chafe themſelves till they ſweat copiouſly; by theſe means he preſerved their health, kept them in wind, and ready for ſervice. The ſingle pillar, once ſo frequent in maneges, but now laid aſide, was firſt uſed in Naples, and owes its origin to the want of covered buildings for riding and breaking horſes: in lieu of which they dug trenches for working their horſes; the ſides of the trenches ſupplying the want of walls, and producing in a certain degree the ſame effect. The famous Pignatelli, of Naples, having no covered manege, worked his horſes in the open air, and uſed to tie them to a tree, and work them round it. Pluvinal, of France, was one of his ſcholars; and returning to France, where he profeſſed horſemanſhip, he placed a poſt or pillar in his manege, in imitation of Pignatelli's tree, and made the ſame uſe of it: to this he ſoon added another of the ſame ſize and height; which two pillars were calculated to anſwer purpoſes different from thoſe for which the ſingle pillar had been erected: the two pillars are ſtill in uſe, and reckoned an eſſential piece of furniture in all riding-houſes. The ſingle pillar has been long diſcontinued, but may be employed to advantage upon certain occaſions; eſpecially where a horſeman undertakes to *longe* a horſe, without the aſſiſtance of another perſon. It ſhould be obſerved that no horſe ought to be put between the two pillars till he is well ſupplied, and has acquired the firſt principles of the union between the legs, which are the natural pillars that every horſeman ſhould employ. The horſe ſhould be gently worked at firſt, that he may not become furious, and he ſhould be made to go only from ſide to ſide by means of the ſwitch, or from fear of the chambriere. In a few days, when he is accuſtomed to the ſubjection of the pillars, try to make him inſenſibly go into the cords, and endeavour to get from him a ſtep or two exact, and in time of the *paſſage* or *piaffer*.

The worſt effect of the pillars is the hazard you run of entirely ruining the hocks of your horſe, if you do not diſtinguiſh very exactly between theſe parts and the haunches. Berenger's Hiſt. and Art. of Horſemanſhip, vol. ii. p. 60. and 164, &c.

PILLAR, *Cape*, in *Geography*, a cape at the weſtern entrance of the ſtraits of Magellan, which is known by a large gap upon the top; and when it bears W.S.W. an iſland appears off it which has an appearance ſomewhat like a hay-ſtack, and about which lie ſeveral rocks. The ſtrait to the eaſtward of the cape is between ſeven and eight leagues over; the land on each ſide is of a moderate height, but it is loweſt on the north ſhore, the ſouth ſhore being much the boldeſt, though both are craggy and broken. Weſtminſter iſland is nearer to the north than the ſouth ſhore; and by the compaſs lies N.E. from cape Pillar. S. lat. 52° 45′. W. long. 75° 10′.

PILLARS, in *Ship Building*, are ſquare or round columns of timber, fixed perpendicularly under the middle of the beams for the ſupport of the decks.

PILLARS, *Ropes of two.* See ROPE.

PILLAU, in *Geography*, a ſea-port town of Pruſſia, in the province of Samland, ſituated on a tongue of land that projects into the Baltic, at the entrance of the Friſch Haff, with a good harbour; well fortified, and conſidered as the bulwark and key of the kingdom. The ſtreets are broad and ſtraight; and the houſes are built and furniſhed in the Dutch taſte. This harbour is frequented by foreign ſhips, and the town is the reſort of people of various nations. The fort is nearly a regular pentagon; the baſtions exhibit a grand appearance; and all the edifices belonging to the fortifications are ſtrong, handſome, and regular. Here is alſo a magazine for military ſtores. In the fort there is a church, ſerving for both the Lutherans and Calviniſts, and below the gate of the caſtle is a ſtone equeſtrian ſtatue of Frederic William the Great. Over the gate, on one ſide of the entrance, ſtands the image of Mars, in a bold attitude, looking towards Sweden. The peninſula along which the road from Pillau to Fiſchhauſen lies, is called the "Paradiſe of Pruſſia," from its pleaſantneſs and fertility. Near the fort is a fine plain, where the Friſch Haff forms a fine ſemicircular bay, that is frequented by a great number of ſwans, ſea-mews, wild-ducks, and other water-fowl. On the other ſide of the bay lies Alt Pillau or Old Pillau, inhabited by fiſhermen; 22 miles W.S.W. of Königſberg. N. lat. 54° 37′. E. long. 19° 55′.

PILLE *of Foddray*, or PILE *Fouldery*, in the county of Lancaſter; a defence built on a creek of the ſea, called *Pille*, by the idiom of the county, for a pile, or a fort, built for the ſafeguard or protection of any place.

This pile was erected there by the abbot of Fourneſſe, in the firſt year of Edward III. Camd. Brit. Rex. "Dedimus Henrico comiti Northum. inſulam, caſtrum, pelam, & dominium de Man, &c." Rot. Par. 1 Hen. IV.

PILLEER, in *Geography*, a town of Hindooſtan, in Myſore; nine miles N.W. of Dalmachery.

PILLERSTORFF, a town of Auſtria, on the river Ruſbach; eight miles E.N.E. of Korn-Neuberg.

PILLIBEAT, a town of Hindooſtan, in Rohilcund; 28 miles N.E. of Bereilly. N. lat. 28° 36′. E. long. 80° 10′.

PILLORY was anciently a poſt erected in a croſs road, by the lord, as a mark of his ſeigniory, with his arms on it, and ſometimes with a collar to tie criminals to.

PILLORY, at preſent, is a wooden machine, on which certain criminals, as perjurers, &c. are faſtened, and expoſed to the public deriſion.

With us it is in the form of a frame erected on a pillar, and made with holes and folding boards, through which the heads and hands of criminals are put.

The etymology of this word has been variouſly aſſigned by different writers: Spelman derives it from the French *pilleur*, *depeculator;* Cowel from πυλη, *janua*, and οραω, *video;* but the etymology of Du-Cange is the moſt probable, who derives it from *pila*, *a pillar*.

In the laws of Canutus it is called *healfchang*. Sir Henry Spelman ſays it is *ſupplicii machina ad ludibrium, magis quam pœnam*. It was peculiarly intended for the puniſhment of bakers who ſhould be caught faulty in the weight, or fineneſs, of their bread. In old charters it is called *colliſtrigium*.

The pillory in Paris is in the middle of a round tower, with openings on every ſide. It is moveable on an axis, or arbor; round which the executioner gives the criminal the number of turns appointed in court; ſtopping him at each opening, to ſhew him to the people. It was intended for ſeveral kinds of criminals, particularly for fraudulent bankrupts; and all thoſe who made a ceſſion, or ſurrender, of their effects to their creditors, were obliged to take ſome turns round the pillory on foot, with a green cap on.

PILLOW *of a Plough*, a term uſed by the farmers to expreſs that part of a plough which ſerves to raiſe or ſink the beam, and with it the ſhare, as the land is to be ploughed ſhallower or deeper.

This pillow is a croſs piece of wood, reaching from one of the crow-ſtaves, or uprights, to the other; and as they are bored with two rows of holes, this pillow can be ſlipped up or down to any height, and kept there by pegs or cords in the holes. See PLOUGH.

PILLOW, in a *Ship*, is that piece of timber whereon the bowſprit reſts at its coming out of the hull aloft, cloſe by the ſtem.

PILLVENKEGEN, in *Ornithology*, the name of a bird approaching to the ſnipe kind; deſcribed by Aldrovand, and ſuppoſed by ſome to be the bird we call the *knot*.

PILNAUD, in *Geography*. See PALNAUD.

PILNIKAW, a town of Bohemia, in the circle of Koniggingratz; five miles W.S.W. of Trautenau.

PILNITZ, a town of Saxony, in the margraviate of Meiſſen, ſeated on the Elbe, in which is a royal palace; celebrated for a treaty entered into by the powers of Europe againſt France in 1792; ſeven miles S.E. of Dreſden.

PILOBOLUS, in *Botany*, from πιλος, *a cap* or *cover*, and βολος, *a throw*, or *caſt*. Tode Fung. Mecklenb. faſc. 1. 41. Perſ. Syn. 117.—Claſs and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Eſſ. Ch. Receptacle ſtalk-like, pellucid, bearing a naked veſicle, which flies off elaſtically.

1. P. *cryſtallinus*. Perſ. Obſ. Mycolog. v. 1. 76—78. t. 4. f. 9—11. Fl. Dan. t. 1080. (Mucor urceolatus; Dickſ. Crypt. faſc. 1. 25. t. 3. f. 6. Bull. Fung. t. 480. f. 1.)—Receptacle obovate. Veſicle hemiſpherical, black.—Common in autumn on horſe or cow-dung. In an early ſtate it appears, according to the obſervations of Perſoon, like ſome little yellowiſh kind of *Sphæria*; but it ſoon becomes an obovate, ſtalked, pellucid, whitiſh body, about half an inch high, full of a clear watery liquor, and bearing on its top a black hemiſpherical head, of ſhort duration.

2. P. *roridus*. Perſ. n. 2. (Mucor roridus; Bolt. Fung. t. 132. f. 4. Relh. Cant. 548?)—Receptacle globoſe, with a capillary ſtalk. Veſicle depreſſed, black.—Found by Bolton on horſe-dung, in fields about Halifax, in Auguſt and September, when the morning is cloudy, as it periſhes when the ſun ſhines upon it. The plants are four lines high, growing in cluſters, and diſtinguiſhed from the former by the long ſlender *ſtalk*, globoſe *head*, and minute, depreſſed, black *veſicle*.

PILOCARPUS, from πιλος, *a cover*, and καρπος, *fruit*. Vahl Eclog. v. 1. 29. Willd. Sp. Pl. v. 1. 1133. Mart. Mill. Dict. v. 3.—Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Dumoſæ*, Linn. *Rhamni*, Juſſ.

Eſſ. Ch. Calyx of five leaves. Petals five. Stamens inſerted under the germen. Capſules five, combined at the baſe, elaſtic. Seeds ſolitary, tunicated.

1. P. *racemoſus*. Vahl t. 10. (Euonymus latifolius racemoſus, fructu pentagono atropurpureo; Plum. Ic. 119. t. 127.)—Native of lofty mountains in the iſland of Montſerrat. A low *ſhrub*, with pendulous branches. *Leaves* alternate, on ſhort ſtalks, elliptical, entire, very obtuſe, and generally emarginate. *Cluſters* terminal, ſolitary, many-flowered, a foot or more in length. We readily agree with Willdenow that this plant is very nearly akin to *Euonymus*; certainly far more ſo than to *Prunus*, to which Burmann, the editor of Plumier, refers it!

PILORUS, in *Ancient Geography*, a town of Macedonia, ſituated at the foot of mount Athos, or rather on the Singitic gulf, S.W. of Aſia.

PILOSE LEAF, in *Botany*. See LEAF.

PILOSELLA, diminutive of *piloſa*, hairy, an old appellation, and now the Linnæan ſpecific name, of a very common ſpecies of *Hieracium*, remarkable for the long tawny hairs of its leaves.

PILOT, the perſon who ſuperintends the navigation of a ſhip, either upon the ſea-coaſt, or on the main ocean; but it is more particularly applied to a perſon retained on board a ſhip to conduct it into a road or harbour, or over bars or ſands; or through ſerpentine and intricate channels, or the like.

Menage derives the word pilot from *prorita*; *q. d.* he who governs the prow, or head. Others fetch it from the old French *pile*, *a ſhip*.

Pilots are no conſtant and ſtanding officers on board our veſſels; but are moſtly called in occaſionally, on coaſts and ſhores unknown to the maſter. And, having done their parts in piloting the veſſel, they return to ſhore, where they reſide.

The regulations, with regard to pilots in the royal navy, are as follow: the commanders of the king's ſhips, in order to give all reaſonable encouragement to ſo uſeful a body of men as pilots, and to remove all their objections to his majeſty's ſervice, are ſtrictly charged to treat them with good uſage, and in equal reſpect with warrant-officers.

The purſer of the ſhip is always to have a ſet of bedding provided on board for the pilots, and the captain is to order the boatſwain to ſupply them with hammocks, and a convenient place to lie in, near their duty, and apart from the common men; which bedding and hammocks are to be returned when the pilots leave the ſhip.

A pilot, when conducting one of his majeſty's ſhips in pilot-water, ſhall have the ſole charge and command of the ſhip, and may give orders for ſteering; ſetting, trimming, or furling the ſails; tacking the ſhip; or whatever concerns the navigation: and the captain is to take care that all the officers and crew obey his orders. But the captain is diligently to obſerve the conduct of the pilot, and if he judges him to behave ſo ill as to bring the ſhip into danger, he may remove him from the command and charge of the ſhip, and take ſuch methods for her preſervation as ſhall be judged neceſſary; remarking upon the log-book the exact hour and time when the pilot was removed from his office, and the reaſons aſſigned for it.

Captains of the king's ſhips, employing pilots in foreign parts of his majeſty's dominions, ſhall, after performance of the ſervice, give a certificate thereof to the pilot, which being produced to the proper naval officer, he ſhall cauſe the ſame to be immediately paid; but if there be no naval officer there, the captain of his majeſty's ſhip ſhall pay him, and ſend the proper vouchers, with his bill, to the navy-board, in order to be paid as bills of exchange.

Captains of his majeſty's ſhips, employing foreign pilots, to carry the ſhips they command into or out of foreign ports, ſhall pay them the rates due by the eſtabliſhment or cuſtom of the country, before they diſcharge them; whoſe receipts being duly vouched, and ſent with a certificate of the ſervice performed, to the navy-board, they ſhall cauſe them to be paid with the ſame exactneſs as they do bills of exchange. Regulations and Inſtructions of the Sea Service, &c.

Pilots of ſhips taking upon them to conduct any ſhip from Dover, &c. to any place up the river Thames, are to be firſt examined and proved by the maſter and wardens of the Trinity-houſe, &c. or ſhall forfeit 10*l.* for the firſt offence, 20*l.* for the ſecond, and 40*l.* for every other offence; one moiety to the informer, the other to the maſter and wardens; but any maſter or mate of a ſhip may pilot his own veſſel up the river: and if any ſhip be loſt through the negligence of any pilot, he ſhall be for ever afterwards diſabled to act as a pilot. (3 Geo. I. cap. 13.) The lord wardens of the cinque-ports may alſo make rules for the government of pilots, and order a ſufficient number to ply at ſea to conduct ſhips up the Thames. 7 Geo. I. cap. 21.

No perſon ſhall act as a pilot on the Thames, &c. (except in collier ſhips) without licence from the maſter and wardens of the Trinity-houſe, at Deptford, on pain of forfeiting 20*l.* Pilots are to be ſubject to the government of that corporation, and pay ancient dues not exceeding 1*s.* in the pound out of wages for the uſe of the poor thereof. (5 Geo. II. cap. 20.) In charter parties of affreightment, the maſter generally covenants to find a pilot, and the merchant to pay him: and in caſe the ſhip ſhall miſcarry through the inſufficiency of the pilot, the merchant may charge either the maſter or the pilot; and if he charges the maſter, ſuch maſter muſt have his remedy againſt the pilot. Lex Mercator. 70.

Among the French, pilot is alſo uſed for a ſteerſman, or an officer on board a ſhip, who always watches her courſe, and directs it.

There are among the French two kinds of pilots; the one a coaſting pilot, well acquainted with the coaſts, ports, roads, bars, ſands, &c., and who commands in ſight thereof.

The other an officer who makes obſervations, and takes altitudes out at ſea; uſes the quadrant and fore-ſtaff; and alſo watches the compaſs.

The pilot is always the ſecond perſon in the ſhip, whether it be a man of war, or merchant-man. In the former the captain is the firſt, the pilot the ſecond. In a merchant-ſhip, the maſter is the firſt, the pilot after him.

The pilot is alſo the ſteerſman, who ſtands at the helm, and manages the rudder.

PILOTAGE, money paid for piloting a ſhip.

PILOTING, in *Navigation*, is either common or proper: common piloting is that art which conſiſts in coaſting along ſhore, or ſailing within ſight of land. Proper piloting is the art of ſailing to diſtant places through the ocean, and out of ſight of land. See Navigation, Pilot, and Sailing.

PILOTO, or *Salinas del Piloto*, in *Geography*, craggy rocks on the W. coaſt of Mexico, S.E. of Cape Corientes, where are good anchorage, and ſhelter from N.W. and W. and S.W. winds, and near which are ſalt-pits.

PILOT-TOWN, a town of America, in Suſſex county, Delaware; ſix miles N.W. of Cape Healopen.

PILOUTA, a town of Candahar, on the Attock; 90 miles N.N.W. of Moultan.

PILOUTAI Hotun, a town of Chineſe Tartary, near the river Hoang-ho; 308 miles W. of Peking. N. lat. 40° 38′. E. long. 108° 43′.

PILPAY, or Bidpay, in *Biography*, an oriental philoſopher, of whoſe country, time, life, or works, little is known with any degree of certainty. According to tradition he was the counſellor and vizier to an ancient king of India, for whoſe uſe he compoſed his famous apologues or fables. Theſe apologues are in the form of dialogues between two animals of a ſpecies very like the European fox. The fame of this work having reached Perſia, Choſroes, the king of that country, is ſaid to have ſent his phyſician into India for the ſole purpoſe of procuring a copy of it. This phyſician, being permitted to peruſe it in the library of the Indian king, tranſlated it into the ancient Perſian, and gave it the title of the *royal or auguſt book*. Such is the account given of Pilpay, and of the introduction of his fables into Perſia. The work itſelf is thought to contain internal evidence of its having been written at a much later period. It has been tranſlated into moſt of the modern languages; but the beſt European verſion is the French one of M. Galland, publiſhed in two vols. 12mo. 1714, with relics of the fables of Lokman. The ſame writer publiſhed the tranſlation of another work attributed to Pilpay, entitled "The Shipwreck of the floating Iſlands, or the Baſiliad." Enfield's Hiſt. Phil.

PILSEN, in *Geography*, a town of Hungary, on the river Ipol; 10 miles N.E. of Gran.—Alſo, a well-built and fortified town of Bohemia, and capital of a circle of the ſame name, ſituated near the conflux of the rivers Miza and Radbuzo. The circle is rich in ſheep; and the cheeſe made by the inhabitants is preferred to any other in the kingdom; 44 miles S.W. of Prague. N. lat. 49° 43′. E. long. 13° 33′.

PILSENITZ, a town of Bohemia, in the circle of Pilſen; five miles S.E. of Pilſen.

PILSNO, a town of Auſtrian Poland; 56 miles S.W. of Sandomirz.

PILSTART. See Pylstart.

PILSTING, a town of Bavaria; two miles N. of Landau.

PILTEN, a town of the duchy of Courland, and capital of a diſtrict, anciently called "the dioceſe of Courland;" 12 miles N.N.W. of Goldingen. N. lat. 57° 5′. E. long. 21° 38′.

Pilten *Lake*, a lake of Chineſe Tartary, 23 miles in circumference; 25 miles S.W. of Nimgouta.

PILULARIA, in *Botany*, from *pilula*, a little ball, or pill, in alluſion to the ſhape of its receptacles.—Linn. Gen. 561. Schreb. 754. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 1143. Juſſ. 16. Lamarck Illuſtr. t. 862. Claſs and order, *Cryptogamia Filices*, or perhaps *Monoecia Polyandria*. Nat. Ord. *Filices*, Linn. Juſſ.

Eſſ. Ch. Common receptacle globoſe, of four cells and four valves, filled with numerous anthers in the upper part, and numerous piſtils in the lower. Seeds coated.

1. P. *globulifera*. Pillwort. Linn. Sp. Pl. 1563. Engl. Bot. t. 521. Bolt. Fil. 72. t. 40. Fl. Dan. t. 223. Bulliard t. 375. (P. paluſtris juncifolia; Vaill. Par. t. 15. f. 6. Dill. Muſc. 538. t. 79. Pepper-graſs; Pet. Herb. Brit. t. 9. f. 8.)—This, the only known ſpecies of its genus, is found on heaths that are partially inundated, in various parts of England, France, and Germany, flowering in June and July. The thread-like *ſtem* creeps cloſe to the ground, with fibrous *roots* ſuppoſed to be perennial, and throws up many erect, ſcattered or cluſtered, awl-ſhaped, ſmooth, ſimple branches, two or three inches high, each of which unrolls, in the peculiar manner of genuine ferns, or of ſome intermediate plants between ferns and palms, as the *Cycas* and *Zamia*, to which, however widely different in dimenſions, the *Pilularia* is perhaps moſt allied. Its little blackiſh globular *fruits*, or *receptacles*, reſembling pepper-corns, are ſolitary, and nearly ſeſſile, at the baſes of the branches, and are externally downy. Bulliard's figure is excellent.

PILUM, in *Roman Antiquity*, a maſſive weapon, which in charge they darted upon the enemy. It was commonly four-ſquare, but ſometimes round, compoſed of a piece of wood three cubits long, and a ſlip of iron of the ſame length, hooked and jagged at the end.

PILWARA, in *Geography*, a town of Hindooſtan, in Oudipour; 40 miles N. of Oudipour. N. lat. 25 19′. E. long. 74° 25′.

PILY Barry. See Barry *Pily*.

PILZICHE, in *Geography*, a town of Saxony, in the circle of Erzgebirg; 10 miles S.E. of Schwarzenberg.

PIMBLE-Mere. See Bala Pool.

PIMELA, in *Botany*, from πιμελη, *fatneſs*, becauſe of the oily nature of its nut, a genus of Loureiro's, Cochinch. 407. See Canarium.

PIMELÆA, a name adopted, by the writer of this, from the manuſcripts of the celebrated Solander, and derived from πιμελη, *fatneſs*; in alluſion, as it is ſuppoſed, to the oilineſs of its little oval ſeed, like an olive in miniature. As there is a Fabrician genus of inſects named *Pimelia*, from their corpulent ſhape, we wiſh to include the idea of an olive, ελαια, in the above word; writing it therefore with a diphthong, to guard againſt ambiguity, either in its ſenſe or pronunciation.—Sm. Bot. of New Holl. 31. Mart. Mill. Dict. v. 3. Willd. Sp. Pl. v. 1. 50. Vahl. Enum.

v. 1. 305. Brown Prodr. Nov. Holl. v. 1. 359. Ait. Hort. Kew. v. 1. 25. Lamarck Illuſtr. t. 9. (Bankſia; Forſt. Gen. t. 4.)—Claſs and order, *Diandria Monogynia.* Nat. Ord. *Vepreculæ*, Linn. *Thymelææ*, Juſſ. Brown.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, funnel-ſhaped, coloured; tube thread-ſhaped, very long; limb ſpreading, in four deep ſegments, two oppoſite ones exterior; mouth naked and pervious. *Cor.* none. *Stam.* Filaments two, capillary, inſerted into the mouth of the tube, oppoſite to the outer ſegments (*Brown*); anthers roundiſh, erect, ſimple, of two cells. *Piſt.* Germen ovate, ſuperior; ſtyle thread-ſhaped, as long as the tube, inſerted laterally into the germen; ſtyle capitate, ſmall, ſmooth. *Peric.* a dry, or ſlightly ſucculent, berry, with a thin coat. *Seed* ſolitary, ovate, obliquely pointed.

Eſſ. Ch. Calyx funnel-ſhaped, four-cleft, coloured, withering. Petals none. Stamens prominent, inſerted into the top of the tube. Style lateral. Stigma capitate, ſmooth. Seed coated.

Obſ. This genus comes neareſt in technical characters to *Paſſerina*, from which it differs nevertheleſs ſufficiently, in having but two ſtamens inſtead of eight, and, if we miſtake not, a conſtantly ſmooth ſtigma, inſtead of a hiſpid one. (See PASSERINA, GNIDIA, and DAPHNE, for remarks on the generic characters of this tribe.) Forſter originally called the genus before us *Bankſia*; but its ſpecies having all been reduced, by Linnæus and his ſon, to *Paſſerina*, a much finer genus was fortunately choſen to commemorate our illuſtrious countryman, and the name which he and his friend Dr. Solander had firſt contrived for this, is now retained. Of its numerous ſpecies we know not how to give any thing more than a comprehenſive idea, nor can we calculate their number with perfect preciſion. Willdenow has only four, conſiſting of our *linifolia*, firſt publiſhed in the Botany of New Holland, and the three Forſterian *Bankſiæ*, given as *Paſſerinæ* in Linn. Suppl. 226, 227. Vahl has added two. Labillardiere deſcribes ſix more, from the ſouth coaſt of New Holland. But Mr. Brown has carried our knowledge of this genus far beyond any preceding writer, as he defines thirty-four ſpecies of *Pimelæa* from New Holland alone. In theſe are not included the above three plants of Forſter, nor the *virgata* of Vahl, being natives of New Zeeland only; from which country we are poſſeſſed of three others, given by ſir Joſeph Banks to the younger Linnæus, and hitherto, we believe, entirely nondeſcript. Thus the known ſpecies may be reckoned to amount to forty-one. Of theſe *linifolia* alone is mentioned in the Hortus Kewenſis, as cultivated in Britain. Mr. Brown divides this genus into five ſections, of which we ſhall give examples.

Sect. 1. *Leaves oppoſite. Flowers in a terminal head. Involucrum (or rather four bracteas) unlike the leaves.* Fourteen ſpecies.

P. *cornucopiæ.* Vahl. n. 1. Br. n. 1.—Common bractea of one leaf, funnel-ſhaped, with four broad acute ſegments. Stem herbaceous.—Gathered by ſir Joſeph Banks at New South Wales, in 1770. Mr. Brown has met with the ſame in the tropical part of New Holland. This is one of the very few herbaceous ſpecies, moſt of the genus being ſhrubby, with the habit of *Daphne* and *Paſſerina*. Every part is ſmooth. *Branches* ſlender. *Leaves* an inch long, more or leſs, elliptic-lanceolate, entire as in all the reſt of this natural order, of a fine green, minutely dotted. *Flowers* ſmall, greeniſh-yellow, with a reddiſh ſlender tube about half an inch long. *Stamens* about the length of the rather unequal limb. The head of *flowers* is encompaſſed with four broad, acute, green *bracteas*, about its own length, the two outermoſt heart-ſhaped at the bottom, and all connected by an inverſely conical baſis, of one leaf, reſembling a *cornucopiæ*.

P. *linifolia.* Flax-leaved Pimelæa. Sm. Bot. of New Holl. 31. t. 11. Willd. n. 1. Br. n. 4. Vahl n. 2. Curt. Mag. t. 891.—Bracteas ovate, broad, ſmooth on both ſides, half the length of the head. Tube of the calyx ſilky. Leaves linear-lanceolate, or partly ſpatulate, ſtalked, ſingle-ribbed.—Native of New South Wales and the iſland of Van Diemen. *Br.* In England it is a green-houſe ſhrub, bearing, from February to Auguſt, a profuſion of elegant, white, but inodorous, *flowers*. The copious ſtraight *branches* are clothed with numerous, ſmooth *leaves*, about an inch long, variable in breadth. The globular briſtly common *receptacle* remains long after the *flowers* and *ſeeds* are fallen, ſurmounted by numerous young flowering branches.

Sect. 2. *Leaves oppoſite. Head terminal. Bracteas ſcarcely different from the leaves.* Fifteen ſpecies in Mr. Brown's Prodromus; to which are to be added the New Zeeland ſpecies, all of them, as far as we have ſeen, anſwering to the character of this ſection.

P. *drupacea.* Labill. Nov. Holl. v. 1. 10. t. 7. Br. n. 27.—Leaves oval-oblong, flat, ſlightly downy beneath; floral ones longer than the head. Tube of the calyx cylindrical, deciduous. Fruit pulpy.—From Van Diemen's land. Above ſix feet high. Young *branches* hairy. *Leaves* about an inch and a half long; the floral ones two or four, ſometimes larger, ſometimes ſmaller, than the reſt. Beſides the uſual terminal head of *flowers*, there are ſeveral ſmall, oppoſite, axillary ones, with two diminutive floral leaves to each. *Stamens* half the length of the limb. *Berry* black, pulpy.

P. *longifolia.* Banks, Herb. Linn. fil.—Leaves lanceolate, acute, ſmooth on both ſides; floral ones twice as long as the many-flowered head. Calyx externally ſilky.—Gathered by ſir J. Banks at New Zeeland, in 1769. This ſeems to be a tall and handſome *ſhrub*, ſmooth in every part except the *flowers*, which are white, externally ſilky, with elliptical obtuſe ſegments. *Leaves* willow-like, three inches long, half an inch wide, on ſhort broad *footſtalks*; the floral ones four, half the ſize of the reſt, but full twice the length of the flowers.

P. *lævigata.* (P. lævigata β; ibid.)—Leaves ovate, obtuſe, concave, ſmooth on both ſides; floral ones the length of the head. Calyx and young branches ſilky.—From the ſame country. *Stem* apparently procumbent. Young *branches* numerous, clothed with fine, denſe, rather prominent, white, ſilky hairs. *Leaves* ſcarcely above a quarter of an inch long, perfectly ſmooth and naked; the floral ones exactly like the reſt. *Flowers* many in each head, the length of the leaves, externally finely ſilky; their ſegments broad and rounded.

P. *villoſa.* Ibid.—Leaves imbricated, ovate, acute, concave; ſmooth above; very hairy beneath; floral ones the length of the head. Calyx and young branches hairy.—From the ſame country. This agrees with the laſt in ſize, but ſeems more erect, and differs in the long ſhaggy, though ſhining, pubeſcence of the *flowers*, young *branches*, and backs of the *leaves*.

P. *proſtrata.* Vahl n. 6. (P. lævigata α; Banks, H. Linn. fil. Bankſia proſtrata; Forſt. Gen. t. 4. f. *k*—*n*. Paſſerina proſtrata; Linn. Suppl. 227. Forſt. Prodr. 28.)—Leaves elliptical, obtuſe, concave, ſmooth on both ſides; floral ones the length of the head. Calyx and young branches hairy.—Native of dry hills in New Zeeland. Very like the laſt but one, though ſmaller in all its parts, with elliptical rather than ovate *leaves*, fewer *flowers* in each head, and ſlightly hairy, rather than denſely ſilky, young *branches*, as well as *calyx*. It is ſtill poſſible this and *lævigata* may be varieties of each other, as their original diſcoverers thought.

P. *piloſa*. Vahl. n. 4. (Bankſia tomentoſa; Forſt. Gen. n. 2. Paſſerina piloſa; Linn. Suppl. 226. Forſt. Prodr. 28.)—Leaves lanceolate, obtuſe, hairy beneath; floral ones rather ovate, twice the length of the few, lateral or terminal, hairy flowers.—Found in New Zeeland.—*Stem* erect, woody. *Branches* repeatedly forked, ſhort, ſpreading, ſilky. *Leaves* about an inch long; loſing their hairs by age.

P. *Gnidia*. Vahl n. 3. (Bankſia Gnidia; Forſt. Gen. t. 4. f. *a*—*i*. Paſſerina Gnidia; Linn. Suppl. 226. Forſt. Prodr. 28.)—Leaves ovato-lanceolate, acute, ſtalked, rigid, channelled, quite ſmooth, as well as the branches. Calyx very hairy.—Found in the ſiſſures of rocks in New Zeeland, near the coaſt, as well as on the loftieſt mountains. The copious bright-green *leaves*, about an inch long, have the aſpect of myrtle. The floral ones rather exceed in length the denſe heads of copious white *flowers*, whoſe outſide is very hairy.

Sect. 3. *Leaves oppoſite. Flowers ſpiked.* One ſpecies only.

P. *ſpicata*. Br. n. 30.—Leaves oval, ſmooth, as well as the calyx. Spikes naked. Flowers polygamous. *Br.*—Found near Port Jackſon, New South Wales. This is a delicate, ſmooth, upright ſpecies, whoſe *leaves* have the aſpect of ſome *Hypericum* or *Euphorbia*. The *flowers* are of a yellowiſh-green, tipped with purple, and are remarkable for forming a ſimple corymboſe ſmooth *ſpike*, at the ſummit of each branch. The ſegments of the *calyx* are broad and obtuſe; tube very ſlender, quite ſmooth.

Sect. 4. *Leaves oppoſite. Flowers axillary.* One ſpecies.

P. *argentea*. Br. n. 31.—"Leaves lanceolate, ſilvery on both ſides. Flowers from two to four together, axillary."—Gathered by Mr. Brown on the ſouth coaſt of New Holland. We have ſeen no ſpecimen.

Sect. 5. *Leaves alternate.* Three ſpecies.

P. *curviflora*. Br. n. 32.—Leaves elliptic-oblong; ſmooth above; ſomewhat ſilky beneath, like the branches, with depreſſed hairs. Heads lateral, of few flowers. Calyx ſilky; tube curved; limb unequal.—Native of Port Jackſon. We have fine ſpecimens from ſir J. Banks. This is a humble ſhrubby ſpecies, with thyme-like ſcattered *leaves*. The dried *flowers* are of a dull greeniſh-brown; their tube externally very ſilky; ſegments of the limb acute, one of them rather longer than the reſt.

P. *gracilis*. Br. n. 33.—"Leaves oblong-linear, taper at the baſe; rather hairy beneath; ſome of them oppoſite on the branches. Heads lateral and terminal, of few flowers. Calyx ſilky; tube nearly ſtraight; limb equal."—Gathered by Mr. Brown in the ſouth part of New Holland.

P. *latifolia*. Br. n. 34.—"Leaves oblong; acute and hairy at the baſe; rather ſilky beneath. Heads many-flowered, ſpiked; either terminal and ſeſſile; or ſtalked and oppoſite to the leaves. Calyx villous."—Found by Mr. Brown in the tropical region of New Holland. We have ſeen neither of theſe two laſt ſpecies.

PIMELIA, in *Entomology*, a genus of the Coleoptera order of inſects. The generic character is as follows: antennæ filiform; four feelers; thorax plano-convex, margined head exſerted; ſhells rather rigid; they are ſeldom found with wings. There are nearly 120 ſpecies enumerated by Gmelin, divided into ſections, according as their antennæ are moniliform, or entirely ſiliform; and theſe are ſubdivided according to the ſhape and ſtructure of the feelers.

A. *Antennæ moniliform at the tip.*

a. *Feelers ſiliform.*

Species.

STRIATA. Black, glabrous; ſhells with four ſanguineous ſtriæ. It is a native of India. The body is gibbous; antennæ brown at the tip; ſhells united, the four ſtreaks meeting at the tip.

UNICOLOR. Glabrous, black; the ſhells are marked with three raiſed obſolete lines. This is called the Tenebrio gibbus by Pallas. It is found at the Cape of Good Hope; as is the next.

FLAVICOLLIS. Glabrous, black; head white, villous behind.

GIBBA. Black; thorax globular; ſhells with an abbreviated lateral line. It is a native of India.

GLOBOSA. Thorax globular and very ſmooth; the ſhells are ſpinous behind. This is a native of the Cape.

LÆVIGATA. Oblong, black; thorax globular; ſhells very ſmooth, immaculate. It inhabits Hungary.

GLABRATA. Ovate, black; thorax globular; ſhells very ſmooth, immaculate. This is found in divers parts of Germany.

HISPIDA. Dull black; body rough, with erect ſtiff hairs. It inhabits Alexandria.

LONGIPES. Black; ſhells united, muricate; the legs are long. It is a native of ſeveral parts of Egypt.

RUSTICA. Thorax globular; grey; ſhells with a ſingle raiſed angular line. It inhabits the Cape of Good Hope.

MURICATA. Black; ſhells obtuſe, with muricate ſtriæ. It inhabits ſouthern Europe and the Eaſt.

TUBERCULATA. Black; thorax rough; ſhells with ſubſpinous tubercles. It inhabits divers parts of Italy.

VARIOLOSA. Black; thorax ſmooth; ſhells with obtuſe tubercles; the legs are long. It inhabits the Cape.

BI-PUNCTATA. Black; thorax globular, with two impreſſed dots; the ſhells are rugged, with three raiſed ſmooth ſtriæ. This is a native of Italy.

SCABRA. Black; ſhells rough; the antennæ and legs are brown. This is found at the Cape.

GROSSA. Black; ſhells rough, with three ſmooth raiſed lines. It inhabits Barbary.

ANGULATA. Shells ſpinous, with a lateral raiſed ſerrate line. It is a native of Alexandria.

ECHINATA. Thorax ſpinous at the ſides; ſhells with raiſed ſpinous lines. It inhabits the Cape of Good Hope.

DENTATA. Thorax glabrous; body black; ſhells brown, with three raiſed ſerrate lines. It inhabits the Cape.

PORCATA. Thorax ſmooth, poliſhed; ſhells with three raiſed lines, the ſpaces between are rough, with raiſed dots.

MACULATA. Thorax black; ſhells cinereous, ſpotted with brown, with three raiſed lines; the ſecond ſlightly waved. It inhabits the Cape.

SERRATA. Thorax variolous, ſhells with three raiſed lines; the interſtices are rugged, and the legs long.

MINUTA. Thorax ſmooth and duſky; the ſhells are cinereous and rough, with three raiſed ſmooth lines.

RUGOSA. The thorax of this ſpecies rough; the ſhells are rugged, and narrower before.

SPINOSA. Thorax margined, ſpinous before and behind;

the ſhells are marked with raiſed ſmooth ſtriæ. It is found in the ſouth of Europe, and alſo in the Eaſt.

Acuminata. Thorax margined, the fore and hind margins are ſpinous; the ſhells are ſmooth and united. A native of ſouthern Europe.

Reflexa. Thorax margined, and reflected at the edges; the ſhells are muricate, with a ſingle raiſed lateral line. Found in the Eaſt.

Fasciata. Of this the thorax is ſub-orbicular: the body is black; and the ſhells have two abbreviated yellow bands. It is an Indian inſect.

Collaris. Black; ſhells ſmooth, with a ſingle angle; the thorax is narrower than the ſhells; the head is depreſſed, carinate. Found in the ſouthern parts of Europe.

Carinata. Black; thorax orbicular; ſhells raiſed with three ſmooth lines. Inhabits the ſouth of Europe.

Ciliata. Black; depreſſed; thorax and ſhells ciliate, the latter reflected at the edges. It is a native of the Cape.

Lineata. Rounded and rough thorax; the ſhells have three lines of raiſed dots, and between theſe there are three lines. It inhabits Siberia.

Leucographa. Rounded and rough thorax; ſhells cinereous, with nine black raiſed lines. It is a ſmall inſect, and found in Saxony.

Glabra. Black; thorax rounded and ſmooth; the ſhells are very ſmooth. It inhabits Egypt, and varies very much in ſize.

Angustata. Glabrous; thorax narrowed behind; ſhells pointed. It inhabits the Eaſt. The body is entirely ſhining black.

Orbiculata. Glabrous; thorax orbicular; ſhells pointed. It is denominated the Tenebrio nomas by Pallas. It is a native of the Eaſt.

Cephalotes. Thorax ciliate at the fore and hind edges; the ſhells are very rough, with four raiſed lines, the lateral ones carinate and ſubſerrate. It inhabits the deſerts of Ural.

Convexa. Black, ſmooth; thorax orbicular, convex, truncate before. It is found in divers parts of Europe and Africa.

Linearis. Black, ſmooth; legs ferruginous; antennæ very ſhort. It inhabits Sweden.

Pubescens. Ovate, pubeſcent, opaque; ſhells with each four denticulate ribs. It is found in Egypt.

Aurita. Thorax margined, dilated on the fore part; ſhells bicarinate, with two gibboſities. It inhabits Mauritania, as does the next.

Didyma. Thorax widely margined, two-horned behind; ſhells angular, with two gibboſities.

Caspica. Ovate, ſlightly depreſſed; thorax excavated before and behind; ſhells carinate on each ſide, with alternate rough and ſmooth bands. A native of the Caſpian ſea.

Subglobosa. This, as its name imports, is ſubglobular; ſhells with ſmooth raiſed dots, and about four ribs, the outmoſt are carinate and crenulate. It is the Tenebrio ſubgloboſus of Pallas. It inhabits ſouthern France, and the deſerts of Tartary. It moves very ſlowly, and is infeſted with the Gordius; and ſuppoſed to be a variety only of the Pimelia rugoſa.

Silphoides. Sides of the thorax pointed behind, jagged before; ſhells with three ſmooth ſtriæ. A native of Mauritania.

Tibialis. Black, ſmooth; fore-ſhanks compreſſed, one-toothed. It inhabits Africa and Spain.

Femoralis. Black, ſmooth; thighs thick, channelled beneath. It is found in divers parts of Germany.

Striatula. Black; ſhells ovate-oblong, ſtriate. A native of Spain.

Laticollis. Oval, depreſſed, deep black, ſmooth; thorax very broad, margined, excavated before, and truncate behind; the ſhells are ſubſtriate. Found at the Cape of Good Hope.

Vittata. Gibbous, black; ſhells united, glabrous, with three ſcarlet ſtriæ and ſutures on each ſide; the legs are unarmed.

b. *Feelers clavate.*

Gages. Black; the thorax is a little rounded; the ſhells are mucronate and very ſmooth. Inhabits the ſouthern parts of Europe. It reſembles the P. mortiſaga, but is twice as large.

Sulcata. Shells mucronate and grooved. It is found in the Eaſt; the ſhells are united with eight or nine ſmooth grooves. This inſect is ſold in Turkey as a ſpecific againſt pains in the ears, and the bite of ſcorpions, and is boiled with butter, and eaten by the Turkiſh ladies for the purpoſe of making them grow fat.

* Mortisaga. Black; ſhells mucronate, ſub-punctured. Found in various parts of Europe, as well as in this country. This inoffenſive animal is regarded as a preſage of the death of one in the family, by the common people in Sweden, if it is ſeen crawling about the houſe.

Excavata. Thorax angular behind; ſhells with indented dots, ſomewhat pointed. It is a native of Coromandel.

Granulata. Black, depreſſed; ſhells with ſub-ſpinous tubercles. It inhabits the Cape of Good Hope, as does the next.

Buprestoides. Ovate, black; ſhells united and very ſmooth.

Dermestoides. Black, ovate; ſhells obſoletely ſtriate; ſhield emarginate. It is a native of Saxony.

Obtusa. Thorax angular behind; body black; ſhells obtuſe, ſtriate. It inhabits Coromandel. This is the Blaſis ſtriata of Fabricius.

Capensis. Ovate, depreſſed, black; thorax with dilated margins; it has four fore-ſhanks one-toothed. Found at the Cape.

Emarginata. Black, ſhells with crenate ſtriæ; lip emarginate. It inhabits Morocco.

Granulosa. Black; ſhells with three raiſed lines, and ſmall raiſed dots between them; thorax emarginate. This is an African inſect.

Sublævigata. Depreſſed, black; ſhells with three raiſed ſmooth lines. A native of Morocco.

Tristis. Black; ſhells grooved; the grooves ſmooth. Found in the ſandy plains of Barbary.

Serratula. Thorax thickened at the edge; ſhells with three raiſed crenate lines. It inhabits the Cape of Good Hope.

Femorata. Black; hind-thighs channelled beneath, and covered with ferruginous down. A native of Germany.

Tibiata. Black; ſhells ſtriate; fore-ſhanks dilated and triangular. It is found at the Cape of Good Hope.

Crenata. Thorax angular behind; of a grey-brown colour; ſhells with crenate ſtriæ, obtuſe. It inhabits Coromandel.

Helopioides. Oblong, black; ſhells very ſmooth. It is an European inſect.

Punctata. Black; antennæ ferruginous; ſhells ſtriate, and punctured. It is a native of the South American iſlands.

Clathrata. Black; ſhells latticed; antennæ ferruginous at the tip. It inhabits South America.

Speciosa. Subovate, bronzed, winged; ſhells highly poliſhed, ſtriate, with coppery and green lines. It inhabits Brazil.

Chrysomeloides. Ovate, very rough; thorax longitudinally ridged; ſhells with three tuberculate lines. A native of Mauritania.

Costata. Subglobular, roughiſh, opaque; ſhells with each three crenulate ribs, the outmoſt carinate. A native of Siberia.

Torulosa. Ovate, ſubglobular; ſhells tuberculate, convex, without ribs. It is found at the Cape of Good Hope.

Agricola. Pale rufous; head and thorax black. It inhabits Germany.

Sabulosa. Black; ſhells rugged, pointed behind. Found in France, as is the next.

Octo-striata. Black; ſhells with eight punctured ſtriæ diſpoſed in pairs.

B. *Antennæ entirely filiform.*

a. *Feelers four, filiform.*

Tricuspidata. Thorax with three teeth before; the body is of a grey colour. It is an Arabian inſect.

Similis. Thorax duſky, with three teeth; diſk of the ſhells whitiſh, with three brown lines. Found in Barbary.

Cristata. Thorax with three teeth, creſted; body variegated. Found in Arabia.

Reticulata. Thorax angular at the ſides; ſhells reticulate. It inhabits the Cape of Good Hope; as do the two following.

Corrugosa. Thorax ſmooth; gloſſy-black; ſhells rugged, with a ſingle raiſed line.

Vittata. Thorax ſubangular; ſhells black, with two white fillets, and a ſingle raiſed line.

b. *Fore-feelers hatched-ſhaped, hind-ones clavate.*

Laminata. Black; thorax nearly ſquare, ſmooth; ſhells grooved; fore-ſhanks incurved, with a round ferruginous appendage at the tip. It inhabits India.

Punctulata. Black; thorax ſquare, the edges ſlightly toothed; ſhells ſtriate, punctured. It inhabits India.

* Cærulea. Blueiſh; thorax ſuborbicular; ſhells ſtriate. This is found in this country, and other parts of Europe.

Lanipes. Bronzed; ſhells ſerrate and pointed. It is a native of Germany.

Marginata. Black; ſhells with a ſanguineous edge all round. It inhabits Guinea. The ſhells are ſtriate, black, with a blue gloſs; the breaſt is rufous.

Æruginosa. Green bronzed; antennæ, ſhells, and legs black. Found at the Cape of Good Hope.

Bicolor. Above dull braſſy; beneath black; ſhells ſtriate. It inhabits the South American iſlands.

* Serrata. Black; claws ferruginous; feelers projecting. This is an Engliſh inſect, and found in other parts of Europe.

Barbata. Black; feelers projecting; legs yellowiſh. A native of Saxony.

Caniculata. Black; thorax channelled, impreſſed on each ſide; the ſhells are ſtriate; the feelers projecting. This is a native of Saxony.

Hæmorrhoidalis. Head and thorax azure; ſhells green, with crenate ſtriæ; the tail is rufous. It is found in India.

Lurida. Black; antennæ and legs brown. Inhabits Brazil.

Lævis. Black; thorax channelled, tapering behind; ſhells ſmooth. It inhabits Saxony.

Equestris. Black; ſhells with an abbreviated gold band. It inhabits Brazil.

Maura. Black; thorax rounded on each ſide, ſmooth; ſhells with indented dots. It inhabits the Eaſt Indies.

Morio. Black; thorax ſquare, ſmooth; ſhells with punctured grooves. It inhabits North America.

Nigrita. Black; thorax rounded at the edges; ſhells with crenate grooves. It inhabits Tranquebar.

Picicornis. Ovate, black; ſhells ſtriate; antennæ and abdomen piceous. It inhabits the Eaſt Indies.

Rufipes. Black; ſhells, antennæ, and legs rufous. Found in New Holland.

Longipes. Black; ſhells ſtriate; legs long; ſecond pair of ſhanks bearded. It inhabits the equinoctial parts of Africa.

Capensis. Ovate, black; thorax ſmooth; ſhells ſtriate. It inhabits the Cape.

Marginata. Ovate; thorax thickened at the edges; ſhells ſtriate and ſmooth. It inhabits the Cape.

Atra. Black; ſhells ſtriate; antennæ and legs brown. It is a native of Germany.

* Anglica. Black; thorax rounded before; ſhells ſtriate, punctured; antennæ rufous at the tip. It is a rare inſect, but a native of England.

Hottentotta. Black; ſhells with crenate ſtriæ. This is found in France.

Bankii. Black; ſhells grooved, punctured; fore-thighs ſharply toothed. It is found in Coromandel.

Undata. Black; thorax rufous, with black ſpots; ſhells rufous, with waved black bands. It inhabits Cayenne.

* Quisquilia. Black; antennæ and legs ferruginous. It inhabits divers parts of Europe, and is found in filth and manure.

Flavipes. Brown; mouth, antennæ, and legs ferruginous; ſhells with crenate ſtriæ. It inhabits the South American iſlands.

Ruficollis. Ferruginous; ſhells ſtriate, black. It inhabits Saxony.

Cyanea. Blue; thorax punctured; ſhells ſtriate. It inhabits Germany.

Violacea. Cylindrical, varied with fine poliſhed blue and violet; abdomen red behind; ſhells ſtriate, punctured.

Leucographa. Ovate; thorax very rough, uneven; ſhells carinate, rough, with longitudinal, whitiſh, ſmooth ſtripes.

Buparia. Winged, black, glabrous; thorax lunate; jaws ſtrong, toothed, as long as the head. It inhabits Spain, is deſcribed to be of the ſize of Lucanus interruptus, and it reſembles the Tenebrio foſſor.

PIMENI, in *Geography*, a town of Naples, in Calabria Ultra; 17 miles N.E. of Nicotera.

PIMENTA, or Pimento, in *Botany*, *All-ſpice*, or *Jamaica Pepper*, a ſpecies of the *Myrtus*, the *Myrtus pimenta.* (See Myrtus.) It grows plentifully on the hilly parts of Jamaica, and is much cultivated there; becauſe of the great profit from the cured fruit ſent in great quantities yearly into Europe.

It flowers in June, July, and Auguſt, ſooner or later, according to its ſituation and the different ſeaſons for rain; and after its flowers, the fruit ſoon ripens. The flowers, with every part of the tree, breathe an aromatic fragrance.

Its fruit is called *all-ſpice*, from its taſte being ſuppoſed to reſemble that of many different ſpecies mixed together.

There is little difficulty in curing and preſerving this fruit for uſe, which is done thus: the negroes climb the trees and pull off the twigs with the unripe green fruit, and afterwards carefully ſeparate the fruit from the twigs, leaves, and ripe berries; which done, they expoſe them to the ſun from its riſing to ſetting, for many days, ſpreading them thin on cloths, turning them now and then, and carefully avoiding the dews. By this management they become a little rugoſe or wrinkled, dry, and from a green change to a brown colour, and then they are fit for the market.

The ripe berries are very carefully ſeparated from thoſe to be cured; becauſe their wet and plenteous pulp renders them unfit for cure.

The berries that are fully ripe loſe the aromatic warmth for which they are ſo much eſteemed, and acquire a taſte perfectly reſembling that of juniper berries, which renders them an agreeable food for the birds, the moſt induſtrious planters of theſe trees, which devouring them greedily, and muting the ſeeds, afterwards propagate theſe trees in all parts of the woods.

After the above deſcribed proceſs is completed, which is known by the colour and rattling of the ſeeds in the berries, they are put up in bags or hogſheads for the market. The aromatic odour and warm pungent taſte of the pimento are qualities, which reſide chiefly in the capſule, or rather cortical part of the dried berry. Its virtues are extracted by water, alcohol, and ether. The watery infuſion is of a brown colour, and reddens litmus infuſion. With ſolution of ſulphat of iron it immediately ſtrikes a deep black colour, and ſlowly lets fall a precipitate. Nitrate of mercury precipitates it of a yellowiſh-brown; ſuperacetate of lead of a dirty green; and nitrate of ſilver of a deep reddiſh-brown colour. It alſo forms a precipitate with the infuſion of yellow cinchona bark. The ſulphuric and muriatic acids redden it, and throw down pale roſe coloured precipitates. The nitric acid forms no precipitate, but gives it a yellow hue. The alcoholic tincture is rendered milky, and after a time precipitated by water; the ethereal, when evaporated in water, depoſits drops of a greeniſh-yellow volatile oil, a pellicle of a pungent nauſeous-taſted reſin, and ſome extractive. Hence pimento appears to contain a volatile oil, reſin, extractive, tannin, and gallic acid.

For dietetic purpoſes, to which it is chiefly applied, it is accounted the beſt and moſt temperate, mild, and innocent of common ſpices, and fit to come into greater uſe, and to gain more ground than it hath yet done. It ſurpaſſes moſt of the Eaſt Indian aromatics in promoting the digeſtion of meat, attenuating tough humours, moderately heating, ſtrengthening the ſtomach, expelling wind, and doing thoſe friendly offices to the bowels, we generally expect from ſpices. Phil. Tranſ. N° 192.

This ſpice has been alſo long employed in the ſhops as a ſuccedaneum to the more coſtly oriental aromatics. Diſtilled with water, it yields an elegant eſſential oil, ſo ponderous as to ſink in water, in taſte moderately pungent, in ſmell and flavour approaching to oil of cloves, or a mixture of thoſe of cloves and nutmegs: the remaining decoction, inſpiſſated, leaves an extract ſomewhat ungrateful but not pungent. To rectified ſpirit it imparts, by maceration or digeſtion, the whole of its virtue, together with a browniſh-green tincture. In diſtillation it gives over very little to this menſtruum, nearly all its active matter remaining concentrated in the inſpiſſated extract.

Pimento is ſtimulant and tonic. It is uſeful as an adjunct to bitters in dyſpepſia attended with much flatulence, and in arthritic and hyſterical affections. The watery infuſion of it ſweetened with ſugar, and with the addition of a little milk, is readily taken by children, and ſerves as an excellent cordial in malignant meaſles, ſcarlatina, confluent ſmall-pox, and the other exanthemata, when the fever aſſumes the typhoid type. But its principal uſe in medicine is to cover the diſagreeable taſtes of other remedies, or to give them warmth. The doſe of the berries is from grs. v to ℈ij in powder, or in their entire ſtate. The officinal preparations are the following; *viz.* Aqua pimenta, L. E. D. Oleum pimentæ, L. E. D. Pilulæ opiatæ, E. Spiritus pimentæ, L. D. Syrupus rhamni, L.

The "Aqua pimentæ" of the London college, "Aqua myrti pimentæ," Edinb., "Aqua pimento," Dub., or pimenta water, is prepared by macerating half a pound of pimenta berries bruiſed in a pint of water for 24 hours; and by diſtilling with a ſufficient quantity of water to prevent empyreuma, a gallon (10 pounds, Edinb.)

This water has the odour and aromatic quality of the Jamaica pepper, but it is not very agreeable to the taſte. It is uſed as a carminative in dyſpepſia.

"Oleum pimentæ," L.E.D. (ſee OIL *of Jamaica Pepper*), "Pilulæ opiatæ," (ſee PILLS, *Opiate*), "Spiritus pimentæ," L., "Spiritus pimento," Dub., Spirit of pimenta, is prepared by macerating for 24 hours two ounces (three ounces, Dub.) of pimenta berries bruiſed in a gallon of proof ſpirit, with water ſufficient to prevent empyreuma; and then diſtilling a gallon by gentle heat. "Spiritus fructus myrti pimentæ," Edinb., Spirit of pimenta, is prepared with half a pound of bruiſed pimenta berries, in the ſame manner as ſpirit of caraway. This is an uſeful carminative in flatulent colic, atonic gout, and dyſpepſia.

Syrupus *Rhamni*. See *Syrupus* RHAMNI.

PIMERIA, in *Geography*, a province in the domain of New Biſcay, ſo called from the Pimas, a ſavage tribe. It is divided into two diſtricts, the higher and the lower, and extends more than 100 leagues to the N. of Sonora. The ſavages here are rather pacific, and friends of the Spaniards. The climate is moiſt and cold, the rains being ſometimes continued during a whole week in winter, while many torrents deſcend from the Sierra Madre. The Spaniards have left this province almoſt a deſert, on account of the frequent invaſion of the Apaches.

PIMOCHA, a town of South America, in the audience of Quito; 36 miles N.N.E. of Guayaquil.

PIMOLISA, in *Ancient Geography*, a fortified place of Cappadocia, in Pontus, on this ſide of the river Halys, and which gave name to the country of "Pimoliſena," in the environs of this river.

PIMP-TENURE, in *Law*, a kind of tenure mentioned in our old writers, "Willielmus Hoppeſhort, tenet dimidiam virgatam terræ, per ſervitium cuſtodiendi ſex damiſellas ſcil. meretrices, ad uſum domini regis." 12 Ed. I.

PIMPELGONG, in *Geography*, a town of Hindooſtan, in the circar of Kitchwara; 15 miles E. of Saurungpour.

PIMPERNEL, in *Botany* and the *Materia Medica*. See ANAGALLIS.

PIMPERNEL, *Water*, a ſpecies of ſpeedwell or *veronica*; which ſee.

PIMPERNEL, *Round-leaved Water*. See SAMOLUS.

PIMPERNEL, *Yellow, of the Woods*. See LYSIMACHIA.

PIMPINELLA, is ſuppoſed by Ambroſinus, whoſe opinion is adopted by Linnæus, to be a corruption of *bipinella*, or *bipennula*, words expreſſive of the pinnate, or feather-like, ſtructure of the foliage. Linn. Gen. 145. Schreb. 195. Willd. Sp. Pl. v. 1. 1471. Mart. Mill.

Dict. v. 3. Sm. Fl. Brit. 331. Ait. Hort. Kew. v. 2. 159. Juſſ. 219. Lamarck Illuſtr. t. 203. (Aniſum; Gærtn. t. 23.)—Claſs and order, *Pentandria Digynia.* Nat. Ord. *Umbellatæ.*

Gen. Ch. *General umbel* of numerous rays; *partial* of ſtill more. *General* and *partial involucrum* wanting. *Perianth* ſcarcely diſcernible. *Cor.* Univerſal nearly uniform; flowers all fertile; partial of five, nearly equal, inflexed, heart-ſhaped petals. *Stam.* Filaments five, ſimple, longer than the petals; anthers roundiſh. *Piſt.* Germen inferior; ſtyles two, very ſhort; ſtigmas capitate, nearly globoſe. *Peric.* none; the fruit ovate-oblong, ſeparable into two parts. *Seeds* two, oblong, contracted towards the top, convex and ſtriated on the outer ſide, flat on the inner.

Eſſ. Ch. General and partial involucrum wanting. Petals uniform, inflexed. Fruit ovate-oblong, ſtriated. Stigmas nearly globoſe.

1. P. *ſaxifraga.* Common Burnet-Saxifrage. Linn. Sp. Pl. 378. Fl. Dan. t. 669. Jacq. Auſtr. t. 395. Engl. Bot. t. 407. (Bipinella, ſive Saxifraga minor; Ger. Em. 1044.)—Leaves pinnate, variouſly cut; the radial leaflets roundiſh; the uppermoſt linear. Seeds ſmooth. —Native of dry gravelly or lime-ſtone paſtures and hills, in various parts of Europe; frequent in England, flowering in July and Auguſt. The *root* is perennial, woody, aromatic, very hot and pungent. *Herb* roughiſh, and ſomewhat downy. *Stems* erect, rigid, round, ſtriated, rather zigzag; the flowering branches elongated, and nearly naked. The leaflets of the radical *leaves* are ovate, obtuſe, or roundiſh, very deeply and irregularly cut, ſome of them, from the ſame root, doubly pinnatifid in the moſt regular manner; the *leaves* on the upper part of the ſtem are ſimply pinnatifid, and linear; and the uppermoſt of all minute, as if abortive, conſiſting of little more than a lanceolate, concave, membranous *footſtalk.* The *umbels* are terminal, ſolitary, naked, and ſmooth, with angular ſtalks. *Flowers* ſmall, white or cream-coloured, almoſt perfectly regular. *Stigmas* capitate, which is unfortunately omitted in Engl. Bot., ſome of the *flowers* being occaſionally found incomplete in that reſpect, as there repreſented. *Seeds* ſmall, ſtriated, ſmooth, crowned with the fleſhy receptacle of the flower. *P. diſſecta.* Retz. Obſ. faſc. 3. 30. t. 2. Willd. n. 4. Ehrh. Herb. 42; appears to us a mere variety, with triply pinnatifid leaves. Ehrhart's ſpecimen, at leaſt, is not ſpecifically different from *ſaxifraga,* except in its ſmooth *ſtem,* a variable character.

2. P. *nigra.* Black-rooted Burnet-Saxifrage. Willd. n. 2. Berolin 110. (Saxifragia hircina minor, foliis ſanguiſorbæ; Bauh. Hiſt. v. 3. part 2. 111.)—Stem ſtriated, hairy. Leaves pinnate, downy; the radical ones with inverſely heart-ſhaped, cut, obtuſely toothed leaflets; thoſe on the ſtem bipinnate, their leaflets wedge-ſhaped, toothed. —Native of dry ground in Germany. We know it not, but we follow Willdenow's *Prodromus Berolinenſis,* in preference to his Sp. Pl., in the character, as agreeing beſt with Roth's Fl. Germ. v. 2. 342. The latter author deſcribes "the terminal leaflet of the radical *leaves* conſtantly three-lobed." So it often is in *P. ſaxifraga.* The *root* of *P. nigra* is ſaid to diſcharge a blue milky fluid, when wounded.

3. P. *magna.* Great Burnet-Saxifrage. Linn. Mant. 2. 219. Willd. n. 3. Engl. Bot. t. 408. (P. major; Hudſ. 127. Fuchſ. Hiſt. 608. Jacq. Auſtr. t. 396. P. ſaxifraga; Ger. Em. 1044. Matth. Valgr. v. 2. 379.)—Leaves pinnate; leaflets ovate, pointed, cut; the terminal one three-lobed. Stem angular, furrowed, ſmooth.—Native of various parts of Europe. Found with us chiefly on a chalky or lime-ſtone ſoil, in rather hilly places, flowering in July and Auguſt. The *root* is larger than that of the firſt ſpecies, but weaker in flavour and qualities. Whole plant larger, diſtinguiſhed by the uniformity of its *leaves,* which are pointed, and doubly ſerrated, ſmooth, and of a lighter green. *Stem* ſmooth, remarkably angular and furrowed. *Umbels* large, always white in England. Jacquin repreſents them of a pale bluſh, though he deſcribes them as generally white, except in ſubalpine ſituations. On the alps of Switzerland, France, Savoy, &c. this ſpecies is always found with beautiful pink *flowers.* This is P. flore rubro; Riv. Pentap. Irr. t. 81. We have often, in contemplating its beauty, wiſhed to detect ſome ſpecific diſtinction, but in vain. Another acknowledged variety, though much differing in habit, is *P. orientalis,* Gouan. Illuſtr. 21. t. 15. Jacq. Auſtr. t. 397. (Pimpinella; Riv. Pentap. Irr. t. 80.)—In this moſt of the *leaflets* are deeply, and even doubly, pinnatifid, with linear-lanceolate, entire, not ſerrated, ſegments. Without the radical *leaves,* which agree with the common appearance of *P. magna;* and the weighty authority of Jacquin, who has traced its variations; few perſons would believe this to be but a variety. Willdenow ought to have marked it γ, as differing from his β.

4. P. *Tragium.* Downy-ſeeded Burnet-Saxifrage. Villars Dauph. v. 2. 605. (Tragium alterum Dioſcoridis; Column. Phytobaſ. 75. t. 76. ed. 2. 61. t. 17, excluding Tournefort's ſynonym.)—Leaves pinnate; leaflets wedge-ſhaped, cut; the uppermoſt linear and entire. Seeds downy.—Found by Villars near Grenoble, at the foot of the mountain of St. Juſte, near St. Paul of the three caſtles, amongſt red ochry ſand and foſſil ſhells. We have a ſpecimen from M. Thouin. Authors have paſſed over this ſpecies, though it appears to us very diſtinct, eſpecially in its downy *ſeeds,* which ſerve to aſcertain the ſynonym of Columba, though his plate muſt ſurely have been taken from a ſpecimen of *P. ſaxifraga;* at leaſt his *leaves,* except that on the middle of the *ſtem,* give no idea of our plant. The *root* of *P. Tragium* is woody, branched at the top, very pungent. *Stems* from ſix to twelve inches high, branched, ſpreading, round, ſtriated, downy, almoſt leafleſs. Radical *leaves* numerous, ſimply pinnate, two inches long, rigid, minutely downy; wedge-ſhaped, not rounded, very acutely cut into about three ſegments. Villars ſays the leaflets of the firſt year's growth are more rounded. *Umbels* finely downy. *Stigmas* capitate. *Seeds* ovate, angular rather than ſtriated, uniformly covered with fine, ſhort, denſe pubeſcence.

5. P. *bubonoides.* Round-leaved Burnet-Saxifrage. Broter. Luſit. v. 1. 462. Phytogr. faſc. 1. 41. (Apium macedonicum; Luſit. Griſl. Virid. 19, excluding the ſynonym. A. luſitanicum rotundifolium; Tourn. Inſt. 305.)—Leaves twice or thrice pinnate, rounded, obtuſe, crenate. Stem panicled. Umbels and ſeeds downy.—Native of ſandy barren places in Portugal. *Brotero.* Loefling ſent ſpecimens from St. Ubes, with Tournefort's ſynonym, to Linnæus, who laid them undetermined into his genus of *Bubon.* We have others gathered by the Abbé Durand, in July, near Salée in Barbary. This is a ſtriking and moſt diſtinct ſpecies, with all the characters of a *Pimpinella.* *Root* perennial, acrid, externally green. *Stem* often ſolitary, ſometimes three or four from one root, herbaceous, annual, twelve or eighteen inches high, round, downy, thickiſh, much branched, and panicled, bearing a multitude of white *umbels,* very downy in every part; the *branches* and *ſtalks* accompanied by broad, ſolitary, ovate, often recurved *bracteas,* or rather abortive leaf-ſtalks. Radical *leaves* large, green, finely veined, ſlightly downy, twice or thrice pin-

nate; each leaflet near an inch long, rounded and obtuſe, ſtrongly crenate; oblique, entire, and cut away, as it were, at the baſe.

6. P. *capenſis.* Cape Burnet-Saxifrage. Thunb. Prodr. 51. Willd. n. 6.—"Leaves thrice compounded; their ſegments acute. Stem ſtriated."—Found at the Cape of Good Hope.

7. P. *peregrina.* Nodding Burnet-Saxifrage. Linn. Sp. Pl. 378. Willd. n. 7. Ait. n. 4. Jacq. Hort. Vind. v. 2. 61. t. 131. (Daucus tertius Dioſcoridis, ſecundus Plinii; Column. Ecphr. 108. t. 109.)—Radical leaves pinnate, rounded, crenate; upper ſtem-leaves wedge-ſhaped, cut. Young umbels pendulous. Seeds hiſpid.—Native of Italy, Spain, and France. Cultivated by Parkinſon in 1640. *Root* perennial, ſpindle-ſhaped, white, aromatic and acrid. *Stem* eighteen inches high, erect, round, downy, not much branched. Radical *leaves* ſimply pinnate, rounded and crenate; the reſt compoſed of narrow wedge-ſhaped leaflets; all ſomewhat rough or downy. *Umbels* few, large, white, perfectly pendulous, as if dying, before the *flowers* expand. *Seeds* ovate, minutely briſtly.

8. P. *Aniſum.* Aniſe. Linn. Sp. Pl. 379. Willd. n. 8. Ait. n. 5. Woodv. Med. Bot. t. 180. (Aniſum; Riv. Pentap. Irr. t. 73. Ger. Em. 1035.)—Radical leaves three-cleft; ſtem-leaves acutely laciniated. Germen downy.—Native of Egypt. A hardy annual, but ſeldom ripening its ſeeds plentifully in our gardens. What are required for medical uſe, as an agreeable aromatic and cordial, are imported from Spain and Malta. The *herb* is a foot high, branched, ſlightly rough or downy, known by its jagged ſharp *leaves.* *Umbels* always erect, white.

9. P. *dichotoma.* Fork-leaved Burnet-Saxifrage. Linn. Mant. 58. Willd. n. 9.—Leaves repeatedly compound, linear, channelled, acute. Footſtalks with a membranous dilated wing. Stem panicled. Seeds globoſe, rough.—Native of Spain; ſent by Loeffling to Linnæus, who alone has deſcribed it, nor do we find it any where figured. The *ſtem* is about a foot high, very much branched and panicled, with numerous white *umbels.* *Leaves* fleſhy, roughiſh, in narrow channelled ſubdiviſions, ſo that this ſpecies might well have been termed *abrotanifolia.* Their broad *footſtalks* are conſpicuous for a fine, broad, membranous, ſnow-white border.

10. P. *dioica.* Dwarf Burnet-Saxifrage, or Rock Parſley. Linn. Syſt. Veg. ed. 13. 241. Willd. n. 10. Engl. Bot. t. 1209. (P. pumila; Jacq. Auſtr. t. 28. P. glauca; Linn. Sp. Pl. 378. Willd. n. 5. Seſeli pumilum; Linn. Sp. Pl. 373. Peucedanum pumilum; Ger. Em. 1054.)—Leaves twice or thrice compound, linear, ſmooth. Umbels panicled. Flowers dioecious. Seeds ovate, ſmooth.—Native of Italy, Switzerland, France, and Auſtria; found on lime-ſtone rocks, in the ſouth of England, but rarely. We no longer ſcruple to unite all the above ſynonyms of Linnæus, on the authority of his own ſpecimens. This ſpecies is of humble growth, ſmooth, glaucous, with a ſtout, zigzag, ſtriated, purpliſh *ſtem,* divided into many alternate ſpreading branches. The *umbels* are diſpoſed in a panicled manner, on reddiſh ſtalks. *Flowers* white, perfectly dioecious in effect, though not entirely in ſtructure. *Seeds* roundiſh-ovate, ſtriated, quite ſmooth. Dr. Wade has met with this rare plant, in great abundance, in paſtures near the church of Athby, county of Meath, Ireland. Dr. Sibthorp found it on the ſummits of mount Athos, and the Bithynian Olympus.

Pimpinella, in *Gardening,* contains a plant of the annual kind, of which the ſpecies cultivated is the aniſe (P. aniſum).

In theſe plants the ſeeds have an aromatic ſmell, and a pleaſant warm taſte, accompanied with a conſiderable degree of ſweetneſs.

Method of Culture.—The ſeeds ſhould be ſown in the early part of April, on a dry warm border, where the plants are to remain; being afterwards properly thinned out, and kept free from weeds. Theſe plants, however, ſeldom afford much profit by their ſeeds in this climate.

They produce variety in the borders, &c. of pleaſure-grounds, as well as in pots in other places, when cultivated in that way.

PIMPLA, or Pimpleus, in *Ancient Geography,* one of thoſe mountains which ſeparated Macedonia from Theſſaly, and which were conſecrated to the Muſes.

PIMPLE, in *Medicine,* a ſmall puſtule ariſing on the face.

By mixing equal quantities of the juice of houſe-leek, *ſedum minus,* paſſed through paper, and of ſpirit of wine rectified by itſelf, a white coagulum of a very volatile nature is formed, which Dr. Burghart commends for curing pimples of the face; and ſays, that the thin liquor ſeparated from it, with ſugar-candy, is an excellent remedy for thick viſcid phlegm in the breaſt. Satyr. Sileſiac. Spec. 4. Ob. 2.

PIMPRAMA, in *Ancient Geography,* a town of India, towards the ſource of the river Indus, according to Arrian.

PIMSAN-IM, in *Geography,* a town of Chineſe Tartary; 35 miles S.W. of Ning-yuen.

PIN, in *Commerce,* a little neceſſary implement, chiefly uſed by the women in adjuſting their dreſs.

The form and application of this little article need no deſcription; but its conſumption, and the number of hands it employs, are too conſiderable to be paſſed by unnoticed.

Pins are now moſtly made of braſs-wire: formerly they likewiſe made them of iron-wire, which, being blanched, like the others, paſſed for braſs; but the ill effect of thoſe pins has almoſt altogether diſcarded their uſe. The French, however, could not be driven off from them without ſeveral arrets of parliament. By a ſentence of the lieutenant de police, July 1695, the ſeizure of ſome millions of thoſe pins was confirmed, and the pins condemned to be burnt by the common executioner.

The pins moſt eſteemed in commerce are thoſe of England. The method of manufacturing this uſeful article, that has been long practiſed, is as follows. The braſs wire, of which theſe implements are now almoſt wholly made, is generally too thick for being cut into pins. It is, therefore, reduced in ſize, by cauſing it to paſs through a ſmall hole in a piece of iron. When it has been reduced to a proper ſize, it is ſtraightened, and ſubſequently cut into proper lengths; and again afterwards cut into ſmaller ones, each length being ſufficient for making ſeveral pins. Each end of theſe pieces is pointed, ſo as to be ſharp enough for penetrating, without difficulty, through linen, paper, &c. by either men or boys, ſeated before two ſmall grinding-ſtones, or ſteel-mills, that are turned by a wheel, either by means of machinery or of the hand. Theſe ſtones, or ſteel-mills, are uſed for making the rough point, and for ſmoothing them; and, therefore, they are careful to turn the wire, ſo as to render the points uniform and regular. The pin is afterwards cut off to the length that is wanted, from each end; and the proceſs is repeated; till the whole of the length is pointed. The manufacture of the head is performed by the following operations. A piece of wire, ſuitable for heads, is ſpun on another; and thus the inſide wire occaſioning the upper wire to be hollow, when drawn off, is then in the ſtate required for being cut into heads: this is done by ſhears, every two rounds of the wire making a ſingle head. The next proceſs is that of heading the lengths, which is done by the operators or work-people taking up a ſingle length, and thruſting it among the heads, and then immediately placing it under a heavy weight or hammer; when receiving the neceſſary blow, it is made ſecure; and thus the pin is completed in the firſt ſtate. After this it is to be blanched or whitened, which is accompliſhed by putting the pin in a copper, containing tin and the lees of wine. When this is completed, the pin is in a ſtate for ſale, at the option of the buyer, either in a looſe ſtate, or ſtuck in paper for the convenience of the conſumer.

Some ſucceſsful attempts have been lately made by the well-known manufacturers, Meſſrs. Durnford, Francis, and Co., of Gracechurch-ſtreet, London, for putting on the heads of this very uſeful little article, with greater expedition and uniformity than had been previouſly done by others. We are not at liberty to diſcloſe the proceſs, which is ingenious, practicable, and expeditious; but to every effort for the improvement of this, and of every other article of Britiſh manufacture, we cannot but wiſh ſucceſs.

The perfection of pins conſiſts of the ſtiffneſs of the wire, and its blanching; in the heads being well turned, and the points filed.

The London pointing and blanching are in moſt repute; becauſe our pin-makers in pointing uſe two ſteel-mills, (which are alſo occaſionally uſed in the country,) the firſt of which forms the point, and the latter takes off all irregularities, and renders it ſmooth, and as it were poliſhed; and, in blanching, uſe block tin, granulated: whereas in other parts they uſe a mixture of tin, lead, and quickſilver; which not only blanches worſe than the former, but is alſo dangerous, on account of the ill quality of that mixture, which renders a puncture with a pin thus blanched very difficult to be cured.

The conſumption of pins, and the number of artificers employed in the manufacture of them, are incredible. In Paris alone, there were anciently above one thouſand people employed in it; and after the decline of this manufacture in the city, there have been annually ſold above fifty thouſand crowns worth of the pin-wire to the pin-makers of the neighbouring places, all brought thither from Stockholm. In the little town of Rugle, in Normandy, there were computed at leaſt five hundred workmen employed in the pin manufacture; the whole town being peopled with them. Several thouſand perſons are employed in this manufacture, in various parts of our own country. Eſtabliſhments of this kind are to be found in the Metropolis, Warwickſhire, Glouceſterſhire, Eſſex, &c.

Notwithſtanding that there is ſcarcely any commodity cheaper than pins, there is not any one that paſſes through more hands before they come to be ſold. They reckon twenty workmen ſucceſſively employed in each pin, between the drawing of the braſs-wire, and the ſticking of the pin in the paper.

Pins are diſtinguiſhed by numeros; the ſmaller called from N° 3, 4, 5; thence to the 14th; whence they are only accounted by two to two, *viz.* N° 16, 18, and 20, which is the largeſt ſize.

Beſides the white pins, there are alſo black ones made for mourning, from N° 4, to N° 10. Theſe are uſually of iron-wire.

Laſtly, there are pins with double heads, of ſeveral numeros; uſed by the ladies to fix the buckles of their hair for the night, without danger of being diſturbed by their pricking, &c.

The manufacture of both braſs and iron pins is thought by ſome perſons to be in a degree injurious to the pointer; as it is imagined he imbibes, in the courſe of ſome years, a quantity of the duſt which flies off the wire, and which, in that caſe, muſt be pernicious. He is alſo liable, from the conſtant preſſure of his thumb on the ſtones, to a weakneſs in it, which not unfrequently renders him incapable of continuing the operation of pointing.

We are ſorry to learn that the pin manufacture is leſs proſperous than it was ſome years ago. This decline is partly owing to the diminiſhed conſumption of this article by our fair country-women, and of courſe partly to the exceſs of the quantity made above the regular demand; which has occaſioned to the maſter-manufacturer not only an inconvenience, but a diſproportionate return of profit for the capital which it employs. Upon the whole, it is thought, that this uſeful claſs of perſons is decreaſing in number; and that there are no very encouraging expectations of the manufacture's ſoon reviving and flouriſhing.

The firſt mention of pins that occurs in the Engliſh ſtatute-book, is found in the ſtatute of Richard III. in 1483, prohibiting foreign manufactures; and it appears from the manner in which pins are deſcribed in a ſtatute of the 34th and 35th of Henry VIII. cap. 6, A.D. 1543, and the labour and time which the manufacture of them would require, that they were a new invention in this country, and probably but lately brought from France. However, in about three years time, they fell into the preſent ingenious and expeditious manner of making them.

One of the articles of the ſtatutes of the ancient pin-makers of Paris was, that no maſter ſhould open more than one ſhop for the ſale of his wares, except on new-year's day, and the eve thereof: this we mention in an age of luxury and profuſion, to recollect the agreeable ſimplicity of our forefathers, who contented themſelves with giving pins for new-year's gifts.

Hence the cuſtom of ſtill giving the name *pins*, or *pin-money*, to certain preſents, which accompany the moſt conſiderable bargains; in which it is uſual to give ſomething towards the pins of the wife, or children, of the perſon with whom the bargain is ſtruck.

PINS, *Hook*. See HOOK.

PINS, *Protracting*. See PROTRACTING.

PIN, in *Artillery*, &c. an iron nail or bolt, with a round head, and generally with a hole at the end to receive a key. Of this there are many ſorts, as axletree-pins, or bolts, bolſter-pins, pole-pins, ſwing-tree-pins, &c. Muſket-pins are ſmall pieces of iron or wire that faſten the ſtock.

PINS, *Belaying*, in *Block-making*, are wooden pins, turned in a lathe, made of aſh, 16 inches long, and $1\frac{3}{8}$ diameter at the upper end, which is turned as a handle; is $\frac{3}{7}$ths the length, then ſhouldered in to $1\frac{1}{8}$ inch diameter.

PINS *of Blocks* are made of lignum-vitæ, or cocus; and ſometimes, for common blocks, of green-heart, a wood which is imported from the Weſt Indies. The diameter of the pin is the thickneſs of the ſheave, and is turned in a lathe, except the head, which is left eight-ſquare, to prevent its turning in the block, and is driven through the holes in the block and ſheaves. Braſs, iron, and lignum-vitæ ſheaves, that are coaked or plated, have iron-turned pins with ſquare heads, and ſometimes a hole in the point, for a forelock, to prevent their coming out. After the ſheaves are fitted, the inſide of the ſheave-hole, at the arſe of the block, is gouged hollow, to admit the rope, and anſwer with the ſheave; and a ſmall neat chamfer taken off the edges. See BLOCK.

PINS, in *Ship Building*, are various, according to their ſeveral purpoſes ; ſuch are the bitt-pins, belaying-pins. Pins to prevent the bars of the capſtan unſhipping, are of iron, with an eye and a ſhoulder in their upper end. Connected with the eye is a ſhort chain, fixed to the drum-head : thus they are always ready, when wanted, to put through the ends of bars, when ſhipped.

Pins *of Boats*, are pins of iron or hard wood, fixed along the gunwales of ſome, inſtead of row-locks, whoſe oars are confined by grommets ; ſuch are whale-boats, that occaſionally row either end foremoſt. Pins and plates are iron pins, fitted in plates at convenient diſtances in the ſide of the pall-head of capſtans, and occaſionally drawn out to ſupport the palls of the capſtan.

Pin-*Fallow*, in *Agriculture*, a provincial term applied to a winter fallow.

Pin-*Money*, the name given to that allowance uſually made by the huſband to his wife, for her own ſpending.

Ad Pinnas *bibere*, a method of drinking anciently uſed among the Danes in England. The cuſtom was, to fix a pin in the ſide of the wooden cup or waſſal-bowl ; which pin each gueſt was to drink bare, upon penalty of forfeiting.

Pin *and Web*, a horny induration of the membranes of the eye, not much unlike a cataract.

The pin and web is the ſame with what we otherwiſe call the pannus, unguis, pterygium, &c.

Pin *Wheel of a Clock*, the ſame with the ſtriking wheel. See Wheel and Clock.

Pin, in *Geography*, a city of China of the ſecond rank, in the province of Chan-tong ; 170 miles E.S.E. of Peking. N. lat. 37° 34′. E. long. 117° 40′.

PINA, Ruy de, in *Biography*, one of the earlieſt and beſt Portugueſe hiſtorians, who flouriſhed in the latter part of the 15th and half the 16th centuries. He was employed by Joam II. in many embaſſies of confidence and honour, ſigned the will of the monarch as public notary, was preſent at his death, and was the perſon who opened and publicly read his will. Emanuel heaped more favours upon him, and made him chief chronicler, an office of which he had already performed the duties. He lived ſome years after the death of this monarch, but the time neither of his birth nor of his death has been aſcertained. He is ſuppoſed to have written the chronicles of Sancho I. and II., Alfonſo II. III. IV. and V., of Diniz and Joam II. Some of theſe are diſputed, and ſaid to be the production of Fernam Lopes. Joam III. commiſſioned him to write the chronicle of his father Emanuel, for which he had collected materials, as the mighty events of that extraordinary reign took place. The celebrated Albuquerque, looking to him as the hiſtorian of his victories, ſent him a preſent of jewels. "He," ſaid his rival, Damian de Goes, "had the ruby rings, and I had the trouble." "Ruy de Pina," ſays Mr. Southey, "might have been called a chronicler of firſt rate merit, if Fernam Lopes had never written, who is infinitely the beſt of all chroniclers. But though coming immediately after that incomparable writer, Ruy de Pina ſtill appears an excellent hiſtorian, and far ſuperior to all who followed him."

PINACIA, Πινακια, among the Athenians, tablets of braſs, whereon the names of all the perſons in each tribe duly qualified, and willing to be judges, or ſenators of the areopagus, being ſeverally written, they were caſt into a veſſel provided on purpoſe ; and into another veſſel were caſt the ſame number of beans, a hundred of which were white, and all the reſt black ; then the names of the candidates and the beans were drawn, one by one ; and thoſe whoſe names were drawn out together with the white beans, were received into the ſenate. See Probuleuma.

In Solon's time there were only four tribes, each of which elected a hundred ſenators ; ſo that the areopagus conſiſted of four hundred members ; but the number of tribes being afterwards increaſed, the number of ſenators was conſequently augmented by ſome hundreds ; but the manner of election remained the ſame. See Areopagus.

PINACLE, La, in *Geography*, a cape on the W. coaſt of the iſland of Jerſey ; one mile S. of Grones.

PINACOTHECA, among the *Ancients*, a place where pictures, ſtatues, and other curioſities were kept.

PINAGRA, in *Geography*, a ſtrong mud-fort of Hindooſtan, in Baramaul, taken and deſtroyed by the Britiſh in 1790 ; 14 miles W.S.W. of Darempour.

PINANG, the name of the kernel of the areca nut, and alſo a preparation made in the Eaſt Indies of this nut, or the mixture of the ingredients which they uſe for maſtication. Into one of the ſiri or betel leaves, a piece of the areca nut, which is generally divided into ſix parts, one of which ſerves at a time, being put, with a little lime, the leaf is folded together, and kept in the mouth till the whole ſtrength is drawn out of it. See Betel.

Pinang, or *Pulo-Pinang*. See Prince *of Wales iſland.*

PINANPIRO, a town of South America, in the province of Quito ; 10 miles N.N.E. of Quito.

PINARA, in *Ancient Geography*, a town of Aſia Minor, being one of the largeſt in Lycia. It is placed by Strabo in the interior of this province, at the foot of mount Cragus.—Alſo, a town of Aſia, in the northern part of Cœleſyria, upon the Gindarus, according to Pliny. Ptolemy places it in Pieria of Syria.—Alſo, an iſland of the Ægean ſea, upon the coaſt of Ætolia.

PINARII, among the Romans, an order of prieſts belonging to Hercules, who offered ſacrifices to that god in a ſolemn manner every year. They were in this ſervice connected with the Potitii.

PINARUS, in *Ancient Geography*, a river of Aſia, which roſe in mount Amanus, and purſuing its courſe between two chains of theſe mountains, diſcharged itſelf into the Mediterranean, in the ſtrait where was the bay of Iſſus, in the gulf of Iſſicus.

PINAS, John, in *Biography*, a painter of hiſtory, portrait, and landſcape, born at Haerlem about the year 1596. He travelled to Italy for improvement, and afterwards obtained conſiderable reputation. He had a brother of the name of Jacques, who practiſed in the ſame ſtyle as John, but not with equal ſucceſs.

Pinas, in *Geography*, a town of Spain, in Catalonia ; 17 miles N.N.W. of Motril.

Pinas *Iſland*, an iſland on the coaſt of the gulf of Honduras, ſituated off Trivigillo bay.

Pinas *Point*, the eaſtern point of Panama bay. N. lat. 6° 15′. W. long. 80° 30′. The port of this name is on the ſame S.W. coaſt of the iſthmus of Darien, near the point. The whole coaſt ſouthward to cape Corientes abounds with pine-trees, whence the name.

PINASTELLA, in *Botany*, Dill. Giſſ. 168, ſo called by that author from its fancied reſemblance to a pine-tree in miniature. See Hippuris.

PINCH, in *Muſic*, a kind of grace proper for certain inſtruments, particularly the harpſichord ; it is formed by ſtriking alternately the ſound of the written note with the ſound of the inferior note, and obſerving to begin and finiſh with the note which bears the pinch. The difference between the pinch and trill is this, that the latter is ſtruck with the ſuperior note, and the pinch with the inferior.

To Pinch, is to uſe the fingers inſtead of the bow, to make the chords of an inſtrument ſound. There are ſome chord inſtruments which have no bow, and which are played only by pinching, as the lute, guitar, &c. and ſometimes thoſe with which the bow is generally uſed are pinched, as the violin, and violoncello; and this method of playing is marked in the Italian by the word *pizzicato*.

PINCHBECK, in the *Arts*, an alloy of copper and zinc, in various proportions. The copper in all theſe alloys ſhould not be in leſs proportion than two of copper to one of zinc. This is ſcarcely malleable. The proportions in all caſes ſhould be definite. In the inſtance of theſe two metals proper compounds will be 1 to 1, 2 to 1, 3 to 1, &c. Any intermediate alloy will be defective. See Gold-*coloured Metal.*

PINCHE, in *Zoology*, the Simia *Oedipus*; which ſee.

PINCHES, in *Geography*, a town of South America, in the province of Quito; 100 miles E.S.E. of Macas.

PINCHINA, one of the Cordilleras, in South America.

PINCHING, in *Gardening*, a ſort of pruning, performed by nipping or breaking off the branches or ſprings of a plant, or tree, between the nails of two fingers.

Moſt gardeners hold, that pinching contributes to the abundance of the fruit, as well as of the branches; and they ſay that young ſhoots, thus lopped, are leſs apt to grow black and die, than when cut with a pruning-knife.

The ſeaſon for pinching is chiefly in April or May; ſometimes it is alſo practiſed in June and July. The fruits it is practiſed on, are chiefly melons, cucumbers, &c. Quintiny alſo preſcribes it for fruit-trees.

It is chiefly to be practiſed on the large branches towards the top of the plant, or tree, which are uſeleſs, and yet conſume a great quantity of good ſap. It muſt rarely be employed on the large branches below; which ought always to be preſerved for the winter's pruning, that they may yield others the following year, fit to fill the empty places. Nor muſt the operation of pinching be performed on the tender ſhoots; becauſe, having only juſt ſap enough for themſelves, when they come to put forth more branches in the place where they are pinched, the ſmall ſtock of ſap allotted them, being divided, will ſtarve them. The operation is to be performed within two or three eyes of the branch they grow out of.

The effect of pinching is, that inſtead of one uſeleſs, and, perhaps, hurtful wood-branch, a vigorous tree will put forth two or three at the eyes remaining; and the ſap being thus divided, the branches will be leſs, and fit for both wood and fruit.

Pinching, in the *Manege*, is when, the horſe ſtanding, the rider holds him faſt with the bridle-hand, and applies the ſpurs juſt to the hairs of his ſides, without pricking him.

If the horſe is impatient under this, and draws himſelf up, and wants to go forward, it is a ſign of vigour and mettle. But the purchaſer ought to try the thing himſelf on the horſe's back; for the jockies have the art of making the dulleſt horſe ſeem to have mettle in theſe trials. The purchaſer muſt alſo diſtinguiſh between the reſtleſſneſs of the horſe under this treatment that ariſes from vigour, and that which ariſes from the horſe's being tickliſh, and which goes off immediately.

Pinching is accounted an aid, ſpurring a chaſtiſement or correction.

PINCHUGA, in *Geography*, a town of Ruſſia, in the government of Tobolſk. N. lat. 58° 20′. E. long. 96° 54′.

PINCKNEY, an iſland on the coaſt of South Carolina.—Alſo, a diſtrict, formerly of the upper country of South Carolina, now divided into the diſtricts of York, Cheſter, Union, and Spartanburgh.

PINCKNEYA, in *Botany*, ſo named by Michaux, (we are not reſponſible for the orthography,) in honour of one of his friends or patrons in America, probably Mr. Pinkney, once envoy to the Britiſh court; but nothing is recorded on the ſubject, either in the Flora of Michaux, or in the account of his life, where this tree is mentioned, (ſee Sims and Konig's Ann. of Bot. v. 1. 333,) as uſed by the inhabitants of Georgia to cure fevers, being allied to the *Cinchona*, or Peruvian bark. Michaux Boreal-Amer. v. 1. 103. Ait. Hort. Kew. v. 1. 372. Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Rubiaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth ſuperior, in five deep acute ſegments, one (rarely two) of which is dilated into a large coloured leaf, deciduous. *Cor.* of one petal, funnel-ſhaped; tube thrice as long as the ordinary ſegments of the calyx, five-ſided; limb in five deep, revolute, obtuſe, nearly equal ſegments, half the length of the tube. *Stam.* Filaments five, awl-ſhaped, equal, inſerted into the tube near its baſe, ſhorter than the limb; anthers oblong, incumbent. *Piſt.* Germen inferior, roundiſh-oblong; ſtyle the length and form of the ſtamens; ſtigma thickiſh, in two obtuſe lobes. *Peric.* Capſule globoſe, ſlightly compreſſed, with a furrow at each ſide, cartilaginous, thin, coated, of two cells and two valves, the partitions from the centre of each valve. *Seeds* numerous, horizontal, oval, depreſſed, with a membranous orbicular wing. *Receptacle* central, angular.

Eſſ. Ch. One ſegment of the calyx very large, leafy. Corolla funnel-ſhaped, five-cleft. Stamens prominent. Stigma bluntly two-lobed. Capſule inferior, of two cells and two valves. Seeds numerous, winged.

1. P. *pubens*. Downy Pinckneya. Mich. ibid. 105. t. 13.—Native of the banks of the river St. Mary in Georgia. Brought into England by the late Mr. John Fraſer in 1786. It is a greenhouſe plant, flowering in June and July. We are obliged to Mr. Fraſer for fine ſpecimens in flower and ſeed. Others are found in the herbarium of the younger Linnæus, which muſt have been collected before Michaux viſited America, and we ſuſpect they were ſent by Bartram. This is a very handſome *ſhrub*, or ſmall *tree*, with oppoſite downy *branches*. *Leaves* oppoſite, on downy ſtalks, oval, acute at each end, entire, a ſpan long; naked, but roughiſh above; paler and rather downy beneath. *Stipulas* between the footſtalks, ſmall, acute, deciduous. *Panicles* terminal, corymboſe, many-flowered, downy, as well as the *calyx*, and outſide of the *corolla*. *Flowers* an inch long, pale, ſtreaked with purple. Their moſt conſpicuous part is the large, oval, whitiſh, downy, leafy expanſion, which takes the place of one ſegment of the *calyx*, as in the firſt and ſecond ſpecies of Mussænda; ſee that article. The *capſule* is as big as a large gooſeberry, of a rigid, cartilaginous, but thin texture, with a deciduous ſkin. This genus is intermediate between *Cinchona* and *Muſſænda*, but ſeems ſufficiently diſtinct in its fruit from the former; as it unqueſtionably is from the latter, with which the habit moſt agrees. The name of *Bartramia* was deſtined for it, the original *Bartramia* being a *Triumfetta*; but there is now a very fine and diſtinct genus of moſſes eſtabliſhed under this appellation. See Musci.

PINCKNEYVILLE, in *Geography*, a poſt-town of South Carolina, and capital of Union diſtrict, on the S.W. ſide of Broad river, at the mouth of Pacolet, containing a handſome work-houſe, a gaol, and a few compact houſes; 75 miles N.W. of Columbia.

PINCOS, a town of Peru, in the dioceſe of Lima; 15 miles S. of Xauxa.

PINCZESTI, a town of European Turkey, in Moldavia; 28 miles S.W. of Jaſſy.

PINDA, a ſea-port town of Africa, in the kingdom of Congo, on the left ſide of the Zaire; 125 miles W.S.W. of St. Salvador.—Alſo, a river of Africa, which runs into the Indian ſea, S. lat. 13° 28′.

PINDALA, a town of Hindooſtan, in Tellingana; 15 miles S. of Warengole.

PINDAMAHA, a town of Braſil, in the government of St. Paul; 80 miles N.N.E. of St. Paul.

PINDAR, in *Biography*, the moſt famous lyric poet of ancient Greece, was a native of Cynoſcephalæ, near Thebes in Bœotia. The time of his birth is uncertain, but it is well known that he was at the height of his reputation at the time of the expedition of Xerxes, or B.C. 480. Although brought up under excellent inſtructors, he was chiefly indebted to his own exertions and genius for his peculiar excellencies. His chief patrons were Theron of Agrigentum and Hiero of Syracuſe, whom he has commemorated in his poems. He celebrated the city of Athens in ſuch lofty terms, as greatly to excite the diſpleaſure of his countrymen the Thebans, who, on that account, impoſed a fine upon him, which the Athenians not only doubly repaid, but erected a ſtatue to his honour. His reputation was ſo great, that we find he was rewarded in the public aſſemblies of Greece with the prize, in preference to every other competitor; and as the conquerors at Olympia were the ſubjects of his compoſitions, the poet was courted by ſtateſmen and princes. His hymns and pæans were repeated before the moſt crowded aſſemblies in the temples of Greece; and the prieſteſs of Delphi declared that it was the will of Apollo that her chief poet ſhould receive half of all the firſt-fruit offerings that were annually heaped on his altars. This was not the only public honour which he received; after his death he was honoured with every mark of reſpect, even to adoration. His ſtatue was erected at Thebes in the public place where the games were exhibited, and, ſix centuries after, it was viewed with the utmoſt ſenſations of pleaſure and admiration by the geographer Pauſanias. The honours which were paid him while alive were alſo ſhared by his poſterity, and as a mark of their high attention and reverence, at the celebration of one of the feſtivals of the Greeks, a portion of the victim which had been offered in ſacrifice was reſerved for the deſcendants of the poet. Even the moſt inveterate enemies of the Thebans ſhewed a regard for his memory, and the Spartans ſpared the houſe which the prince of the Lyrics had inhabited, when they deſtroyed the houſes and the walls of Thebes. The ſame ſort of reſpect was likewiſe paid him by Alexander the Great, when Thebes was reduced to aſhes. He died in the public theatre at an advanced age, about the year 440 B.C. The greateſt part of his works has periſhed. He had compoſed ſome hymns to the gods, poems in honour of Apollo, dithyrambics to Bacchus, and odes on ſeveral victories obtained at the four greateſt feſtivals of the Greeks, the Olympic, Iſthmian, Pythian, and Nemean games. Of all theſe the odes are the only compoſitions extant, admired for ſublimity of ſentiments, grandeur of expreſſion, energy and magnificence of ſtyle, boldneſs of metaphors, harmony of numbers, and elegance of diction. In theſe odes, which were repeated with the aid of muſical inſtruments, and accompanied by the various inflections of the voice, with ſuitable attitudes, and proper motions of the body, the poet has not merely celebrated the place where the victory was won, but has introduced beautiful epiſodes, and by unfolding the greatneſs of his heroes, the dignity of their characters, and the glory of the ſeveral republics where they flouriſhed, he has rendered the whole highly beautiful, and in the greateſt degree intereſting. Horace has called our poet inimitable, and this panegyric will not, perhaps, appear too ſtrong, ſince ſucceeding critics have agreed in extolling his beauties, his excellence, the fire, the animation and enthuſiaſm of his genius. Horace refers likewiſe to his pathetic and moral commemorations of departed excellence. It was probably in ſtrains of this kind by which he acquired the epithets of *wiſe* and *divine* from Plato. Dionyſius of Halicarnaſſus ſpeaks of Pindar as the chief model among the lyric poets of what he denominates "ſevere and antique harmony," and he alſo extols his loftineſs, energy, fertility, art, and ſtrength of diction mixed with ſweetneſs. Quintilian repeats theſe praiſes, but Longinus repreſents him as ſometimes, when glowing with the brighteſt flame, undergoing a ſudden extinction; and a more modern critic ſeems to join iſſue with the author of the "Sublime:" ſpeaking of his odes, he ſays they have indeed thoſe characteriſtics of fire, rapidity, and variety, for which he is ſo much celebrated by the critics of antiquity, but that fire is frequently obſcured in ſmoke, and that variety is produced by digreſſions ſo excurſive, that it is often ſcarcely poſſible to follow him, and trace their relation to his propoſed ſubject." The beſt editions of this poet are thoſe of Heyne, Gr. et Lat. Gotting. 1773, 1798; the latter, which is in octavo, contains the Greek ſcholia. Moreri. Bibliogr. Dict.

PINDARIC, in *Poetry*, an ode formed in imitation of the manner of Pindar.

The Pindaric manner is diſtinguiſhed by the boldneſs and height of the flights, the ſuddenneſs and ſurpriſingneſs of the tranſitions, and the ſeeming irregularity, wildneſs, and enthuſiaſm, of the whole.

Pindar, whence the manner takes its name, was of Thebes: he flouriſhed about four hundred and ſixty-eight years before Chriſt, and was contemporary with Æſchylus. What we have remaining of his is a book of odes, all in praiſe of the victors at the Olympian, Pythian, Nemæan, and Iſthmian games; whence the firſt is entitled, the *Olympians;* the ſecond, the *Pythians;* the third, the *Nemæans;* and the fourth, the *Iſthmians*. Pindar is full of force and fire; his thoughts are ſententious, his ſtyle impetuous, his ſallies daring, and frequently running, as it were, at random; he affects a beautiful diſorder, which, yet, is ſaid to be the effect of the greateſt art. See the preceding article.

As the ſubject which engaged his attention comprehended the praiſes of thoſe who had gained the prize in the public games, it was neceſſarily very barren; and therefore he is perpetually digreſſive, and fills up his poems with fables of the gods and heroes, that have little connection either with his ſubject or with one another. Many of the hiſtories of particular families and cities, to which he alludes, are now unknown to us, and therefore, though the ancients admired him greatly, he is often ſo obſcure to modern readers, partly from his ſubjects, and partly from his rapid abrupt manner of treating them, that, notwithſtanding the beauty of his expreſſion, our pleaſure in reading him is very much diminiſhed.

The ſuppoſed irregularity of his numbers has made ſeveral of his imitators imagine themſelves Pindaric poets, by the mere wildneſs and irregularity of their verſes. None of our writers ſeem to have ſucceeded in the Pindaric character better than Cowley.

In a Pindaric ode, the plan of the whole ought to be drawn firſt, and the places marked out where the elegant ſallies and wanderings may beſt be, and how the returns may be juſtly made to the ſubject. See Ode.

PINDING, a diſeaſe among lambs which are in the ſtate of ſuckling. Theſe animals, before they begin to eat graſs, are liable to have a diſcharge from the bowels of a tough, glutinous, adheſive quality, which is apt to ſtick to the tail and buttocks, and when hardened by the ſun, ſometimes to glue them together in ſo cloſe and firm a manner, as to prevent all poſſibility of their having any evacuations, and thereby ſoon to mortify and burſt the inteſtines. The complaint is diſcovered in an eaſy manner, by the lambs appearing ſwelled and ſick, with the upper and middle parts of their tails cloſely glued down, and they are as readily cured, by ſeparating their tails from their buttocks, when the retained excrement will be diſcharged with a diſagreeable ſmell. And the immediate recurrence of it will be prevented by rubbing the parts over with ſand, friable clay, mud, or, what is better, a little tallow. But they muſt be well looked after for eight or ten days, until they begin to eat graſs, when all danger from theſe obſtructions is over. It is ſaid to be moſt dangerous when the ewes are in high condition, and the ſeaſon dry and backward; and ſeldom or ever to appear when the mothers are lean, and the weather diſpoſed to be wet.

PINDLOCK, in *Geography*, a town of Germany, in the principality of Culmbach; three miles N.N.E. of Bayreuth.

PINDMISSUS, in *Ancient Geography*, a town of Aſia, in Syria, ſituated on the mountains, near the ſmall river Singas, on the W. ſide of the Euphrates, S.W. of Samoſata.—Alſo, a town of Cilicia, near mount Amanus, belonging to the Eleuthero-Cilicians, according to Cicero, ad Attic. l. v.

PINDUS, a chain of mountains of Theſſaly, extending to the S.W., conſecrated to the Muſes. This chain extended alſo towards Epirus, and was inhabited by the Atthamanes, the Æthices, and the Perrhæbians.—Alſo, a town of Greece, in the Doride, placed by Strabo on the banks of a river of the ſame name, which diſcharged itſelf into the Cephiſus. It is alſo called "Ciphus" by ſome authors. It was within the territory of this town that the Hellenes, driven from the Hiſteiotide by the Cadmæans, went to eſtabliſh themſelves, according to Herodotus.

PINE, in *Botany*, &c. See Bromelia and Pinus.

Pine, in the *Materia Medica* and *Rural Economy*. Although moſt ſpecies of fir poſſeſs in common the ſame medicinal properties, and all agree in affording the different products of the turpentine kind, yet ſome ſpecies produce theſe different articles in greater purity, and in more abundance, than others. From the wild pine, Pinus ſylveſtris, pinaſter, or Scotch fir-tree, is obtained moſt plentifully the pix liquida, or tar, and from it may alſo be procured the common turpentine, and the white and yellow reſins. The manner in which the tar is procured is by cutting the tree into pieces, and then encloſing them in a large oven conſtructed for the purpoſe, with a channel at the bottom. A ſufficient degree of heat is then applied, by which the tar is forced out of the wood, and it runs off by the opening at the bottom: a proceſs which is denominated "diſtillatio per deſcenſum."

Upon an inciſion being made into the bark of the Pinus abies, or Norway ſpruce fir-tree, a clear tenacious fluid iſſues, which concretes into a reſinous ſubſtance, known by the name of "reſina abietis." This, after being boiled in water, and ſtrained through a linen cloth, is called in the Pharmacopeias "pix Burgundica," or Burgundy pitch. But if the boiling of the native reſin is continued till the water is wholly evaporated, and wine vinegar is at this time added, a ſubſtance is formed, called "colophonium;" which ſee. See alſo *Burgundy* Pitch.

Linnæus, and ſeveral other writers in the Materia Medica, refer the common turpentine to the "pinus ſylveſtris;" and the "Terebinthina argentoratenſis," or Straſburgh turpentine, to the "Pinus picea," or ſilver fir-tree; yet upon the authority of Murray, who follows Du Hamel and Haller, Dr. Woodville aſcribes the "Terebinthina vulgaris" to the latter pine, which pours out the turpentine ſo freely, that it is ſeldom neceſſary to make inciſions through the bark for the purpoſe.

The "Terebinthina Veneta," or "larigna," as it may be more properly called, (becauſe we are not wholly ſupplied with this article by the Venetians,) iſſues ſpontaneouſly through the bark of this tree, but is more commonly obtained by wounding the bark at the diſtance of about two feet from the ground, and inſerting in the wood a ſmall cannula, through which the turpentine flows into proper veſſels, which are placed for its reception.

We may here obſerve farther, and more generally, that pitch, tar, reſin, and turpentine, are all made from theſe trees by a very familiar proceſs. In the ſpring time, when the ſap is moſt free in running, they pare off the bark of the pine-tree, to make the ſap run down into a hole, which they cut at the bottom to receive it; in the way, as it runs down, it leaves a white matter like cream, but a little thicker; this is very different from all the kinds of reſin and turpentine in uſe, and it is generally ſold to be uſed in the making of flambeaux, inſtead of white bees-wax. The matter that is received in the hole at the bottom is taken up with ladles, and put into a large baſket; a great part of this immediately runs through, and this is the common turpentine. This is received into ſtone or earthen pots, and is ready for ſale. The thicker matter, which remains in the baſket, they put into a common alembic, and adding a large quantity of water, they diſtil this ſo long as any oil is ſeen ſwimming upon the water; this oil they ſeparate from the ſurface in large quantities, and this is the common oil or ſpirit of turpentine: the remaining matter at the bottom of the ſtill is common yellow reſin. When they have thus obtained all that they can from the ſap of the tree, they cut it down, and hewing the wood into billets, they fill a pit dug in the earth with theſe billets; and ſetting them on fire, there runs from them, while they are burning, a black thick matter; this naturally falls to the bottom of the pit, and this is the tar. The top of the pit is covered with tiles, to keep in the heat; and there is at the bottom a little hole, out of which the tar runs like oil; if this hole be made too large, it ſets the whole quantity of the tar on fire; but if ſmall enough, it runs quietly out.

The tar, being thus made, is put into barrels; and if it be to be made into pitch, they put it into large boiling veſſels, without adding any thing to it; it is then ſuffered to boil a while, and being then let out, is found, when cold, to be what we call pitch. Phil. Tranſ. N° 243. p. 291.

In a medical point of view it may be remarked, that the kernels of the nuts of the manured or ſtone pine, are of a balſamic and nouriſhing nature; good for conſumptions, coughs, and hoarſeneſs, reſtorative, and of ſervice after long illneſs.

The leaves and tender tops of pines and fir are uſed for diet-drinks, and allowed to be antiſcorbutic and diuretic. See Chowder-*beer*.

The reſinous exudations of pines or firs are an important branch in the materia medica, and not only uſeful in the preſcriptions of phyſicians, but have alſo been thought otherwiſe

wiſe conducive to health. Pliny tells us, that wines, in the time of the old Romans, were medicated with pitch and reſin. And Jonſtonus, in his Dendrographia, obſerves, that it is wholeſome to walk in groves of pine-trees, which impregnate the air with balſamic particles. It is known that all turpentines and reſins are good for the lungs, againſt gravel, alſo, and obſtructions ; and it is ſaid, that the medicinal properties of thoſe drugs are found in tar-water, which operates without heating the blood, or diſordering the ſtomach. See PITCH, RESIN, TAR, and TURPENTINE.

PINE-*Apple*, in *Botany*, *Gardening*, &c. See BROMELIA.

PINE, *Ground*, a ſpecies of germander.

PINE, *Heath, Low*. See CORIS.

PINE, *Screw*. See PANDANUS.

PINE, *Stinking ground*. See CAMPHOROSMA.

PINE-*Tree*, in *Planting*, the name of a foreſt tree, of which there are ſeveral kinds that deſerve cultivating ; namely, the Scotch pine, which is ſo called from its growing naturally on the mountains in Scotland, and which is the tree that affords the red or yellow deal, which is the moſt durable of any of the kinds yet known. The leaves of this tree are pretty broad and ſhort, of a greyiſh colour, growing two out of each ſheath ; the cones are ſmall, pyramidal, and end in narrow points ; they are of a light colour, and the ſeeds are ſmall : this ſort grows well upon almoſt every ſoil ; they have been planted in great numbers upon peat-bogs, where they have made great progreſs ; alſo in clay ſoils, where they have ſucceeded far beyond expectation ; and upon ſand, gravel, and chalk, they likewiſe thrive well ; but as they do not grow near ſo faſt upon gravel and ſand as upon moiſt ground, ſo the wood is much preferable ; for thoſe trees which have been cut down upon moiſt ſoils, where they have made the greateſt progreſs, when they have been ſawn out into boards have not been valuable ; the wood has been white, and of a looſe texture ; whereas, thoſe which have been grown upon dry gravelly ground, have proved nearly equal to the beſt foreign deals. Thoſe plantations, which have been made of late years of theſe trees, will in the next age, not only turn greatly to the advantage of their poſſeſſors, but alſo become a national benefit.

Another variety of this ſort of tree is called *pineaſter*, which is a large timber tree, and naturally throws out very large arms, ſome of which will be nearly horizontal. Some people think theſe trees very ornamental on this account ; for, in the winter eſpecially, they appear naked, and are of a yellowiſh colour ; and being ſpread abroad thus large, and without order, in the mixture of the more regular ſorts of growing firs, they make a good contraſt. It muſt be obſerved, that the leaves of this ſort are very large and long, and of a lighter green, than thoſe of the Scotch fir, which is another circumſtance to direct to its ſituation ; and it muſt alſo be obſerved, that thoſe long and large leaves which ornament the younger branches only, give the tree a majeſtic air ; and as the larger arms appear naked to view, ſo the younger, being thus plentifully furniſhed, have a noble effect, beſides what beauty it receives from its numerous cones. And Mr. Nicol remarks, that the timber of the Scotch pine or fir is found in higheſt perfection on the bleak and gravelly ſcites. In light ſand, it is alſo found durable. But in the richer more loamy ſoils, although it grows apace while young, and flouriſhes exuberantly, it ſoon ſickens, is ſhort-lived ; nor is the wood valuable, but ſhort and brittle. On retentive, tilly clays, in which it is often planted, but from which, above all others, it ſhould be excluded, it frequently becomes ſtinted about the twentieth or thirtieth year of its age ; or when the roots have exhauſted the upper ſoil, and begin to ſeek paſturage in the ſub-ſoil, inſomuch, that the worms attack it on its limbs, anticipating, as it were, its diſſolution.

And the white, or Weymouth pine, is one of the talleſt trees of all the ſpecies, often growing a hundred feet high. The bark of this tree is very ſmooth and delicate, eſpecially when young ; the leaves are long and ſlender, five growing out of each ſheath ; the branches are pretty cloſe, garniſhed with them, ſo make a fine appearance ; the cones are long, ſlender, and very looſe, opening with the firſt warmth of the ſpring : ſo that if they are not gathered in winter, the ſcales open and let out the ſeeds. The wood of this ſort is eſteemed for making of maſts for ſhips. As the wood of this tree was generally thought of great ſervice to the navy, there was a law made in the ninth year of queen Anne, for the preſervation of the trees, and to encourage their growth in America : and it is only within theſe forty years paſt that theſe trees have begun to be propagated in England in any plenty, though there were ſome large trees of this ſort growing in two or three places long before, particularly at the marquis of Bath's at Longleet ; and ſir Wyndham Knatchbull's in Kent ; and it hath been chiefly from the ſeeds of the latter that the much greater number of theſe trees now in England have been raiſed ; for although there have annually been ſome of the ſeeds brought from America, yet thoſe have been few in compariſon to the produce of the trees in Kent : many of the trees which have been raiſed from the ſeeds of thoſe trees, now produce plenty of the ſeeds, particularly thoſe in the garden of the late duke of Argyle at Whitton, which annually produce large quantities of cones.

According to Hanbury, the ſoil which this tree delights in moſt is a ſandy loam ; but it likes other ſoils of an inferior nature ; and although it is not generally to be planted on all lands, like the Scotch fir, yet he has ſeen it luxuriant and healthy, making ſtrong ſhoots, on blue and red clays, and other ſorts of ground ; on ſtrong and ſlaty ground, likewiſe, he has ſeen ſome very fine trees : ſo that, he believes, whoever is deſirous of having plantations of this pine, need not be curious in the choice of his ground.

And this ſort of pine will grow, Mr. Nicol ſays, in many different ſoils and ſituations, but ſeems to affect moſt a deep ſandy loam. On chalky, gravelly, elevated grounds, it is found to luxuriate. It will alſo thrive in pretty ſtrong clay, if lying on an open ſub-ſtratum. It is impatient of ſtagnant water, nor will it flouriſh on a till. It is an elegant tree, and worthy of a place in all extenſive plantations. He conſiders the timber as much ſuperior in quality when produced on mountains, to that produced on richer ſoils, and in more ſheltered ſituations. In fine, as already ſaid, except on ſandy or gravelly ſoils, this tree ought not to be planted. The many obſervations he has made in the Highlands confirm him in this opinion. The value of fir-timber (and that reared in the northern parts of the iſland, in ſoil and ſituation as above, is inferior to none) is known to every mechanic ; nor is there any one at all acquainted with the arts, who does not know, that from this tree is extracted roſin, tar, &c. : articles which are ſo uſeful for many, eſpecially naval purpoſes.

And the deciduous pine or larch is a lofty tree : its branches are ſlender, and incline downward : the leaves are of a light green ; and like thoſe of the cedar, are bunched together in a ſimilar manner to the pencils or little bruſhes of the painter. In ſpring, when the leaves and flowers are breaking out, it has a particularly elegant appearance ; and in the winter, it gives variety to a wooded ſcene by the bright colours of its naked branches : it is in good eſteem as an ornamental tree, and its timber is of the more uſeful kind, being ſuperior to that of moſt of the pine tribe. Indeed the utility of its wood has been highly extolled by ancient writers, and there can be no doubt but that it is an excellent wood for ſhip and houſe building. At Venice its wood is frequently uſed in building their houſes, as well as in Switzerland, where thoſe trees abound: ſo that, without doubt, the larch excels for maſts for ſhips, or beams for houſes, doors, windows, &c. particularly as it is ſaid to reſiſt the worm. It is remarked, that in Switzerland their houſes are covered with boards of this wood, cut out a foot ſquare; and as it emits a reſinous ſubſtance, it ſo diffuſes itſelf into every joint and crevice, and becomes ſo compact and cloſe, as well as ſo hardened by the air, as to render the covering proof againſt all weather. But as ſuch coverings for houſes would cauſe great devaſtation in caſe of fire, the buildings are confined to a limited diſtance by an order of police from the magiſtrates. The wood, when firſt laid on the houſes, is ſaid to be very white; but this colour, in two or three years, is changed, by means of the ſun and reſin, to a black, which appears like a ſmooth ſhining varniſh.

In his work on planting, Mr. Marſhall has obſerved, that of the common larch there are ſeveral varieties. And that the flowers which the commoneſt ſort exhibits early in the ſpring are of a delicate red colour; another ſort produces white flowers at the ſame ſeaſon, and theſe have a delightful effect among thoſe of the red ſort; whilſt another, called the black Newfoundland larch, increaſes the variety, though by an aſpect little differing from the others. There are alſo larches with greeniſh flowers, pale-red, &c. all of which are accidental varieties from ſeeds. Theſe varieties are eaſily diſtinguiſhed, even when out of blow: the young ſhoots of the white flowering larch are of the lighteſt green, and the cones when ripe are nearly white. The red-flowering larch has its ſhoots of a reddiſh caſt, and the cones are of a brown colour; whilſt the cones and ſhoots of the black Newfoundland larch are in the ſame manner proportionably tinged. The cones, which are a very great ornament to ſeveral ſorts of the pines, are very little to theſe. Their chief beauty conſiſts in the manner of their growth, the nature and beauty of their pencilled leaves, and fair flowers; for the cones that ſucceed them are ſmall, of a whitiſh, a reddiſh, or a blackiſh-brown colour, and make no figure.

It is ſtated by the ſame writer, that the larch tree will grow extremely well on almoſt any ſoil, as well in clays as in other ſorts; it thrives amazingly on the declivities of hills, and ſides of high mountains; it is hardy enough to reſiſt the ſevereſt cold, therefore proper for all expoſed places: and, as the timber is ſo valuable, and its growth ſo quick, it is a tree which may be propagated to the great advantage of the owner. In fact, it is almoſt impoſſible to ſay too much in favour of this tree. It grows on the barreneſt ſoils, and in the bleakeſt ſituations. In rich genial ſcites it luxuriates too much, grows top-heavy, and either loſes its head, or is bowed down into an unſightly form, and becomes unprofitable. Its timber, whether in the water, or in contact with the earth, is durable almoſt beyond compariſon.

In his Treatiſe on Planting, Mr. Nicol, however, obſerves that, which ſoil, in this country, when in a ſtate of full maturity, this noble tree may moſt affect, remains yet to be known. If we may judge from appearances, we ſhall decide, that it will be found in the higheſt perfection of timber in the lighter more gravelly ſoils, and in elevated ſituations. That it luxuriates beyond every other tree, in all ſoils and ſituations, excepting thoſe of a low, humid kind, is demonſtrated in every inſtance where impartial compariſon is made.

And it is obſerved by Marſhall, that the Norway ſpruce is a tree of as much beauty while growing, as its timber is valuable when propagated on that account. Its growth is naturally like the ſilver fir upright; and the height it will aſpire to may eaſily be conceived, when we ſay that the white deal, ſo much coveted by the joiners, &c. is the wood of this tree; and it may perhaps ſatisfy the curious reader to know that from this fir pitch is drawn. The leaves are of a dark green colour; they ſtand ſingly on the branches, but the younger ſhoots are very cloſely garniſhed with them. They are very narrow, their ends are pointed, and they are poſſeſſed of ſuch beauties as to excite admiration. The cones are eight or ten inches long, and hung downwards.

The better the ſoil is, the faſter will the ſpruce fir grow, though it will thrive very well in moſt of our Engliſh lands. In ſtrong loamy earth it makes a ſurpriſing progreſs; and it delights in freſh lands of all ſorts, which never has been worn out by ploughing, &c. though it be ever ſo poor.

But why this tree has obtained the name of Norway, rather than Swediſh or Daniſh ſpruce, is a queſtion Mr. Nicol thinks of little importance. Certain it is, however, that many have been led to miſtake on this account, ſuppoſing it to be the tree which produces the deal known by the name of Norway fir, and which is the produce of the Scotch fir beyond all doubt. The timber known by the name of Memel log is the produce of the ſpruce. It will, he adds, like all the fir tribes, grow in very different ſoils; but it is found in greateſt luxuriance in deep ſandy loams, where it hath freedom of ſpace. On clays which are not retentive of water below, although moiſt of themſelves, it will make ſurpriſing progreſs. On thin ſoils, and in bleak ſituations, it grows ſlowly; and may therefore become the better timber of any, on ſuch: but here it becomes unſightly.

It cannot be cultivated in this country with ſuch advantage as the Scotch fir, in reſpect of timber; but as an ornamental tree it outdoes it, where the ſoil is favourable. There are ſome majeſtic ſpruce firs at Duplin, the ſeat of lord Kinnoul, which are ſuppoſed the largeſt in the kingdom. From this tree pitch is alſo extracted in great abundance.

The American ſpruce fir, Mr. Marſhall thinks, includes three varieties: the white Newfoundland ſpruce; the red Newfoundland ſpruce; and the black Newfoundland ſpruce; they however differ ſo little, that one deſcription is common to them all. They are of a genteel upright growth, though they do not ſhoot ſo freely or grow ſo faſt with us as the Norway ſpruce. The leaves are of the ſame green, and garniſh the branches in the ſame beautiful manner as thoſe of that ſpecies, only they are narrower, ſhorter, and ſtand cloſer. The greateſt difference is obſervable in the cones; for theſe are no more than about an inch in length, and the ſcales are cloſely placed. In the cones, indeed, conſiſts the difference of theſe three ſorts: thoſe of the white ſpecies are of a very light brown colour; thoſe of the red ſpecies more of a nut brown or reddiſh colour; and thoſe of the black ſpecies of a dark or blackiſh colour. Beſides this, there is ſcarcely any material difference; though it is obſervable, that this trifling variation ſeems to be pretty conſtant in the plants raiſed from the like ſeeds. Theſe ſorts will often flower and produce cones when only about five or ſix feet high; and indeed look then very beautiful: but this is a ſign of weakneſs in the plant, which it does not often fairly overcome. And it is added, that in many parts of England this is a very difficult tree to raiſe. It ſpends itſelf in cones, and becomes ſtunted and unſightly. Nevertheleſs, in the vallies of the Highlands, it thrives with full luxuriance and vigour; forming a rich picturable outline, poſſeſſing more ſtrength of feature than moſt of the pines. As a ſtandard in poliſhed ſcenery, there are few trees that equal it ; as may be ſeen at Enville and Fiſherwick.

But Mr. Nicol thinks that theſe trees ſeem to affect moſt a deep black loam of a middling texture, and which is alſo ſub-humid of itſelf, but does not retain ſtagnant water. They will alſo thrive well on ſandy or gravelly loams of a moiſt nature. On dry ſhallow ſoils they languiſh ; nor will they thrive on very expoſed ſcites. In deep, ſub-humid vallies, are to be found thoſe moſt ſtately in this country. They require full ſpace ; otherwiſe they become very unſightly, even in youth. This tree, in America, arrives to great magnitude, and produces that vaſt ſtore of maſts and ſpars exported thence to Europe. Of this tree they alſo conſtruct many ſhips of great burthen. But, in this country, the larch far excels it in any ſituation, and, as timber, is more valuable for this and all other purpoſes.

It becomes a fine ornamental detached tree on good ſoil, if allowed room to branch in its youth, and while nurſing ; but at the ſame time it requires ſhelter.

There are two varieties of the yellow-leaved fir, of which the ſilver fir is a noble, upright, full-growing tree. The branches are not very numerous, and the bark is ſmooth and delicate. The leaves grow ſingly on the branches, and their ends are ſlightly indented. Their upper ſurface is of a fine ſtrong green colour, and their under has an ornament of two white lines, running lengthways on each ſide the midrib, on account of which ſilvery look this ſort is called the ſilver fir. The cones are large, and grow erect ; and when the warm weather comes on, they ſoon ſhed their ſeeds ; which ſhould be a caution to all who wiſh to raiſe this plant, to gather the cones before that happens.

The other variety is the balm of Gilead fir, which has of all the ſorts been moſt coveted, on account of the great fragrance of its leaves : though this is not its only good property ; for it is a very beautiful tree, naturally of an upright growth, and the branches are ſo ornamented with their balmy leaves, as to exceed any of the other ſorts in beauty. The leaves, which are very cloſely ſet on the branches, are broad, and their ends are indented. Their upper ſurface, when healthy, is of a fine dark green colour, and their under has white lines on each ſide the midrib lengthways, nearly like thoſe of the ſilver fir. Theſe leaves, when bruiſed, are very finely ſcented ; and the buds, which ſwell in the autumn for the next year's ſhoot, are very ornamental all winter, being turgid, and of a fine brown colour ; and from theſe alſo exudes a kind of fine turpentine, of the ſame kind of (though heightened) fragrancy.

The ſilver fir is exceedingly hardy, and will grow in any ſoil or ſituation, but always makes the greateſt progreſs in a good rich loamy earth.

Mr. Nicol remarks, that the ſilver fir grows moſt luxuriantly in deep loamy earth ; but there its wood is ſoft and ſpongy. It will thrive on bleak expoſures, and thin gravelly or ſandy ſoil. But that in which we may expect its timber in higheſt perfection, is a ſandy loam, lying on a gravelly ſubſoil, or dry rock. On the mountains of Switzerland it is ſaid to grow to a vaſt ſize, is excellent timber, and is uſed for many valuable purpoſes. In particular, turpentine is extracted from it ; and it would ſeem that from this tree is extracted the true Venice turpentine ; although there is an inferior kind extracted from the larch, which alſo paſſes under that name. As an ornamental tree, it is admiſſible in all extenſive deſigns, and even on a ſmaller ſcale where variety is ſtudied.

The latter ſort muſt be planted in a deep, rich, good earth ; neither will it live long in any other ſort of ſoil. It matters little whether it be a black mould, or of a ſandy nature, provided it be deep, and there is room for the roots to ſtrike freely. See Pinus.

In the raiſing of the trees, all the ſorts are propagated by ſeeds, which are produced in their hard woody cones : the way to get the ſeeds out of theſe cones, which are cloſe, is to lay them in the ſun or before a gentle fire, which cauſes the cells to open, and then the ſeeds may be eaſily taken out. If the cones are kept entire, the ſeeds will remain good ſome years, ſo that the ſureſt way to preſerve them, is to let them remain in the cones until the time of ſowing : if the cones are kept in a warm place in ſummer, they will open and emit the ſeeds ; but if they are not expoſed too much to heat, many of the ſorts will remain entire ſome years, eſpecially thoſe which are cloſe and compact ; and the ſeeds, which have been taken out of cones after ſeven years, have grown very well, ſo that theſe may be tranſported to any diſtance, provided the cones are well ripened and properly put up.

The beſt time for ſowing the ſeeds is about the end of March ; when they are ſown, the place ſhould be covered with nets to keep off birds : otherwiſe, when the plants begin to appear with the huſk of the ſeed on their tops, the birds will pick off the heads of the plants, and deſtroy them. Where the quantity of ſeed to be ſown is large, ſo as to require a good ſpace to receive them, they ſhould be ſown on an eaſt or north-eaſt bed of fine mould in the nurſery, where they may be ſcreened from the ſun, whoſe heat is very injurious to the plants at their firſt appearance above ground. When the plants appear, they muſt be conſtantly kept clean from weeds ; and in very dry ſeaſons, if they are now and then gently refreſhed with water, it will forward their growth ; but this muſt be done with great care and caution, for if they are haſtily watered it may waſh the tender plants out of the ground, or lay them down flat, which often rots their ſhanks ; and when this is too often repeated, it will have the ſame effect ; ſo that unleſs it is judiciouſly performed, it will be the beſt way to give them none, but only ſcreen them from the ſun and wind.

In caſes where the plants come up too cloſe, it will be a good method to thin them gently about the beginning of July. The plants, which are drawn up may be planted on other beds, which ſhould be prepared ready to receive them, as they ſhould be immediately planted as they are drawn up, becauſe their tender roots are ſoon dried and ſpoiled at this ſeaſon of the year. This work ſhould be done, if poſſible, in cloudy or rainy weather, and then the plants will draw out with better roots, and will ſoon put out new fibres again ; but if the weather ſhould be dry, the plants ſhould be ſhaded every day from the ſun with mats, and now and then gently refreſhed with water. In drawing up the plants, there ſhould be great care taken not to diſturb the roots of thoſe that are left remaining in the ſeed-beds, &c. ſo that if the ground be hard, the beds ſhould be well watered ſome time before the plants are thinned, to ſoften and looſen the earth ; and if, after they are drawn out, the beds are again gently watered to ſettle the earth to the roots of the remaining plants, it will be of great ſervice to them ; but it muſt be done with great care, ſo as not to waſh out their roots, or lay down the plants. The diſtance which ſhould be allowed theſe plants, is four or five inches row from row, and three inches in the rows, but ſome allow them more.

And in theſe beds the plants may remain till the ſpring twelve-months after, by which time they will be fit to plant out where they are to remain, as the younger the plants are, when planted out, the better they ſucceed ; for though ſome ſorts will bear removing at a much greater age, young plants put out at the ſame time will in a few years overtake the large ones, and ſoon outſtrip them in their growth; and there is an advantage in planting them by ſaving the expence of ſtaking and much watering which large plants require. It is often the caſe, with reſpect to plantations of pines, which were made of plants ſix or ſeven feet high, and at the ſame time others of one foot high planted between them, that in ten years the latter are better trees than the former, and much more vigorous in their growth; but if the ground, where they are deſigned to remain, cannot be prepared in proper time, the plants ſhould be removed out of the ſeed-beds into a nurſery, where they remain two years, but they ſhould not continue much longer on any account.

The beſt ſeaſon for planting out pine-trees, is the early ſpring, as March or the following month, juſt before they begin to ſhoot; for although the Scotch and ſome of the moſt hardy ſorts may be removed in the autumn or winter, eſpecially when they are growing in ſtrong land, where they can be taken up with balls of earth to their roots; it is not a practice to be generally adopted in other caſes.

In inſtances where theſe trees are planted in expoſed ſituations, they ſhould be put pretty cloſe together, eſpecially on the outſides, that they may ſhelter each other; and when they have grown a few years, part of the plants may be thinned out, to give room for the others to grow. But this muſt be gradually performed, leſt by too much opening the plantation at once, the air ſhould be let in among the remaining trees with too great violence, and ſtop their growth.

And wherever large plantations of theſe trees are deſigned to be made, the beſt method will be to raiſe the plants either upon a part of the ſame land, or as near to the place as poſſible, and alſo upon the ſame ſort of ſoil. A ſmall piece of ground will be ſufficient to raiſe plants enough for many acres. As the Scotch and larch kinds are capable of thriving upon the moſt barren ſands, where ſcarcely any thing elſe except heath and furze will grow, they may in many ſituations be extenſively planted; as there are many thouſand acres of ſuch land, which at preſent are of little benefit to any body, that might, by plantations of theſe trees, become of great value to their proprietors, and alſo a national benefit. It is in general the expence of making ſuch plantations, that chiefly operates againſt ſuch undertakings; though, when properly managed, it is much leſs than is commonly ſuppoſed, as the greateſt of the expence is that of fencing them from the cattle, &c. for the other is trifling, as there will be no neceſſity of preparing the ground to receive the plants; and the charge of planting an acre of land with theſe plants will not be more than thirty ſhillings, where labour is dear, excluſive of the plants, which may be valued at forty ſhillings more. Many acres of land have been planted with theſe trees, which were covered with heath and furze, merely by digging holes to put in the plants, and afterwards laying the heath or furze, which was put upon the ſurface of the ground, about their roots, to prevent the ground drying; few of which have failed; the plants being moſtly four years old from the ſeed. In five or ſix years, the pines have grown ſo well as to overpower the heath and furze, and deſtroy it, without their having had any further culture.

In regard to the diſtance at which they are generally planted in all large open ſituations, it is about four feet, but always irregular, avoiding planting in rows as much as poſſible; and in performing the work, great care is neceſſary not to take up the plants faſter than they can be planted out, ſome men being employed in digging up the plants, while others are planting. Thoſe who take up the plants ſhould be looked after, to ſee that they do not tear off their roots, or wound their bark; and as faſt as they are taken up, their roots ſhould be covered, to prevent their drying, and put into their proper ſituations as ſoon as poſſible. In planting them, it is adviſed that care ſhould be had to make the holes large enough for their roots, as alſo to looſen and break the clods of earth, and put the fineſt immediately about their roots, then to ſettle the earth gently with the foot to the roots of the plants. Where theſe circumſtances are duly attended to, and a proper ſeaſon choſen for performing it, there will be very little hazard of their ſucceeding; but where plantations are made with plants which are brought from a great diſtance, and which have been ſo cloſely packed up as to heat, and cauſe the leaves to become yellow, few of them will grow in a perfect manner.

In general, after the plantations are made, the only care they require, for four, five, or ſix years, is to ſecure the plants from cattle, hares, and rabbits; for if theſe are admitted to them, they make great deſtruction in a ſhort time: as where the branches are gnawed by hares or rabbits, it greatly retards the growth of the plants, if it does not wholly deſtroy them. In about this length of time after planting, the branches of the young trees meet, and begin to interfere with each other; therefore they require a proper thinning out. Some, however, adviſe pruning off the lower branches; but this muſt be done with great caution. The lower tier of branches only ſhould be cut off: this ſhould be performed in September, at which time there will be no danger of the wounds bleeding too much; and the turpentine will harden over the wounds as the ſeaſon grows cold, and prevent the wet from penetrating them. Theſe branches ſhould be cut off cloſe to the ſtems of the plants, and care be taken not to break any of the remaining branches of the young trees. This work ſhould be repeated every other year, at each time taking off only the lower tier of branches: for if the plants are much trimmed, it will greatly retard their growth, as it does in general that of all trees; but as theſe trees never put out any ſhoots where they are pruned, ſo they ſuffer more from amputation than thoſe which do. It is probably the beſt practice, in all caſes, to thin out the trees ſo as to let them have ſufficient room and air, as they can never be pruned in the branches without great injury. And in about twelve or fourteen years, they will require more thinning, where the plants have made good progreſs; but this ſhould be gradually performed, beginning in the middle of the plantation firſt, leaving the outſide cloſe, to ſcreen thoſe within from the cold, and by degrees coming to them, when thoſe which were firſt thinned will have had time to get ſtrength, and not be in danger of ſuffering from the admiſſion of cold air. When theſe plantations are thinned, the trees ſhould not be dug up, but their ſtems cut off cloſe to the ground, as their roots never ſhoot again, but decay in the earth; ſo there can be no harm in leaving them, and the roots of the remaining plants are not injured. The trees which are now cut will be fit for many purpoſes: thoſe which are ſtraight will make good putlocks for the bricklayers, and ſerve for ſcaffolding poles; ſo that there may be as much made by the ſale of theſe as will defray the whole expence of the planting, and probably alſo intereſt for the money firſt laid out for the whole.

And as the upright growth of theſe trees renders their wood the more valuable, they ſhould be left pretty cloſe together, in order to draw each other up, and grow tall. The naked ſtems of the trees ſometimes riſe more than ſeventy feet in height, and as ſtraight as poſſible; and as many boards have been ſawn from one of them, as laid the floor of a room near twenty feet ſquare. If theſe trees are left eight feet aſunder each way, it will be ſufficient room for their growth: therefore, if, at firſt thinning, a fourth part of the trees is taken away, the others may ſtand twelve or fourteen years longer, by which time they will be of a ſize for making ladders, and ſtandards for ſcaffolding, and many other purpoſes; ſo that from this ſale as much may be made, as not only to pay the remaining part of the expence of planting, if any ſhould be wanting in the firſt, but rent for the land with intereſt; and the ſtanding trees for fortunes for younger children, or other purpoſes.

But the great uſe and value of theſe ſorts of trees will be ſeen more fully under the proper heads. See Pine, *ſupra.*

Pine-*Tree*, in *Gardening*, the common fir-tree. See Pinus.

Pine-*Apple*, in *Metallurgy*, a word uſed to expreſs a ſort of mould, uſed in the refining of ſilver. It has this name from its ſhape, reſembling the fruit of that name.

When the refiners have taken the mixture of the ſilver and mercury together out of the cauldron, and ſtrained it through two coarſe wetted cloths, to make it the thicker, they then beat it with a ſort of battledores, to drive out yet more of the quickſilver; and ſtraining it again after this, they take out the remaining thick amalgam, and forming it into little pellets, they put theſe carefully into the moulds called pine-apples, preſſing them down. The amalgam, when put into theſe veſſels, or moulds, is uſually ſo rich as to be about one-fifth ſilver. The manner of diveſting this of the quickſilver afterwards is by means of fire; in which the quickſilver riſes in vapour, and the ſilver is left pure behind; but the careleſſneſs of the workmen in doing this, and particularly the uſing bad veſſels, or the not luting them cloſe, cauſes a waſte of this mineral greater than could be conceived. Alonſo tells us, that in the city of Potoſi alone, at the time of his writing, when the trading in metals ran but low, above thirty thouſand pieces of eight were waſted in quickſilver that was loſt one year with another. To prevent this, they then principally ſtudied the means of keeping the ſilver as dry of quickſilver as they could, in the pine-apple; but it then holding four-fifths of the whole maſs in quickſilver, the great waſte was in the ſeparating it afterwards. See Potosi.

Pine-*Martin*, in *Zoology*. See Mustela *Martes*.

Pine-*Salt*, a name given to a preparation of the bark of the pine-tree, uſed as a ſort of ſeaſoning to food in the manner in which we uſe ſalt.

The Laplanders are very fond of this; and the manner of their preparing it is given in Scheffer's hiſtory of that country. They peel off the bark from the lower part of the bodies of thoſe trees, and ſeparating the outer rough part, they take the inner bark, which they carefully divide into its ſeveral thin coats: when they have thus reduced them to as thin pieces as they can, they expoſe them to the ſun in their ſummer months to dry; and when thoroughly dried, they tear them into thin and narrow ſlips, and put them up in boxes made of the outer bark of other trees freſh taken off. They bury theſe boxes in deep holes dug in the ſands, and let them remain thus one day; on the day following, they bring together a number of ſtumps of trees, and other wood, and laying them over the place where the bark is buried, they ſet them on fire; the next day they take out their buried boxes, and the heat having penetrated ſo deep into the earth in a mild degree, the bark is found to have been greatly affected by it, and to have received a red colour, and a very agreeable flavour, ſomewhat ſweetiſh. This is their general ſauce: they eat it with all their food, as we do ſalt; but it has ſo little of the nature of ſalt, that the name is ill adapted to it.

There is another vegetable ſubſtance, which, though of a diſagreeable taſte to us, yet cuſtom teaches them to be fond of. This is the angelica petroſa: they cut the large ſtalks of this plant before it runs to ſeed, and roaſt them; they eat this in conſiderable quantities with their pine-ſalt, and eſteem it not only an agreeable, but a more than ordinary wholeſome ſort of food.

Pine, in *Geography*, a townſhip of America, in Allegany county, Pennſylvania, containing 588 inhabitants.

Pine-*Creek*, a townſhip of America, in Lycoming county, containing 397 inhabitants.

Pine-*Creek*, a river of America, in Pennſylvania, which runs into the weſt branch of the Suſquehannah, N. lat. 41° 11′. W. long. 77° 22′.

Pine *River*, a river of America, which runs into lake Huron, N. lat. 45° 42′. W. long. 84° 25′.—Alſo, a river of America, which runs into the Wabaſh, N. lat. 40° 15′. W. long. 87° 18′.—Alſo, a river of Canada, which runs into lake Huron, N. lat. 44° 44′. W. long. 80° 26′.

Pine *Iſland*, a ſmall iſland in the gulf of Mexico, near the ſouth coaſt of Weſt Florida. N. lat. 30° 18′. W. long. 88° 18′.

PINEA, in *Botany*. See Pinus.

Pinea, or *Pigne*, in *Commerce*, a term uſed in Peru and Chili, for a kind of light, porous maſſes or lumps, formed of a mixture of mercury and ſilver-duſt from the mines.

The ore, or mineral, of ſilver, being dug out of the veins of the mine, is firſt broken, then ground in mills for the purpoſe, driven by water with iron peſtles, each of two hundred pounds weight. The mineral, thus pulveriſed, is next ſifted; then worked up, with water, into a paſte; which, when half dry, is cut into pieces, called *cuerpos*, a foot long, weighing each about two thouſand five hundred pounds.

Each cuerpo is again kneaded up with ſea-ſalt, which, diſſolving, incorporates with it. They then add mercury, from ten to twenty pounds for each cuerpo, kneading the paſte afreſh until the mercury be incorporated with it. This office being exceedingly dangerous, on account of the noxious qualities of the mercury, is always made the lot of the poor Indians.

This amalgamation is continued for eight or nine days; and ſome add lime, lead, or tin ore, &c. to forward it; and, in ſome mines, they are obliged to uſe fire. To try whether or no the mixture and amalgamation be ſufficient, they waſh a piece in water; and if the mercury be white, it is a proof that it has had its effect; if black, it muſt be further worked.

When enough, it is ſent to the lavatories, which are large baſons that empty ſucceſſively into one other. The paſte, &c. being laid in the uppermoſt of theſe, the earth is then waſhed from it into the reſt by a rivulet turned upon it; an Indian, all the while, ſtirring it with his feet, and two other Indians doing the like in the other baſons.

When the water runs quite clear out of the baſons, they find the mercury and ſilver, at bottom, incorporated. This matter they call *pella*, and of this they form the *pineas*, by expreſſing as much of the mercury as they can; firſt, by putting it into woollen bags, and preſſing and beating it ſtrongly; then, by ſtamping it in a kind of wooden mould, of an octagonal form, at the bottom of which is a braſs plate pierced full of little holes.

The matter, being taken out of the mould, is laid on a trivet, under which is a large veſſel full of water; and the whole being covered with an earthen head, a fire is made around it.

The mercury ſtill remaining in the maſs is thus reduced into fumes, and at length condenſing, it is precipitated into the water, leaving behind it a maſs of ſilver grains of different figures, which only joining or touching at the extremes, render the matter very porous and light.

This, then, is the pinea, or pigne, which the workmen endeavour to ſell ſecretly to veſſels trading to the South ſea; and from which thoſe who have ventured to engage in ſo dangerous a commerce, have made ſuch vaſt gains. Indeed, the traders herein muſt be very careful; for the Spaniſh miners are errant knaves, and to make the pignes weigh the more, they make a practice of filling the middle with ſand, or iron.

PINEAL GLAND, in *Anatomy*, a ſmall conical body, about the ſize of a pea, in the brain. See BRAIN.

PINEAU, GABRIEL DU, in *Biography*, a celebrated French lawyer, was the ſon of an eminent advocate at Angers, where he was born in 1573. He practiſed firſt at his native place, then at Paris, and afterwards was created by Mary de Medicis her maſter of requeſts. In her differences with the court, ſhe ſought to ſupport herſelf by his counſels; but, faithful to his ſovereign, he continually adviſed her to an accommodation, which was at length effected. By Lewis XIII. he was nominated mayor and captain-general of Angers in 1632. The integrity and impartiality with which he performed the duties of his ſtation, cauſed him to be called the father of the people. His houſe was, at length, made a kind of academy, in which conferences were held on points of law for the inſtruction of members of the profeſſion, and others. He was exact in the performance of his religious duties, and exemplary in his conduct. He died at the age of 71, in the year 1644. His writings are, "Latin Notes on the Canon Law, in oppoſition to thoſe of Du Moulin;" "A Latin Commentary on the Cuſtom of Anjou;" "Conſultations on ſeveral important Queſtions relative to the Cuſtom of Anjou and to the French Law, with Diſſertations on various Subjects:" theſe were reprinted in 2 vols. folio, 1725. Moreri.

PINEDA, JUAN DE, a native of Medina del Campo, and author of an univerſal hiſtory under the title of "Le Monarquia Eccleſiaſtica." He was an indefatigable writer; his commentaries alone filled 6826 leaves in folio. The moſt uſeful of his labours, however, was that of editing and abridging a very curious book, entitled "El Paſo Honroſo defendido por Suero de Quinones," of which a new edition was printed at Madrid in 1783. Pineda was a Franciſcan, and lived to the age of fourſcore. There is another writer of the ſame name, who lived about the ſame time, a Jeſuit, who was of ſuch eſtimation, that once when he paſſed through Evero, he was received in the Jeſuit college there, and a monument was afterwards erected with this inſcription, "Hic Pineda fuit." The taſk of compiling the great "Index Expurgatorius," publiſhed in 1640, was performed by him. He alſo publiſhed a funeral oration for that extraordinary woman Donna Luiſa de Carvajal y Mendoza, in the Engliſh ſeminary at Seville.

PINEDA, in *Geography*, a town of Spain, on the coaſt of Catalonia; 12 miles N.E. of Mataro. N. lat. 41° 37′ E. long. 2° 35′.

PINEG, a town of Ruſſia, in the government of Archangel, on the Pinega; 48 miles E. of Archangel. N. lat. 64° 30′. E. long. 41° 26′.

PINEGA, a river of Ruſſia, which riſes in the province of Uſting, and runs into the Dwina; eight miles E. from Cholomgori, in the government of Archangel.

PINEGROVE, a townſhip of America, in Berks county, Pennſylvania, containing 1290 inhabitants.

PINEI *nuclei Maluccani ſive pergatorii, J. B. Pinus Indica nucleo purgante C. B. Pinei nuclei Maluccani.* Park., in *Botany*, a ſpecies of the croton in the Linnæan ſyſtem. There grows, ſays Acoſta, in ſome gardens of Malabar, and alſo wild, in ſome woods, a tree of the bigneſs of a pear-tree, whoſe leaves are of a watery-green beneath, and of a dead green on the upper face, and are very tender and ſoft. They are of a very acrid taſte, and vellicate the tongue for a long while afterwards: the fruit is triangular, of the ſize of a filberd, and divided into many capſules, containing each a round ſort of white or dark greeniſh ſeed, equal to a pine-kernel, when taken out of its ſhell.

The Indians, as Acoſta ſays, take a couple of the kernels, peel them, and then pound them, and mix them in clyſters, againſt difficulty of urine, and the pain of the ſciatica; or exhibit them in cock-broth, for the evacuation of putrid, ſlimy, groſs, and cold humours, and particularly for the cure of an aſthma. They anoint the impetigo with theſe kernels, bruiſed in water, and ſo cure it; but they are very burning. The cathartic pine-kernels, as Monardes ſays, purge very ſtrongly bile, phlegm, and water; and though milder than filberds, excite vomiting. When roaſted, they operate with leſs violence, and fewer gripes. They are exhibited in chronic diſeaſes, and have a peculiar virtue of evacuating groſs humours.

The fruit of this tree is the grana tiglia of other writers. It is intenſely hot and acrimonious; and ſo violent an evacuant, that it cannot be taken with any tolerable ſafety. This, as well as the pinhones Indici, and avellana purgatrix, which is a ſpecies of the jatropha, in the Linnæan ſyſtem, yield upon expreſſion a conſiderable quantity of oil, impregnated more or leſs with the taſte and purgative quality of the ſeeds; but they all appear too draſtic to be ventured on in ſubſtance. The wood and leaves of the plants are likewiſe ſtrong cathartics.

PINELLI, GIANVINCENZO, in *Biography*, an eminent patron of literature, was born of Genoeſe parents, at Naples, in 1535. From a very early period he entered with ſo much earneſtneſs into literary purſuits, that beſides the ancient and ſeveral modern languages, there was ſcarcely any branch of ſcience which he had not acquired. At the age of twenty-three he left Naples for Padua, where he had improved himſelf by his acquaintance with many eminent ſcholars. In 1561 he was recommended to Philip II. as the fitteſt perſon to undertake a hiſtory of Charles V. He is applauded by other learned perſons of high eſtimation on account of his literary and moral qualifications. Though from his rank and ſituation he might have aſpired to the moſt important ſtations, yet his fondneſs for letters, joined to a delicate habit of body, led him to paſs his days in retirement. His houſe was a kind of academy, frequented by the literati, who found in him a munificent patron, and an enlightened director of their ſtudies. He collected a numerous library of books; expenſive mathematical and aſtronomical inſtruments; a cabinet of foſſils and minerals; together with maps, plates, and every thing that could facilitate learned reſearch. He died in 1601, and the fate of his fine library was very remarkable. After his death, the ſenate of Venice ſet its ſeal upon his manuſcripts, and took away all that related to the affairs of the republic, amounting to 200. There were beſides 14 cheſts of MSS., which, with 116 cheſts of printed books, were embarked in three ſhips to be conveyed to Naples, where his heirs reſided. One of them fell into the hands of the corſairs, who, conſidering the books as mere lumber, threw them overboard; the reſt were ſcattered on the beach at Fermo, which was entirely covered with papers. Theſe were totally diſregarded, till the biſhop of the place having collected all he could, ſent them to Naples. In this ſtate the library was purchaſed by cardinal Borromeo at the price of 3400 gold crowns.

PINES, *Iſland of*, in *Geography*, a ſmall iſland on the N.W. of Terra Firma, about 41 leagues E. of Porto Bello, which forms a good harbour, with two other ſmall iſlands and the main land. N. lat. 9° 12′. W. long. 80° 15′. The river of Pines is five miles from the above harbour.

Pines, *Pinez*, or *Pinas*, an iſland in the Caribbean ſea, near the S.W. coaſt of Cuba, about 25 miles long, and 15 broad. N. lat. 21° 30′. W. long. 83° 25′.

Pines, *Bay of*, a bay on the coaſt of Weſt Florida. N. lat. 30° 20′. W. long. 88° 21′.

Pines, *Iſland of*, an iſland in the South Pacific ocean, near the coaſt of New Caledonia; about 15 or 16 miles in length, in a S.E. and N.W. direction, high in the central part, and ſloping towards the extremities. S. lat. 22° 38′. E. long. 167° 38′.

PINET, Anthony du, in *Biography*, lord of Norroy, who flouriſhed in the 16th century, was a native of Beſançon in the Franche Comtè, concerning whom we know nothing but that he was zealouſly attached to the Proteſtant religion, in behalf of which he wrote ſeveral books. He was likewiſe author of "Plans, Draughts, and Deſcriptions of ſeveral Towns and Fortreſſes, as well in Europe, Aſia, and Africa, as in the Indies and America, their foundations, antiquities, and manners of living, &c." He tranſlated Pliny's Natural Hiſtory in 2 vols. folio, and many other works of repute. Bayle. Moreri.

PINETUS, in *Ancient Geography*, a town of Spain, on the route from Bracara to Aſturica, between Ad Aquas and Roboretum, according to Antonine's Itinerary, attributed by Ptolemy to the Callaici.

PINETZKOI, in *Geography*, a town of Ruſſia, in the government of Archangel, on the Dwina; 60 miles S.S.E. of Archangel.

PINEVILLE, a town of America, in South Carolina, in St. Stephen's diſtrict, which has a flouriſhing academy, between 20 and 30 dwelling houſes, 150 white inhabitants, and 300 negroes. In its vicinity is a valuable quarry of brown iron-ſtone, the only one found in the low country of Carolina.

PINEY, a town of France, in the department of the Aube, and chief place of a canton, in the diſtrict of Troyes; 12 miles N.E. of Troyes. The place contains 1456, and the canton 5920 inhabitants, on a territory of 250 kiliometres, in 13 communes.

PING-CHAN, a city of Corea; 35 miles S. of Hoang-tcheou.

PING-CHAN-PO, a ſmall iſland, with a town, near the S. coaſt of Corea. N. lat. 34° 8′. E. long. 126° 22′.

PING-HAI, a town of Corea; 115 miles S.E. of King-ki-tao. N. lat. 36° 47′. E. long. 128° 41′.

PING-ING, a town of Corea; 40 miles S. of Koang-tcheou.

PING-KING, a city of China, of the firſt rank, in Koei-tcheou. N. lat. 26° 38′. E. long. 106° 56′.

PING-LIANG, a city of China, of the firſt rank, in Chen-ſi. N. lat. 35° 35′. E. long. 106° 18′.

PING-LO, a city of China, of the firſt rank, in Quang-ſi. N. lat. 24° 22′. E. long. 110° 4′.

PINGNAVIR, a town of Africa, in Querimba. S. lat. 11° 55′. E. long. 41° 10′.

PINGRE', Alexander-Guy, in *Biography*, a French mathematician and aſtronomer, was born at Paris in 1711. In 1727 he became a member of the canons regular of the congregation of France. He was intended for the church, but after a few years' ſtudy of theology he devoted himſelf entirely to the ſciences. In 1749 he was appointed a member of the Academy of Sciences in Rouen, and was elected to fill the office of aſtronomer, and attained to firſt rate excellence. His earlieſt production, as an author, was the "Calculation of an Eclipſe of the Moon," on the 23d of December 1749. In May 1753 he was elected correſpondent of the Academy of Sciences at Paris, after having ſent them an obſervation of the tranſit of Mercury, which he made at Rouen. He was next appointed librarian of the abbey of St. Genevieve, obtained the conſtruction of an obſervatory, and was furniſhed by the abbot and chapter with a ſix-foot teleſcope, while he had the loan of an excellent quadrant from the academy. At the deſire of Monnier, he next engaged in calculating "A Nautical Almanack," to enable navigators more eaſily to aſcertain the longitude by means of lunar obſervations. He calculated a table of the eclipſes viſible of the ſun and moon from the commencement of the Chriſtian era to the year 1900, and afterwards a table of the eclipſes viſible from the northern pole to the equator, for a thouſand years before our era. The utility of theſe labours for verifying hiſtorical dates, induced the Academy of Inſcriptions to inſert a part of them in the 42d volume of their Memoirs. He publiſhed the "State of the Heavens" for the year 1754; in this the moon's place was calculated with the utmoſt exactneſs according to the tables of Dr. Halley for noon and midnight, with the right aſcenſion in ſeconds of time twice a day. In 1758 he publiſhed "A Memoir relating to the Diſcoveries made in the South Sea, during the Voyages of the Engliſh and French round the World." In 1760, Pingrè left France for the iſland of Rodriguez in the Indian ocean, to obſerve the tranſit of Venus that was to take place in the following year, and on the 6th of June of that year he made his obſervations, from which he concluded that the parallax of the ſun was 10″.2. At the ſame time the Engliſh aſtronomer Maſon concluded from the obſervations which he made at the Cape of Good Hope, that the parallax was 8″.2. La Lande, in his "Aſtronomy," publiſhed in 1764, adopted a medium between theſe concluſions, and ſuppoſed the parallax to be 9″, in which he was followed by aſtronomers in general, till more numerous obſervations made on the tranſit of 1769 led to a different reſult. After the return of Pingrè from the Eaſt, he publiſhed a deſcription of Pekin, in which he ſhewed the poſition of that capital from the reſult of a number of calculations of eclipſes, and aſcertained its longitude, by other calculations, with a degree of preciſion to which none of the labours of the ſcientific miſſionaries had any pretenſions. In 1769 he ſailed for the iſland of St. Domingo, on board the Iſis man of war, to obſerve the tranſit of Venus, and performed the ſervice committed to him in the moſt able and ſatisfactory manner poſſible. An account of this voyage, which proved of conſiderable importance to the ſcience of geography, as well as aſtronomy, appeared in 1773, in two vols. 4to. After comparing the reſults of the immenſe number of calculations made by the obſervers of the tranſit in the year 1769, the ſun's parallax has been concluded to be about 8″.6. (See Venus, *Tranſit of.*) In 1771, Pingrè made another voyage, on board the Flora frigate, with the view of extending the intereſts of geographical and aſtronomical knowledge, having with him, as the companion of his purſuits, the chevalier de Borda, a celebrated engineer and geometrician; the account of their proceedings, obſervations, and experiments, was publiſhed in 1778, in two vols. 4to. In 1784, M. Pingrè publiſhed his Cometography, or hiſtorical and theoretical treatiſe on Comets, in two vols. 4to., which is his moſt conſiderable work, and contains calculations of the orbits of all the comets of which an account has been preſerved. After a long life ſpent in the moſt important ſervices to the world, he died in the month of May 1796, leaving behind him a high character for integrity, having enjoyed the eſteem of the public as well as that of his friends. He was author of many other works beſides thoſe that have been already noticed.

PING-TCHAI, in *Geography*, a town of Corea; 40 miles W. of Ou-tchuen.

PING-TCHANG, a town of Corea; 63 miles E. of King-ki-tao.

PINGUAGUEM, a river of Africa, which runs into the Zambeze, S. lat. 18° 10′.

PINGUEDO, in *Anatomy*, the Latin term for fat.

Some reſtrain pinguedo only to that humid ſoft kind of fat found in animals, next under the ſkin. See ADEPS.

PINGUICULA, in *Botany*, the diminutive of *pinguis*, fat, which alludes to a peculiar appearance of greaſineſs upon the leaves; whence aroſe the Engliſh name of Butterwort, and the French one of Graſſette, for the plant in queſtion.—Linn. Gen. 13. Schreb. 19. Willd. Sp. Pl. v. 1. 109. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 26. Ait. Hort. Kew. v. 1. 44. Juſſ. 98. Lamarck Illuſtr. t. 14. Gærtn. t. 112.—Claſs and order, *Diandria Monogynia.* Nat. Ord. *Corydales*, Linn. according to his own opinion, but we ſhould rather have referred it to his *Perſonatæ;* akin to *Lyſimachiæ*, Juſſ. rather to his *Pediculares;* the flower agrees beſt with the latter, the fruit with the former. Its proper place however is in the new order of *Lentibulariæ*, founded by Richard, and adopted in Brown's Prodr. Nov. Holl. v. 1. 429.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, ſmall, permanent, ringent; upper lip erect, three-cleft; lower reflexed, divided. *Cor.* of one petal, ringent; its border more or leſs equally five-cleft. Nectary a ſpur, elongated from the baſe of the petal behind. *Stam.* Filaments two, cylindrical, curved upwards, ſhorter than the calyx; anthers roundiſh, clapped cloſe to the ſtigma. *Piſt.* Germen ſuperior, globoſe; ſtyle very ſhort; ſtigma two-lipped, the upper lip larger, flat, reflexed, covering the anthers, the lower very narrow, erect, cloven, ſhorteſt. *Peric.* Capſule roundiſh or ovate, burſting at the top by two valves, with one cell. *Seeds* numerous, cylindrical. *Recept.* central, unconnected.

Eſſ. Ch. Corolla ringent, ſpurred. Calyx two-lipped, in five ſegments. Stigma two-lipped. Capſule ſuperior, of one cell, with many ſeeds.

1. P. *luſitanica.* Pale Butterwort. Linn. Sp. Pl. 25. Engl. Bot. t. 145. (P. villoſa; Lightf. Scot. 77. t. 6. Viola paluſtris, Pinguicula dicta, luſitanica; Griſl. Virid. 84.)—Nectary obtuſe, ſhorter than the nearly regular petal. Flower-ſtalk hairy. Capſule globoſe.—Native of Portugal according to Griſley, whoſe plant we have verified. It is found alſo on the borders of bogs in Dorſetſhire, Hampſhire, Devonſhire, and Cornwall, as well as in the weſt of Scotland and Ireland. It is perennial, flowering in June and July. Like all the reſt of its genus this herb is deſtitute of a *ſtem*, the *leaves* being radical, ſpreading, ovate, obtuſe, viſcid, pale with red reticulated veins; their edges involute. *Stalks* ſeveral, erect, ſimple, ſlightly hairy, three or four inches high, each bearing an elegant little *flower*, whoſe limb is of a pale lilac, in five nearly equal, emarginate ſegments, the tube yellow, ſtreaked with red, hairy at the mouth. *Stigma* very unequally two-lipped, concave. *Capſule* exactly globular. The ſhape of the part laſt mentioned affords excellent ſpecific characters in this genus, but is not uniform enough in all to enter into the generic deſcription.

2. P. *cryſtallina.* Cryſtalline Butterwort. Sm. Fl. Græc. Sibth. v. 1. 8. t. 11.—Nectary obtuſe, ſhorter than the very irregular ſix-cleft petal. Segments of the calyx oblong. Flower-ſtalk ſmooth at the baſe.—Gathered by Dr. Sibthorp and Mr. Ferdinand Bauer, in watery places near Camandria, in the iſle of Cyprus. Differs from the former in its uniformly glaucous *leaves*, unmarked by red veins, but diſtinguiſhed by a glandular cryſtalline clothing like the ice-plant. The *flowers* are ſimilar in colour to *P. luſitanica*, but very different in ſtructure; the ſegments of their *calyx* being almoſt linear, not broadly ovate; and the limb of their *corolla* diſtinctly two-lipped, its upper lip ſhort, in two divaricated lobes, the lower much broader and longer, in three lobes, the middle lobe deeply cloven. The *germen*, and probably the *capſule*, is globoſe.

3. P. *vulgaris.* Common Butterwort. Linn. Sp. Pl. 25. Fl. Dan. t. 93. Engl. Bot. t. 70. (P. ſive Sanicula Eboracenſis; Ger. Em. 788.)—Nectary cylindrical, acute, as long as the very irregular five-cleft petal. Segments of the calyx oblong. Capſule ovate. Common on the bogs of Europe, flowering with us in May and June. Larger than either of the foregoing. The tube and ſpur of the *corolla* are pale purple, but the limb is deep blue, in five rounded ſegments, of which the two uppermoſt are much the ſmalleſt, the lower central one the largeſt, all of them entire. The viſcid ſubſtance, found on the leaves, is ſaid to be uſeful to anoint the dugs of cows when ſore or injured; at leaſt ſuch is the report of old Gerarde, and hence came the name of Yorkſhire Sanicle for this plant.

4. P. *grandiflora.* Large-flowered Butterwort. Willd. n. 3. Decand. Fl. Franc. v. 1. 250. v. 3. 575. Lamarck Dict. v. 3. 22. Illuſtr. t. 14. f. 2. Engl. Bot. t. 2184.—Nectary cylindrical, acute, as long as the nearly regular, five-cleft, veiny petal. Segments of the calyx ovate, obtuſe. Capſule ovate.—Native of France and Ireland. It was diſcovered by Mr. Drummond, curator of the botanic garden at Cork, in marſhy ground in the weſt part of that county, very abundantly, flowering in May. The *leaves* are nearly twice as large as *P. vulgaris*, which is not found in that neighbourhood. *Flowers* alſo twice the ſize of that ſpecies, on ſtronger more viſcid *ſtalks*. *Corolla* much more equally divided, and particularly diſtinguiſhed by its fine reticulations of dark-blue veins.

5. P. *alpina.* Alpine Butterwort. Linn. Sp. Pl. 25. Fl. Lapp. ed. 2. 11. t. 12. f. 3. Fl. Dan. t. 453. Gunn. Norv. faſc. 2. 71. t. 4. f. 4.—Nectary conical, deflexed, ſhorter than the tube of the very irregular five-cleft petal. Capſule oblong, beaked.—Native of the alps of Lapland, Switzerland, and Auſtria, flowering in June, earlier in that country than the *vulgaris*, according to Gunner. It is like that ſpecies in foliage, but rather ſmaller, and eſſentially different in *ſpur* and *capſule*. The *corolla* is white, with a yellow palate; its ſegments very unequal, rounded, undivided.

6. P. *villoſa.* Little Hairy Butterwort. Linn. Sp. Pl. 25. Fl. Lapp. ed. 2. 12. t. 12. f. 2. Lapland Tour,

v. 1. 255. v. 2. 109.—Nectary awl-ſhaped, ſhorter than the petal. Capſule inverſely heart-ſhaped, compreſſed. Flower-ſtalk hairy.—Gathered by Linnæus amongſt bog-moſs in Lapland, but rarely. It has alſo been found occaſionally in Norway and Siberia. This is much ſmaller than any of the foregoing, flowering in May or June; the foliage being withered, and ſeed ripe, by July. The *leaves* are rounded and three-ribbed. *Stalk* ſlender, ſtraight, finely hairy or downy. *Corolla* pale violet. *Capſule* emarginate. Linnæus originally confounded Ray's ſynonyms of the *luſitanica* with the preſent ſpecies, which by that means came to be reckoned a Britiſh plant.

PINGUIN, a Weſt Indian name, adopted as generic by Dillenius, in Hort. Elth. 320. t. 240. See BROMELIA, n. 4.

PINGUIN, in *Ornithology*, is made a diſtinct genus of birds, of the order of web-footed, by Mr. Pennant; the characters of which are, that the bill is ſtrong, ſtraight, and bending a little towards the point; the tongue is covered with ſtrong ſharp ſpines, pointing backwards; the wings are very ſmall, pendulous, uſeleſs for flight, and covered with mere flat ſhafts; the body is covered with thick ſhort feathers, with broad ſhafts, placed as compactly as ſcales; the legs are ſhort and thick, placed quite behind; the toes are four, ſtanding forward, the interior looſe, the reſt webbed; and the tail is very ſtiff, conſiſting only of broad ſhafts. He has enumerated and deſcribed three ſpecies; *viz.* 1. The Patagonian pinguin, which inhabits an iſle near the Cape of Good Hope, on the coaſts of New Guinea, the iſle of Deſolation, ſouth of the Cape, the ſouthern parts of America, and the ſeas among the ice, as high as ſouth lat. 64° 12′, long. 38° 14′ eaſt. It lives much at ſea; the wings act as fins; it burrows on land, and is analogous to ſeals. The name pinguin is given to theſe birds, he ſays, *propter pinguedinem*, on account of their fatneſs; and he obſerves, that it has been corrupted to *penguin;* ſo that ſome, imagining it to be a Welch word, ſignifying *white head*, entertained ſome hopes of tracing the Britiſh colony, ſaid to have migrated into America, under Madoc Gwineth, ſon of Owen Gwineth, A.D. 1170. But he adds, as the two ſpecies of birds that frequent that coaſt have black heads, we muſt reſign every hope, founded on that hypotheſis, of retrieving the Cambrian race in the new world. 2. The leſſer pinguin, diomedea demerſa of Linnæus, or anſer Magellanicus of Cluſius. And, 3. The red-footed pinguin, the phæton demerſus of Linnæus, inferior to the laſt in ſize, with a thick, arched red bill; plumage like the former in texture; the head, hind part of the neck, and the back, of a duſky purpliſh hue, and breaſt and belly white; brown wings, with the tips of the larger feathers white: inſtead of a tail, a few black briſtles; and red legs. It is found on Pinguin iſle, near the Cape of Good Hope. Phil. Tranſ. vol. lviii. art. 14. See ALCA and APTENODYTA.

PINHEIRA *de Azere*, in *Geography*, a town of Portugal, in the province of Beira, on the Mondego; 15 miles S.W. of Viſeu.

PINHEL, a town of Portugal, in the province of Beira, ſituated on a mountain, and fortified; containing ſix pariſh churches, and about 1600 inhabitants; ſeven miles N.E. of Almeida. N. lat. 40° 33′. W. long. 6° 44′.

PINHONES INDICI, the name by which the Portugueſe call the purging nuts, as they are called, of America; the fruit of the jatropha foliis cordatis angulatis in the Linnæan ſyſtem, or the ricinoides and curcas of other writers. It is called Barbadoes nut; and has an oval, walnut-like fruit, with oblong black ſeeds. Their taſte is ſweetiſh, nauſeous, and acrid; and they are powerful evacuants. In America it is ſaid to be taken in conſiderable quantities, and to purge without much inconvenience. See PINEI *nuclei*, &c.

PINION, in *Mechanics*, an arbor, or ſpindle, in the body whereof are ſeveral notches, into which catch the teeth of a wheel that ſerves to turn it round.

Or a pinion is a leſſer wheel, which plays in the teeth of a larger. See WHEEL.

In a watch, &c. the notches of a pinion (which are commonly 4, 5, 6, 8, &c.) are called *leaves*, and not teeth, as in other wheels.

PINION *of Report* is that pinion, in a watch, which is commonly fixed on the arbor of a great wheel, and which in old watches uſed to have but four leaves; it drives the dial-wheel, and carries about the hand.

The quotient, or number of turns, to be laid upon the pinion of report, is found by this proportion: as the beats in one turn of the great wheel are to the beats in an hour; ſo are the hours of the face of the clock (*viz.* 12, or 24) to the quotient of the hour-wheel or dial-wheel divided by the pinion of report, that is, by the number of turns which the pinion of report hath in one turn of the dial-wheel; which, in numbers, is 26928 : 20196 :: 12 : 9.

Or rather thus: as the hours of the watch's going are to the numbers of the turns of the fuſee; ſo are the hours of the face, to the quotient of the pinion of report. If the hours be 12, then 16 : 12 :: 12 : 9. But if 24, the proportion is 16 : 12 :: 24 : 18.

This rule may ſerve to lay the pinion of report or any other wheel, thus: as the beats, in one turn of any wheel, are to the beats in an hour; ſo are the hours of the face, or dial-plate, of the watch, to the quotient of the dial-wheel, divided by the pinion of report, fixed on the ſpindle of the aforeſaid wheel. See CLOCK and MOVEMENT.

PINION, *Flying*. See FLYING.

To PINION is to bind the hands or arms of a perſon, ſo as to prevent his having the free uſe of them.

PINIROLO, in *Ornithology*, the name of a bird of the tringa kind, ſomewhat approaching to the ſand-piper, but larger; its beak is little more than a finger's breadth long, and black; it is of a mixed cheſnut colour, and brown on the back; and its belly and breaſt are perfectly white: it is common in the Italian markets, and very much reſembles the common tringa.

PINITE, in *Mineralogy*, a ſpecies of the clay genus, is of a blackiſh-grey colour, which is frequently covered, on the ſurface and in rents, with iron ochre. It occurs ſeldom maſſive; is almoſt always cryſtallized, and that in ſix-ſided priſms, with truncated lateral edges and angles; ſometimes the truncating edges are ſo numerous, that the cryſtal acquires a roundiſh aſpect. The cryſtals are frequently middle-ſized, ſometimes ſmall, and they frequently interſect each other. The external luſtre is not at all certain; internally it is gliſtening, and its luſtre is reſinous. Its longitudinal fracture is ſmall-grained and uneven; the croſs-fracture is imperfect and foliated. The fragments are indeterminately angular, ſometimes blunt-edged. On the edges it is ſlightly tranſlucent; it is ſoft, eaſily frangible, and not particularly heavy; the ſpecific gravity, according to Kirwan, is 2.98. With regard to its chemical character, it experiences no alteration before the blow-pipe, either alone or with the addition of borax. With carbonate of ſoda it forms an opaque ſcoriaceous globule; and with microcoſmic ſalt, it makes a tranſparent opaleſcent glaſs. It conſiſts of

Alumine	63.75
Silica	29.50
Oxyd of Iron	6.75
	100.00

It has been hitherto found only in the mine called Pini, at Schneeberg in Saxony, and from the mine it derives its name; it is uſually accompanied with quartz, feldſpar, and mica.

PINK, in *Botany*, *Gardening*, &c. See Dianthus.

Pink, *Indian*, a ſpecies of *ipomoea*; which ſee.

Pink, *Indian*, is alſo a ſpecies of *lonicera;* which ſee.

Pink, *Montpelier*. See Aphyllanthes.

Pink, *Sea*. See Thrift.

Pink, *Brown*, among *Painters*, is the tinging part of ſome vegetable of a yellow or orange-colour, precipitated upon the earth of alum, cuttle-fiſh bone, or ſome ſimilar calcareous ſubſtance. When good, it is a concentrated yellow, which, as a pigment, is tranſparent in oil, gives the effect of a dark colour, and ſerves for deep ſhades. There are many methods of preparing brown pink. One of the beſt and moſt common methods is the following: take of the French berries, one pound; of fuſtic wood in chips, half a pound; and of pearl-aſhes, one pound. Boil them in a tin boiler, with a gallon and a half of water, for an hour; and then ſtrain off the tincture through flannel, while the fluid is boiling hot. Having prepared in the mean time a ſolution of a pound and a half of alum, put it gradually to the tincture, as long as an ebullition ſhall appear; waſh the ſediment, as in the preparation of *lakes* (which ſee); and when it is brought, by filtering through paper with a linen cloth, to a proper conſiſtence, dry it on boards in ſquare pieces. Or, it may be made without the uſe of ſalts, by boiling two pounds of the berries in a gallon of water for two hours, and ſtraining off the tincture through flannel. In the mean time prepare a pound and a half of cuttle-fiſh bone, by levigating the ſoft inner part with water on a marble; add this to the tincture, and evaporate them in balneo Mariæ till the matter becomes of a ſtiff conſiſtence: when the whole has been well mixed by grinding, let it be laid on boards to dry.

The goodneſs of brown pink muſt be judged of by its tranſparency, and force of colour, when mixed with oil; but its qualities of ſtanding well, and not fattening in oil, in both which reſpects it is commonly defective, can only be aſcertained by trial and experience.

Pink, *Dutch*, is a pigment formed of chalk, coloured with the tinging particles of French berries, or other vegetables. It is principally uſed for coarſer purpoſes in water. It may be made by boiling one pound of French berries, and four ounces of powdered turmeric root in a gallon of water for two hours, and then ſtraining off the tincture through flannel, and boiling it again with an ounce of alum, till it be evaporated to one quart. Prepare in the mean time four pounds of chalk, by waſhing it over, and afterwards drying it; and mix the chalk with the tincture, by grinding them together, and then dry it on boards. It is ſometimes prepared in the ſame manner with ſtarch and white lead. Its goodneſs conſiſts in its being of a full gold-coloured yellow, and very bright.

Pink, *Engliſh*, is only a lighter and coarſer kind of Dutch pink; and may be prepared in the ſame manner, the quantity of chalk being increaſed in proportion, as it is intended to be inferior to the Dutch.

Pink, *Light*, is of two kinds; the one being the ſame with the Dutch pink, only with much leſs colour, ſo that the proportion of the French berries and turmeric muſt be leſſened to one-half: the other is the ſame with the brown pink, that is, tranſparent in oil, but with leſs colour. It may be prepared by boiling one pound of French berries in a gallon of water, for an hour, and adding to the ſtrained fluid two pounds of pearl-aſhes, diſſolved and purified, by filtering through paper; then precipitate with alum diſſolved in water, by adding the ſolution gradually, till the ebullition ceaſes; and proceed as with brown pink.

Pink, *Roſe*, is a lake, the earth or baſis of which is principally chalk, and the tinging ſubſtance is extracted from Braſil or Campeachy wood. This pigment, which does not ſtand, is ſeldom employed, except for the coarſe work of houſe-painters, or for paper-hangings, and ſometimes with varniſh. It may be prepared by boiling ſix pounds of Braſil wood, or three pounds of Braſil and three of Campeachy wood, in three gallons of water, in which a quarter of a pound of alum has been diſſolved, for an hour. Purify the fluid, by ſtraining through flannel, and put back the wood into the boiler with the ſame quantity of alum, and proceed as before; repeating the operation a third time; mix the three quantities of tincture together, and evaporate them till only two quarts of fluid remain. Prepare eight pounds of chalk, by waſhing it over in water, in which a pound of alum has been diſſolved, and afterwards fuſing the chalk from the ſalt, formed by the alum, and drying it to the conſiſtence of a ſtiff clay. Grind the chalk and tincture together; and lay the maſs to dry out of the ſun or cold air. The goodneſs of roſe pink conſiſts chiefly in the brightneſs of the colour, and fineneſs of its ſubſtance.

Pink, *Pinque*, *Fr.* in *Sea Language*, is a name given to a ſhip with a very narrow ſtern; whence all veſſels, however ſmall, whoſe ſterns are faſhioned after this manner, are called *pink-ſterned*.

Pinks are Mediterranean veſſels, which differ from the xebec only in being more lofty, and not ſharp in the bottom, as they are veſſels of burthen. They have long narrow ſterns, and three maſts, carrying latteen-ſails.

PINKUFELT, in *Geography*, a town of Hungary; 10 miles W. of Steinam Anger.

PINKZOW, a town of Poland, in the palatinate of Sandomirz; 52 miles W. of Sandomirz.

PINNA, or Penna, a Latin word ſignifying a feather. It is alſo uſed figuratively, in divers arts, to expreſs things which bear ſome reſemblance, in form, to feathers; as the fins of fiſhes, &c. See Fin.

Pinna, *the Nacre*, in *Conchology*, a genus of the claſs and order Vermes Teſtacea. The generic character is; animal a limax; ſhell bivalve, fragile, upright, gaping at one end, and furniſhed with a byſſus or beard; the hinge is without teeth, the valves are united in one. The inhabitants of theſe ſhells produce a large quantity of fine and very ſtrong byſſus, which by the Italians is woven into a ſort of ſilk. The ſhells of all the ſpecies, of which there are eighteen, are generally found ſtanding erect in the ſmoother waters of the bays, with the larger end a little open. The fiſh of many of them are highly eſteemed as food.

Species.

Rudis. Shell vaulted, with arched ſcales arranged in rows. There is a variety: the *firſt* inhabits the American and Atlantic oceans, is from twelve to ſixteen inches long, and from four and a half to eight broad; the ſhell is red, and it has from ſix to eight grooves. The *ſecond* is found in the Indian and Red ſeas; it is black, with ſcarcely any viſible grooves.

Pectinata. Shell longitudinally ſtriate half way; one ſide ſlightly wrinkled tranſverſely. There is a variety of this ſpecies. They are both found in the Indian ocean; the *firſt* is about three inches long and four broad; the ſhell is triangular, horny. The *ſecond* is four and a half inches long, two and a half broad, thinner and more rare.

Nobilis. Shell ſtriate, with ſcales. There are four varieties of this ſpecies. They are found in the Mediterranean, Adriatic, and American ſeas. The ſhell of this ſpecies is ſeven inches and a half long, and three and a half broad: it is brown, the exterior margin rounded; the ſcales are larger towards the edges, and near half an inch long; one-half of the valves is ribbed, the other has tranſverſe wrinkles, which at the broader part are croſſed with ſtriæ.

* Muricata. Shell ſtriate, with concave, ovate, acute ſcales. This is deſcribed and figured in Mr. Donovan's Britiſh Shells; it is the P. fragilis of Pennant. It is a native of the European and Indian ſeas, is from three to nine inches long, and one-third as broad; the ſhell is thin, brittle, pellucid, and horny; the outſide is formed with longitudinal ribs, rough with rows of ſmall prickles.

Rotundata. Shell with obſolete ſcales, the margin rounded. It inhabits the Mediterranean; it is ſometimes above two feet long; the ſhell is oblong, whitiſh, with perpendicular, undulate, parallel wrinkles, and very fine, concave, acute, ſcattered ſcales on the broader part.

Squamosa. Shell with very fine undulate ſcales, and flexuous broad wrinkles; the ſmaller end is pointed and naked. It inhabits the Mediterranean, is about thirteen inches long, and half as broad. In colour it is a little cheſnut at the larger end, and whitiſh at the ſmaller one; the external margin is angular.

Carnea. Shell thin, fleſh colour, naked, longitudinally grooved; the external margin is acute and rounded. Its habitation is not known; it is ſometimes varied with white ſpots.

Succata. Shell ſmooth, ſatchel-ſhaped, and a little erect. It inhabits the Mediterranean and Indian ſeas; is five and a half inches long, and half as broad; the ſhell is thin, above it is reddiſh, beneath whitiſh, above flat, with a rounded margin, beneath gibbous, without ſcales, but marked with ten broadiſh, longitudinal ſtriæ.

Digitiformis. Shell ſmooth, tubular, finger-ſhaped, incurved, the extreme margin membranaceous. It is a native of India. The ſhell is flattiſh, oblong, and pellucid.

Lobata. Shell naked, lobed. Found in India. The ſhell is of a ſtraw colour, with purple ſtriæ, membranaceous and heart-ſhaped when the valves are open. The lateral lobes rounded and broader, with a ſort of nerve from the hinge to the lobes, and from the nerve there are lateral lines.

Vitrea. The ſhell of this ſpecies is hyaline, with longitudinal ſtriæ, the ſtriæ with a few ſcales, are croſſed by other tranſverſe ſtriæ at the margin. It inhabits the Indian ocean, but is very rare.

Incurva. Shell narrow, long, naked, carinate, with tranſverſe undulate wrinkles. It inhabits the Indian ocean; pale horn colour, curved at the hinge, and marked with a few longitudinal ſtriæ.

Bicolor. Shell thin, inflected at the lateral margin, yellowiſh, with black-brown rays; with a few longitudinal ſtriæ. It inhabits the Red ſea. It is of a horn colour, long, with a few tranſverſe curved ſtriæ at the margin, the larger end is rounded.

Exusta. Shell flattiſh, horny, with blackiſh rays, ſpots, and clouds, and many ſmooth ſtriæ. It is rare, but ſometimes found in the ſouthern ocean of India.

Vexillum. Shell truncate at the outer margin, dilated, naked, horny, with a few black clouds; longitudinally ſtriate on the fore-part, and tranſverſely wrinkled behind. It inhabits India, and is extremely rare. The ſhell appears as if it were winged, with a curved lateral margin.

Papyracea. Shell very thin, brittle, horny, with longitudinal ribs, the extreme margin roundiſh. This is a native of the Indian ocean: the back of the ribs is ſometimes ſcaly; in the middle of the ſhell is a violet-brown ſpot, and a few tranſverſe wrinkles at the lateral margin.

Sanguinea. Shell flattiſh, and ſlightly incurved: it is red, with a few perpendicular ſmooth ſtriæ. The ſhell is three inches long: it is probably a variety only of ſome other ſpecies.

Bullata. The ſhell of this ſpecies is very ſtraight, thin and perpendicularly ſtriate, with tranſverſe ſpinous wrinkles at the lower margin. This, like the laſt, is thought not to be a diſtinct ſpecies.

Pinna *Auris*, in *Anatomy*. See Ear.

Pinna *Naſi*, is the ſame as ala naſi. See Nose.

PINNACE, a ſmall veſſel, navigated with ſails and oars, and carrying generally two maſts; chiefly uſed as a ſcout for intelligence, and for landing of men.

One of the boats belonging to a great man of war, ſerving to carry the officers to and from the ſhore, is alſo called the pinnace. It reſembles a barge, but never rows more than eight oars, whereas a barge properly never rows leſs than ten. Pinnaces are for the accommodation of lieutenants, &c. as barges are for admirals, and captains of ſhips of war.

PINNACLE, from *pinna*, or *pinnaculum*, in *Architecture*, the top or roof of a houſe, terminating in a point.

This kind of roof among the ancients, was appropriated to temples; their ordinary roofs were all flat, or made in the platform-way.

It was from the pinnacle, that the form of the pediment took its riſe.

Pinnacle *Iſland*, in *Geography*, an iſland in the North Pacific ocean, ſo named by Capt. Cook from the termination of its elevated ſummit in ſeveral pinnacle rocks. N. lat. 60° 25′. E. long. 186° 40′.

Pinnacle *Point*, a cape on the S.E. coaſt of Alaſhka, ſo called by Capt. Cook in 1778. N. lat. 55° 10′. E. long. 198° 5′.

Pinnacle *Iſlands*, two ſmall Japaneſe iſlands. N. lat. 29° 52′. E. long. 132°.

PINNÆ, *Aculei Pinnarum*, in *Ichthyology*. Every apophyſis, or eminence on the head or body of a fiſh, which is ſo ſharp at the end as to be capable of pricking, is called an aculeus; but the aculei pinnarum in particular are thoſe prickly radii or bones, which ſerve to ſupport the fins; and being carried out beyond the rim of the membrane, end in ſo many points.

Theſe aculei are ſimple cylindric oſſicles; whereas the other oſſicles, which ſuſtain the fins, are leſs rigid, and are bent and not prickly; and theſe are not ſimple, but are compoſed each of two oſſicles, cloſely cohering one to another. Many of theſe radii are divaricated at their extremity into two, three, or more branches; theſe, when they are carried out beyond the rim of the membrane, are harmleſs, and are ſeen to be compoſed of two oſſicles, as the body of the radius is. The aculei of the back and belly of all fiſhes are ſo far of the ſame nature, that they never ſtand ſingle, as ſome have ſuppoſed them to do in particular inſtances; but they are always connected one to the other at the bottom by a membrane, though that be ever ſo ſmall and low, as in ſome it is ſcarcely viſible. See *Anatomy of* Fish.

PINNAMAQUAM, in *Geography*, a ſmall ſtream in Waſhington county, and ſtate of Maine, which gives name to a new ſettlement.

PINNARUM *Dilator Proprius*, in *Anatomy*, a name given by Santorini to one of the muſcles of the face, which he has alſo called myrtiformis naſi, and which Cowper has called depreſſor labii ſuperioris, ſive conſtrictor alæ naſi, and Albinus the depreſſor alæ naſi.

PINNARUM *Radii*. See RADII *Pinnarum*.

PINNATED LEAF, among *Botaniſts*. See LEAF.

PINNATIFID LEAF. See LEAF.

PINNATIPEDES, or *Fin-footed Birds*, in *Ornithology*, an order of birds, the characters of which are; that the bill, body, and mode of life reſemble thoſe of the waders or grallæ; the thighs are likewiſe naked for the lower half, and the feet are fitted for wading in marſhes, all the toes being divided; but the toes are edged on each ſide with a membrane for their whole length. Theſe birds moſtly live in pairs while breeding, and conſtruct very large neſts of various leaves and graſs in their marſhy haunts. The genera are *Phalaropus*, *Fulica*, and *Podiceps*; which ſee.

PINNATUS, in *Heraldry*, a term uſed by the Latin writers on theſe ſubjects, to expreſs that ſort of line in arms which is called by our heralds the embattled *line*, or *crenelle*. It is alſo called by ſome *linea pinnis aſperata*, and by Sylveſter Petro Sancto *murales pinnulæ*. When this line is only embattled on one ſide, it is properly expreſſed by this word; but when it is embattled on both ſides, as in ſome arms, it is called *breteſſe*, and *contre breteſſe*.

PINNAW, in *Geography*, a river which runs into the Elbe; 20 miles below Hamburgh.

PINNE, a town of the duchy of Warſaw; 24 miles W. of Poſen.

PINNEBERG, a town of the duchy of Holſtein, capital of a lordſhip; eight miles N.W. of Hamburgh. N. lat. 53° 43′. E. long. 9° 54′.

PINNEYRAH, a town of Hindooſtan; 12 miles N.N.W. of Benares.

PINNING, in *Building*, the faſtening of tiles together, with pins of heart of oak; for the covering of a houſe, &c.

PINNIRAPI, in *Antiquity*, an order of gladiators, who being matched with the Samnites, uſed to catch at the pinnæ which adorned their helmets, and bear them off in triumph, as marks of victory.

PINNOW, in *Geography*, a town of Hinder Pomerania; ſix miles N.E. of Plate.—Alſo, a lake of Brandenburg, in the Middle Mark, near Oranienburg.

PINOLA, or PINGOLA, a town of Mexico, in the province of Guatimala; 75 miles E. of Guatimala.

PINOLS, a town of France, in the department of the Upper Loire, and chief place of a canton, in the diſtrict of Brioude. The place contains 747, and the canton 3580 inhabitants, on a territory of 210 kiliometres, in nine communes.

PINOS, a town of Spain, in the province of Grenada; five miles E. of Grenada.—Alſo, an iſland near the S. coaſt of Cuba, reſembling a horſe-ſhoe in its figure, about 75 miles in circuit, mountainous and covered with pines. N. lat. 21° 32′. W. long. 82. 10′.

PINOS. See PINES.

PINOSA, a town of the iſland of May.

PINSHOWITZ, a town of Bohemia, in the circle of Leitmeritz; ſeven miles S. of Auſſig.

PINSK, a town of Ruſſian Lithuania, in the palatinate of Brzeſc, ſurrounded by moraſſes. Jews are numerous, and the Greeks have a biſhop; the chief manufacture is that of dreſſing Ruſſian leather; 84 miles E. of Brzeſc. N. lat. 52° 12′. E. long. 25° 53′.

PINSSON, FRANCIS, in *Biography*, a learned juriſt, ſon of a profeſſor of law of the ſame name, was born at Bourges in 1612. He was admitted an advocate in the parliament of Paris in 1633; but he was particularly diſtinguiſhed for his great knowledge of the law of benefices, in which he was regarded as the oracle, and which he illuſtrated by ſeveral learned works. Of theſe were "Traité des Benefices;" "La Pragmatique Sanction de St. Louis, et celle de Charles VII. avec Commentaires;" "Notes ſommaires ſur les Indults accordes à Louis XIV. &c.;" "Traités des Regales," 2 vols. 4to. which is ſaid to be a very learned and uſeful performance. This induſtrious writer died at Paris in 1691. Moreri.

PINT, PINTA, a veſſel or meaſure uſed in eſtimating the quantity of liquids, and even ſometimes of dry things.

Budæus derives the word pint from the Greek πινθα; others from the German *pint*, a little meaſure of wine; Nicod from the Greek πινειν, *to drink*.

The Engliſh pint is three-fold; the one for wine meaſure, another for beer and ale meaſure, and a third for dry meaſure.

The wine pint is ſaid to contain a full pound, avoirdupois, of common running water; two pints make a quart, two quarts a pottle, two pottles a gallon, &c.; a hogſhead is $8\frac{42}{100}$ cubic feet; a gallon 231 cubic inches; and a pint $28\frac{7}{8}$ cubic inches. See MEASURE, and TUN.

In the Engliſh ale and beer meaſure, the pint is the eighth part of a gallon, or 282 cubic inches; conſequently contains $35\frac{1}{4}$ cubical inches. See GALLON.

As to the pint uſed in Scotland, there are different opinions concerning the number of cubical inches it contains. Dr. Gregory makes them 109; others, from ſeveral careful menſurations of the ſtandard kept at Edinburgh, make the Scotch pint to contain $103\frac{4}{10}$; and thoſe in common uſe are ſaid to contain betwixt 105 and 106 cubical inches. Another experiment was made with a caſk, which was found to contain $46\frac{7}{8}$ Scotch pints, and $18\frac{1}{16}$ Engliſh ale gallons. Suppoſing this menſuration juſt, the Scotch pint will be to the Engliſh ale gallon as 289 to 750; and if the Engliſh ale gallon be ſuppoſed to contain 282 cubical inches, the Scotch pint will contain 108.664 ſuch inches. The Scotch pint, according to the ſtandard ſterling jug, is 103.404 Engliſh cubic inches: hence 105 Scotch pints = 47 Engliſh wine gallons, and 11 Scotch pints = 6 Engliſh ale gallons. The Scotch quart is commonly reckoned about $\frac{1}{10}$th leſs than the Engliſh wine gallon, and about $\frac{1}{4}$th leſs than the Engliſh ale gallon; and 1 pint = 2 choppins; and 1 choppin = 2 mutchkins; and 1 mutchkin = 4 gills. See MEASURE.

The Paris pint, according to the old ſyſtem, is eſtimated at one-ſixth of the ancient congius, and contains two pounds of common water, and is therefore nearly equal to an Engliſh wine quart; it is divided into chopines, which ſome call ſeptiers; the ſeptier into two demi-ſeptiers; the demi-ſeptier into two poiſſons, each poiſſon containing ſix cubic inches. Two pints make a quart, quarteau, which ſome call a pot: the pint of St. Denis is almoſt double that of Paris. See MUID.

At Genoa 100 pinte, wine meaſure, are equal to 2 barrili = a mezzarola = about 39 Engliſh gallons. For a compariſon of the liquid, &c. meaſures of different countries, ſee MEASURE.

PINTADO, or *Afra avis*, in *Ornithology*, a name given by the ancient Roman authors to the Guinea-hen. See NUMIDA; ſee alſo PROCELLARIA *Capenſis*.

PIN-TAIL, or *Anas Acuta*. See DUCK.

PINTARD'S SOUND, in *Geography*, a bay on the W. coaſt of North America, the mouth of which extends from cape Scott on the ſouthern ſide, in N. lat. 50° 56′, and W. long. 128° 57′, to Point Diſappointment, in N. lat. 52° 5′, and W. long. 128° 50′: it contains many ſmall iſlands.

PINTCHLUCO RIVER, a large branch of the Chata Uche, the upper part of Appalachicola river.

PINTLE, in *Artillery*, a long iron bolt, fixed upon the middle of the limber bolſter, to go through the hole made in the trail-tranſom of a field carriage, when it is to be tranſported from one place to another. The hole through which the pintle paſſes is wider above than below, in order to leave room for the pintle to play in.

PINTLE-*Plate*, is a flat iron, through which the pintle paſſes, and nailed to both ſides of the bolſter, with eight diamond-headed nails.

PINTLE-*Waſher*, an iron ring, through which the pintle paſſes, placed cloſe to the bolſter for the trail to move upon.

PINTLE, *Prieſt's*, in *Botany*. See WAKE *Robin*.

PINTLES, in *Ship Building*, ſtraps of mixed metal or iron, faſtened on the rudder in the ſame manner as the braces on the ſtern-poſt, into which they hang the rudder by a ſtout pin or hook at the fore end: thus the rudder turns or traverſes as upon hinges, from ſide to ſide. Sometimes one or two are ſhorter than the reſt, and work in a ſocket-brace, whereby the rudder turns eaſier. The latter are called *dumb-pintles*.

PINTO, THOMAS, in *Biography*, an excellent performer on the violin, born in England of Italian parents. He was a miraculous player on his inſtrument when a boy; and long before manhood came on, was employed as the leader of large bands in concerts. He was, however, when Giardini arrived in England, very idle, and inclined more to the fine gentleman than the muſical ſtudent; kept a horſe; was always in boots of a morning, with a ſwitch in his hand inſtead of a fiddle-ſtick. But after hearing Giardini, who was ſuperior to all other performers on his inſtrument with which he was acquainted, he began to think it neceſſary to practiſe, which he did for ſome time with great diligence. With a powerful hand, and marvellous quick eye, he was in general ſo careleſs a player, that he performed the moſt difficult muſic that could be ſet before him, better the firſt time he ſaw it, than ever after. He was then obliged to look at the notes with ſome care and attention; but, afterwards truſting to his memory, he frequently committed miſtakes, and miſſed the expreſſion of paſſages, which, if he had thought worth looking at, he would have executed with certainty. After leading at the opera, whenever Giardini laid down the truncheon, he was engaged as firſt violin at Drury-lane theatre, where he led during many years. He married for his firſt wife Sybilla, a German under-ſinger at the opera, and ſometimes employed in burlettas at Drury-lane. After her deceaſe, he married the celebrated Miſs Brent, and, quitting England, ſettled in Ireland, where he died in December 1782, aged 53 years.

His accuracy in playing at ſight was ſo extraordinary, that he even aſtoniſhed Bach and Abel by the extent of this faculty; and to embarraſs him, if poſſible, they compoſed jointly a concerto for the violin, with ſolo parts as difficult as they could invent; and, carrying it to Vauxhall as ſoon as tranſcribed in ſeparate parts, told him that they had juſt finiſhed a concerto, of which, as it was ſomewhat out of the common way, they wiſhed to hear the effects, if he would venture to try it at ſight. "Let me ſee it," ſays Pinto; and after a ſlight glance at the ſolo parts, and picking his teeth in his uſual way, he ſaid if they pleaſed he would try it as his concerto for the night. And the eminent compoſers who wiſhed to make this experiment, declared that they did not believe any of the greateſt performers in Europe on the violin, would have played it better with a month's practice.

Pinto, who in playing an adagio ſeemed to have ſo much feeling and expreſſion, was a Stoic at heart, equally indifferent to pain and pleaſure. While he led the band at Drury-lane, during the moſt affecting ſcene of Garrick's capital tragic parts, he uſed to fall aſleep in the orcheſtra full in his view, which, after our *genuine* Roſcius had with indignation ſeen, he never reſted till his place in the orcheſtra was ſupplied with a leader on whoſe feelings he had more power. Indeed, we remember a more ridiculous mortification happening to our ever-to-be-lamented friend, Garrick, from a centinel at one of the ſtage doors, equally deſtitute of human feelings with Pinto, yawning aloud during the deepeſt diſtreſs of king Lear, which ſo completely turned "what ſhould be great, to farce," that the vulgar part of the audience, being cocknies, burſt into a loud *horſe-laugh*; which ſo diſconcerted and enraged the good old king, that he complained to the captain of the guard, and begged that ſo impenetrable a centinel might never be placed again on the ſtage to make the audience laugh, whilſt he was doing every thing in his power to make them cry.

Pinto died with the ſame indifference about worldly concerns as he had lived, and left his unfortunate widow, the once much famed Miſs Brent, ſo literally a beggar, that ſhe returned to England to ſolicit charity from the Muſical Fund; which, alas! ſhe did in vain: for by his having during ſeveral years neglected to pay his ſubſcription, all her claims were annihilated in an eſtabliſhment which ſhe and her huſband had often by their gratuitous performance contributed, at its annual benefits, to ſupport, previous to its being enriched, and rendered a royal inſtitution by the commemoration of Handel.

PINTO, in *Geography*, a town of Spain, in New Caſtile; 9 miles S. of Madrid.

PINTRAL, a town of Hindooſtan, in the Carnatic; 26 miles S. of Ongole.

PINTURICCIO, BERNARDINO, in *Biography*, was born at Perugia in 1454, and was a diſciple, and for ſome years aſſociate, of Pietro Perugino. He painted in hiſtory and portraits, and was in ſo much eſteem, that he was employed to paint the portraits of pope Pius II., and of Innocent VIII; of Giulia Farneſe, Cæſar Borgia, and queen Iſabella of Spain. His ſtyle, neverthelefs, was extremely dry and Gothic, as he introduced gilding in the architectural and other parts of his pictures, and an overlaboured degree of finiſhing.

In his moſt memorable performance, the hiſtory of Pius II., painted in ten compartiments in the library at Sienna, he is ſaid to have been aſſiſted by Raphael, then a very young man, and pupil of Perugino, who made ſome cartoons of the moſt material incidents, and ſketched many parts of the compoſitions.

His laſt work was a Nativity for the monaſtery of St. Francis at Sienna; in which place he had a room aſſigned him to paint in, without the danger of his being interrupted; and out of which he requeſted every thing might be removed. Willing to indulge him, the monks cauſed all the furniture to be taken away, except an old cheſt, which, being greatly decayed, they did not attempt to move, as they were fearful of deſtroying it. Pinturiccio inſiſted, however, upon its removal; and the attempt was ſcarcely made, when it broke to pieces, and a treaſure of 500 pieces of gold was diſcovered concealed within it.

The joy of the monks was equalled only by the mortification of the painter, who was ſaid to have died of chagrin ſoon after, at the age of 59.

PINTZOUA, in *Geography*, a town of Pruſſia, in the province of Pomerelia; 22 miles S.S.W. of Marienburg.

PINUS, in *Botany*, the fir, cedar, larch, &c. a moſt important and well-known genus of plants, two points in whoſe hiſtory have, nevertheleſs, been involved in great obſcurity; theſe are the derivation of the generic name, and the nature and ſituation of the ſtigma of the flower. Linnæus places *Pinus* amongſt ancient Latin names of unknown origin; and Martyn, like Ambroſinus, leaves it unexplained. The lexicographers are moſtly content to refer to its Greek ſynonym πίτυς; and it is poſſible that both words had the ſame ſource. De Theis deduces *Pinus*, very ſatisfactorily, from the Celtic, and ſhews it to exiſt, variouſly modified, in all the dialects of that ancient language, its baſis being *pin* or *pen*, a mountain or rock; whence we have the Apennines; the Pennine Alps, &c. The Gallic *pinwidden*, like the German *pyn-baum*, means preciſely a mountain tree; than which nothing can be more appropriate. Of the ſtigma we ſhall treat in its proper place.—Linn. Gen. 499. Schreb. 651. Willd. Sp. Pl. v. 4. 494. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 1031. Ait. Hort. Kew. v. 5. 314. Juſſ. 414. Tourn. t. 355, 356. Lamarck Illuſtr. t. 786. Michaux Boreal-Amer. v. 2. 204. Purſh North Amer. v. 2. 639. Gærtn. t. 91. (Abies; Juſſ. 414. Tourn. t. 353, 354. Lamarck Illuſtr. t. 785. Larix; Tourn. t. 357.)—Claſs and order, *Monoecia Monadelphia*. Nat. Ord. *Coniferæ*, Linn. Juſſ.

Gen. Ch. Male, *Cal.* none, except the ſpreading ſcales of the flower-bud. *Cor.* none. *Stam.* Filaments very numerous, collected below into a cylindrical column, racemoſe above; anthers horizontal, wedge-ſhaped, opening underneath by two longitudinal cells, and crowned by an aſcending membranous creſt.

Female, on the ſame plant. *Cal.* a nearly ovate denſe catkin, compoſed of oblong, cloſely imbricated, wedge-ſhaped, rigid, permanent, two-lipped ſcales. *Cor.* none. *Piſt.* Germens two at the baſe of each ſcale; ſtyle none; ſtigmas between the lips of the ſcale. *Peric.* none, except the hardened ſcales, combining to form a woody permanent cone. *Seeds* two to each ſcale, each lodged in a little hollow at the baſe, oval, furniſhed with a vertical, membranous, unequal-ſided wing, uſually larger than the ſeed, but ſmaller than the correſponding half of the annexed ſcale.

Eſſ. Ch. Male, Calyx none. Corolla none. Anthers racemoſe, creſted.

Female, Calyx the ſcale of a catkin, unequally two-lipped. Corolla none. Cone woody. Seeds two, winged at the baſe of each ſcale.

Obſ. Linnæus deſcribes as the ſtyle and ſtigma, the awl-ſhaped point, which terminates one lip of the ſcales of the female catkin, and, in ſome ſpecies, hardens into a very powerful ſpine. Juſſieu deſcribes in his *Abies*, which includes the larches and ſpruce firs, two glands like ſtigmas at the baſe of one of the ſcales, or rather, as we underſtand the flower, one of the lips of each ſcale. An examination of ſeveral ſpecies has perſuaded us that the impregnation takes place nearly as this great writer's account implies, and poſſibly, in ſome meaſure, as Mr. Saliſbury has explained, in Tr. of the Linn. Soc. v. 8. 309; though we ſuſpect ſome error as to the Larch, and particularly thoſe "long crimſon ſtigmas" of the *P. Cembra*, there deſcribed. —The knowledge of the ſpecies of this genus, and their various uſeful properties, has been greatly augmented by the magnificent and learned monograph of Mr. Lambert, publiſhed in 1803. Linnæus has defined but twelve ſpecies; Mr. Lambert deſcribes thirty-four, of which thirty are enumerated by Mr. Aiton in the new edition of his Hortus Kewenſis; Mr. Purſh has nineteen in his Flora of North America, juſt come to our hands. Thoſe which are the produce of that country have received the moſt complete botanical inveſtigation. The oriental ones are not, as yet, ſo well underſtood, nor are they, apparently, by far ſo numerous.—The younger Michaux in his *Arbres foreſtiers*, a work in three volumes 8vo., has, it ſeems, criticiſed inaccurately much of Mr. Lambert's work, and very unwarrantably changed ſome of his names. Theſe attacks are repelled by our intelligent friend, in Mr. Purſh's work, publiſhed under his inſpection. Our ſections are thoſe of Mr. Lambert.

Sect. 1. *Leaves ſeveral from the ſame ſheathing baſe.* PINUS of Tournefort. Nineteen ſpecies.

1. P. *ſylveſtris.* Scotch Fir. Linn. Sp. Pl. 1418. Willd. n. 1. Ait. n. 1. Lambert 1. t. 1. Engl. Bot. t. 2460. Mill. Illuſtr. t. 82. Woodv. Med. Bot. t. 207. Ger. Em. 1356.—Leaves in pairs, rigid. Young cones ſtalked, recurved. Creſt of the anthers very ſmall.—Native of dry ſtony ſandy hills in Scotland, and other northern parts of Europe, flowering in May, and ripening ſeed two years afterwards. This ſpecies lives to the age of 400 years or more, and is lofty and ſtraight in its growth, with oblique *branches*. The *bark* ſcales off in large light cellular flakes. *Sheaths* of the leaves ſpirally diſpoſed, tubular, membranous, at length rugged, torn at the end. *Leaves* in pairs from each ſheath, equal, about two inches long, linear, narrow, obtuſe with a ſmall point, minutely ſerrated, evergreen, ſmooth; their upper ſurfaces, which are dark green, and rather concave, originally clapped together, but ſoon ſeparating; the under convex, more glaucous, ſtriated. *Flowers* terminal, erect; the males aggregate, ſpiked, ſulphur-coloured, ſoon ſurmounted by a protruding leafy branch, each flower having ſeveral chaffy concave ſcaly *bracteas* at its baſe, which ſome call a four-leaved *calyx*: females ſolitary, globular, variegated with purple and green, with ſeveral ſerrated, pointed, ſcaly *bracteas*. The year after impregnation, the young *fruit* becomes lateral, ſtalked and reflexed, green, of a more ovate figure; and the ſecond year ripens into ovate, pointed, hard, teſſellated but unarmed, woody *cones*, whoſe dry ſcales finally gape, and allow of the diſperſion of the winged *ſeeds*. This is further promoted, in various ſpecies, by the attacks of *Loxiæ*, and ſuch hard-billed birds, who in ſeeking the ſeeds for food, ſplit the cone, thus diſperſing many more ſeeds than they devour. The wood of *P. ſylveſtris* is known by the name of red deal, and its value, as well as that of the tar, pitch, and turpentine, afforded by this ſpecies, is well known. The *tree* is planted on our moſt barren expoſed hills and downs, as a ſhelter for more tender plantations, and is in itſelf a profitable object of culture, though not one of the moſt agreeable ornaments to a country where any thing elſe will grow. We have obſerved with regret ſome noble beech woods in Berkſhire, recently bordered with miſerable Scotch and ſpruce firs, which happily indeed ſoon die in that chalky ſoil, and the miſchief is neither laſting nor extenſive.

P. Mughus, Jacq. Ic. Rar. t. 193. Willd. n. 2, is judged by Mr. Lambert to be a variety of *ſylveſtris*, of a humble ſpreading growth, cauſed probably by its lofty ſtation on the alps of Auſtria; nor is it, as Jacquin thought, the *Mughus* of Scopoli; ſee the next ſpecies.

2. P. *Pumilio.* Mugho, or Mountain Pine-tree. Willd. n. 3.

n. 3. Ait. n. 2. Scop. Carn. v. 2. 247. Lamb. 5. t. 2. (Pinaſter Pumilio; Cluſ. Pann. 15. P. quartus auſtriacus; Cluſ. Hiſt. v. 1. 32. Ger. Em. 1358.)—Leaves in pairs, ſhort, ſtraight. Cones ovate, obtuſe, very ſmall; the younger ones ſeſſile, erect. Creſt of the anthers prominent, cloven.—Native of mountains in the ſouth-eaſt parts of Europe, flowering in June. Mr. Blackburne of Orford is recorded as its firſt cultivator in England. This, the moſt humble of its genus, is ſcarcely ſeven feet high, extending itſelf by trailing *ſhoots*, and even by rooting decumbent *branches*. The *leaves* are ſhorter, and *cones* much ſmaller than the foregoing, and the much more diſtinct, prominent, two-lobed, crenate creſt of the *anthers*, affords a ſatisfactory mark of ſpecific diſtinction.

3. P. *pungens*. Prickly-coned Pine-tree. Lamb. 91. t. 16. f. *c*, the cone only. Ait. n. 3. Purſh. n. 14. Mich. Arb. For. v. 1. 61. t. 5. *Ait.*—Leaves in pairs, ſhort, acute. Cones ovate; the prickles of their ſcales elongated, very ſharp, incurved; the lower ones deflexed.—Native of the ſummits of the blue mountains on the frontiers of Virginia and North Carolina, in large foreſts, where it was found by W. Strickland, eſq. The *leaves* are much broader and ſhorter than thoſe of *P. Pumilio*, and tipped with a ſpinous point. *Cones* broad-ovate, light tawny brown, armed with extremely pungent incurved ſpines.

4. P. *Bankſiana*. Labrador Pine-tree. Lamb. 7. t. 3. Ait. n. 4. Willd. n. 10. Purſh n. 10.—Leaves in pairs, divaricated, oblique. Cones recurved, twiſted. Creſt of the anthers dilated, emarginate.—Native of Nova Scotia, Hudſon's Bay, &c. Rarely cultivated in England, flowering in April. This is with us a tall *tree*, with numerous long and ſpreading *branches*, though more humble on its native rocks. *Leaves* ſcarcely above an inch long, variouſly twiſted. Creſt rather broader than the *anther* itſelf, kidney-ſhaped, emarginate and crenate. *Cones* very abundant, oblong, rather ſlender, rugged, brown, two inches in length, recurved, ſo that their points touch the branch, and often meet each other. Communicated to Mr. Lambert by ſir J. Banks. The fineſt trees of this ſpecies are in the gardens at Pain's-hill and Kew.

5. P. *Pinaſter*. Cluſter Pine-tree. Ait. H. Kew. ed. 1. v. 3. 367. Lamb. 9. t. 4, 5. Ait. n. 5. Willd. n. 4. (P. maritima altera; Matth. Valgr. v. 1. 91. Duham. Arb. v. 2. 125. t. 29.)—Leaves in pairs, elongated. Cones whorled, cluſtered, ovate, ſeſſile, drooping, with ſomewhat pointed ſcales. Creſt of the anther rounded.—Native of the ſouth of Europe, in rocky mountainous places, eſpecially near the ſea. Common in Engliſh plantations, flowering in April and May. Larger in every part than the Scotch fir, forming a ſtout and lofty *tree*. The *leaves* are four inches long, narrow, pungent, ſtraight. The male *flowers* compoſe a very handſome golden thyrſus; the creſt of their *anthers* is rounded, nearly orbicular, crenate; not *dilated*, as Willdenow has erroneouſly copied Mr. Lambert, which has cauſed a ſimilar error in Hort. Kew. Female *flowers* with rich crimſon ſcales. *Cones* ovate, rather pointed, four inches long, bright brown, each ſcale tipped with a ſhort broad bluntiſh ſpine. In the ſouth of France theſe trees are waſtefully cut all down one ſide, as they ſtand, in winter, for the turpentine to ooze out. The wood and pitch is much uſed in Switzerland. The ſtakes ſerve to ſupport vines of humble growth.

6. P. *Pinea*. Stone Pine-tree. Linn. Sp. Pl. 1419. Lamb. 11. t. 6, 7, 8. Willd. n. 11. Ait. n. 6. (P. domeſtica; Matth. Valgr. v. 1. 87. P. ſativa; Duham. Arb. v. 2. 125. t. 27. Ger. Em. 1355.)—Leaves in pairs. Cones ovate, obtuſe, as long as the leaves; their ſcales with recurved deciduous points. Seeds bony, with very ſhort wings. Creſt of the anthers jagged.—Native of the ſouth of Europe and north of Africa. Mr. Hawkins and Dr. Sibthorp obſerved it in Greece, eſpecially in the ſandy plains of Elis, from whence the nuts are exported for eating, and the timber is often uſed for ſhip-building. In Italy theſe nuts generally ſupply the place of almonds, in various articles of cookery; and that they have done ſo from remote antiquity, appears from their having been found among the domeſtic ſtores in the pantries of Herculaneum and Pompeia. The kernel is ſweet, with a turpentine flavour; its ſhell very hard. This *tree* appears to great advantage in the landſcapes and gardens about Rome, as well as occaſionally in our Engliſh plantations. Its fine dark green *leaves*, copious male *bloſſoms* diffuſing a ſhower of ſulphureous pollen on all the neighbouring plants, and the maſſy *cones*, render it very remarkable.

7. P. *maritima*. Maritime Pine-tree. Lamb. 13. t. 10. Willd. n. 8. Ait. n. 7.—Leaves in pairs, ſlender, rough-edged. Cones ovate, ſolitary, drooping, ſtalked, teſſellated, even, cloſe. Creſt of the anthers ſomewhat pointed, undivided.—Native of the ſea-coaſts of the ſouth of Europe. Micheli ſent a ſpecimen to Sherard from Italy, and Dr. Sibthorp gathered the ſame in Greece, as we learn from his collection of drawings. Miller appears to have cultivated this ſpecies, but we feel ſome ſlight doubts reſpecting Mr. Lambert's ninth plate, and his cone from Sion gardens, t. 10. f. f, is ſurely different. The *cones* of the true *maritima* are peculiar for their even or level ſurface, the outer part of each ſcale being flat, with a central ſcar, which has no point nor prominence; nor do they ſpread or ſeparate much to diſcharge the ſeeds. The male *flowers* are capitate, not ſpiked; they are ſhorter and the creſt of their *anthers* leſs orbicular, and more pointed, in Dr. Sibthorp's figure than in Mr. Lambert's t. 9, though both drawings were made by the ſame excellent artiſt; and their capitate infloreſcence agrees.

8. P. *halepenſis*. Aleppo Pine-tree. Lamb. 15. t. 11. Willd. n. 7. Ait. n. 8. Desfont. Atlant. v. 2. 352. Mill. Ic. t. 208. (P. maritima prima; Matth. Valgr. v. 1. 90.)—Leaves in pairs, very ſlender. Cones ovate-oblong, drooping, ſtalked, tuberculated, poliſhed, unarmed. Creſt of the anthers rounded, jagged.—Native of Syria. Obſerved by Desfontaines alſo on mount Atlas, and on the uncultivated hills of Barbary, abundantly, as well as in the ſouth of France near Frejus; but this tree does not always bear the winters of Paris nor of London, ſo that it is very ſcarce in collections. It differs from the laſt in having more ſlender *leaves;* ſpiked male *flowers*, the creſt of whoſe *anthers* is broader than long, jagged, not pointed; and eſpecially in the ruggedneſs of its cones, the prominent part of whoſe ſcales is tumid, and of a fine poliſhed red-brown. Theſe ſcales ſpread widely to diſcharge the ſeeds. The ſynonym of Matthiolus is given on the authority of a ſpecimen ſeen by Mr. Lambert in the Sherardian herbarium; and indeed his cut anſwers well to our plant, though employed by Duhamel, v. 2. t. 28, for his own P. maritima major, inſtead of his P. hieroſolymitana, &c. n. 14, to which we preſume it belongs.

9. P. *Maſſoniana*. Indian Pine-tree. Lamb. 17. t. 12. Willd. n. 9.—Leaves in pairs, very long and ſlender; their ſheaths very ſhort. Creſt of the anthers ſhort, broad, toothed.—Native of China; from whence its ſeeds were brought to the Cape of Good Hope, and produced flowering trees there, ſpecimens of which, given to ſir J. Banks by Mr. Maſſon, were examined and delineated for Mr. Lambert's work, nor has this ſpecies been elſewhere publiſhed.

liſhed. The *ſtipulas* on the young ſhoots are finely fringed. *Leaves* four or five inches long, apparently erect. Male *flowers* ſpiked; the creſt of their *anthers* twice as broad as long, ſharply toothed. The *cones* have not come to our knowledge.

10. P. *inops*. Jerſey Pine-tree. Ait. Hort. Kew. ed. 1. v. 3. 367. Lamb. 18. t. 13. Willd. n. 5. Ait. n. 9. Purſh. n. 8. Michaux Arb. For. v. 1. 58. t. 4.—Leaves in pairs. Cones drooping, oblong-conical, longer than the leaves; their ſcales with awl-ſhaped prominent ſpines. Creſt of the anthers ſhort, broad, jagged.—Native of dry barren hills, in the interior parts of North America, from New Jerſey to Carolina, where it bloſſoms in May. Mr. Purſh ſays it is of a middle ſize, ſtraggling growth, and full of reſin, the branches tougher than any other pine with which he is acquainted. It might ſerve for ſeveral uſeful purpoſes, if the wood were not ſo liable to early decay. This account agrees with Mr. Lambert's, which M. Michaux has controverted. Kalm has remarked that cattle in hot weather ſtudiouſly ſingle out this tree for ſhade in preference to all others. Its effluvia are ſuppoſed to be agreeable to them; or rather perhaps hoſtile to ſome inſects which perſecute them, ſuch as gad-flies, to whoſe approach all cattle are extremely ſenſible. See Linn. Tour in Lapland, v. 1. 205. The *leaves* of *P. inops* are of a dark green, two inches long, leſs ſlender than in *maritima* or *halepenſis*, the aſpect of the tree being moſt like a ſtarved Scotch Fir. The ſcales of the female *catkin* are reddiſh, with long taper points, that harden into pungent, prominent, ſlightly curved ſpines on the ripe *cone*.

11. P. *reſinoſa*. American Pitch Pine-tree. Red Pine. Ait. H. Kew. ed. 1. v. 3. 367. Lamb. 20. t. 14. Willd. n. 6. Ait. n. 10. Purſh n. 9. (P. rubra; Michaux Arb. For. v. 1. 45. t. 1.)—Leaves in pairs, elongated, with long ſheaths. Cones ovate, ſeſſile, nearly ſolitary, tolerably even, unarmed, not half the length of the leaves. Creſt ſhort, jagged, narrower than the anther.—Native of Canada and the weſtern parts of New York. *Purſh*. It was firſt raiſed in England by the late duke of Northumberland, at Sion Houſe, where many of this ſpecies are ſtill to be ſeen, flowering in May. This tree requires, according to Mr. Lambert, a moiſt ſituation, and light ſandy ſoil, and though rare in England, is well worthy of cultivation, being of elegant appearance, and remarkable for the fragrance and abundance of its reſin. The *leaves* are four inches long, roughiſh at the point, ſpreading, with ſheaths a quarter of their length. Male *flowers* ſpiked, copious, handſome, the creſts of their *anthers* purple. Female *flowers* oval, deep purple, their ſcales broad, the larger lip only very ſlightly pointed. *Cones* uſually two or three together, ſeſſile, ſpreading, ſcarcely half the length of the leaves, ovate, obtuſe, their ſcales a little tumid, but quite deſtitute of ſpines or points. In cloſe foreſts, Mr. Purſh ſays, this ſpecies grows very tall, with a remarkably ſmooth red bark. The timber is very heavy, and therefore unfit for maſts.

12. P. *variabilis*. Two and three-leaved Pine-tree. Yellow Pine. Lamb. 22. t. 15. Willd. n. 12. Ait. n. 11. Purſh n. 11. (P. mitis; Michaux Arb. For. v. 1. 52. t. 3.)—Leaves two or three together, channelled with ſhort ſheaths. Cones oblong-ovate, nearly ſolitary, ſtalked, drooping; their ſcales with ſhort inflexed ſpines. Found in moſt pine foreſts, from New England to Georgia. *Purſh*. Mr. Lambert has ſeen but two trees of this kind in England, one at Pain's hill, the other at Kew; nor has he delineated the male flowers. This author ſpeaks of the wood as too ſpongy and light to be durable; but Mr. Purſh ſays "the yellow pine is the moſt in uſe for building of houſes as well as ſhipping." The diverſity of number among the *leaves* on the ſame branch is peculiar. Their length, almoſt two inches, rather exceeds that of the *cones*. Their *ſheaths* are ſhort.

13. P. *Tæda*. Frankincenſe Pine-tree. Linn. Sp. Pl. 1419. Willd. n. 14. Ait. n. 13. Purſh n. 15.—Leaves three together, elongated, with long ſheaths. Cones ovate-oblong, deflexed; their ſcales with inflexed ſpines. Creſts of the anthers imbricated, orbicular.—Native of barren ſandy ſituations, from Virginia to Florida. Mr. Purſh ſays this, which he terms the Loblolly, or Old-field Pine, "is found in large tracts in the ſouthern ſtates. All the woods ſeem to be ſeeded with it; for when any piece of cleared land is neglected, for any ſpace of time, it will be covered with thoſe pines. It is difficult, and in ſome caſes almoſt impracticable, to recover thoſe lands run over with young pines, as the ground appears to have loſt all fertile properties for any other vegetable than thoſe trees." The *leaves* are three from each ſheath, larger, and their *ſheaths* longer, than even in *P. reſinoſa*. Male *flowers* capitate, of a glowing yellow, the creſts of their *anthers* orbicular and crowded, or imbricated, over each other. The length of the *leaves* is about ſix inches; that of the *cones* about three. Their *ſpines* are very ſharp, broad at the baſe, ſhort, all inflexed. *Fig. c* of Mr. Lambert's t. 16, we have already cited as another ſpecies; ſee *pungens*, n. 3. His reference to Wangenheim, and the obſervations borrowed from that author, are alſo miſplaced here, belonging rather to *rigida* or *ſerotina*, in Mr. Purſh's opinion. *P. Tæda* flowers in America about April or May. It would be well worthy of cultivation in England, on barren ſandy heaths, where nothing elſe of value will thrive; but though it has been known above a century in our gardens, nobody ſeems to have taken up this ſpecies as an object of ornament or economy.

14. P. *rigida*. Three-leaved Virginian Pine-tree. Common American black, or pitch, pine. Mill. Dict. ed. 8. n. 10. Lamb. 25. t. 18, 19. Willd. n. 13. Ait. n. 13. Purſh n. 12. Michaux Arb. For. v. 1. 89. t. 8.—Leaves three together, elongated, with ſhortiſh ſheaths. Cones cluſtered, ovate; their ſcales with reflexed ſpines. Creſt of the anthers rounded, jagged. Found in the plains, from New England to Virginia, either in dry, or wet low ſituations, bloſſoming in May. *Purſh*. It often grows to a large ſize. The numerouſly cluſtered *cones* afford a ſtriking character at firſt ſight. The *leaves* are about three or four inches long, rough at the points; their *ſheaths* of a much ſhorter proportion than thoſe of *P. Tæda*. The ſpines of the *cones* being reflexed, not inflexed, will, at any time, diſtinguiſh them. The wood is not excellent.——*P. ſerotina*; Mich. Boreal-Amer. v. 2. 205. Mich. Arb. For. v. 1. 86. t. 7. Willd. n. 16. Purſh n. 13, of which a cone is given in Lambert's t. 19. f. 5; P. Tæda δ; Ait. H. Kew. ed. 1; the β of the 2d edition; appears, by Mr. Purſh's account, to be but a variety of the *rigida*, growing on the edges of ponds and ſwamps.

15. P. *paluſtris*. Swamp Pine-tree. Long-leaved, or Broom Pine. Mill. Dict. ed. 8. n. 14. Lamb. 27. t. 20. Willd. n. 15. Ait. n. 14. Purſh n. 16. Sm. Abb. Inſ. v. 1. 83. t. 42. (P. auſtralis; Mich. Arb. For. v. 1. 64. t. 6.)—Leaves three together, very long, drooping, with long ſheaths. Stipulas pinnatifid, reflexed, permanent. Cones ſomewhat cylindrical, prickly.—Native of foreſts near the ſea coaſt, from North Carolina to Florida. *Purſh*. Seldom ſeen in our gardens, except of a very ſmall ſize, being tender. A tree at Kew, with its copious drooping *leaves*, 12 or 15 inches long, makes a beautiful appearance. The male *flowers*, which Mr. Lambert was obliged to have drawn from a dried American ſpecimen, are capitate, very

long, with imbricated orbicular tawny creſts to the *anthers*. *Cone* 10 or 12 inches long, each ſcale tipped with a ſmall, prominent, rather incurved, ſpine. The points of the *leaves* are finely ſerrated; their *ſheaths* long, ſplitting at the top into linear, recurved, jagged ſegments. *Stipulas* at the baſe of the ſheaths, and not half ſo long, linear, recurved, acute, torn in a pinnatifid manner.

16. P. *longifolia*. Long-leaved Pine-tree. Lamb. 29. t. 21. Willd. n. 17. Ait. n. 15.—Leaves three together, very long and ſlender, drooping, finely ſerrated, with long ſheaths. Stipulas entire, deciduous. Cones ovate, with prominent, angular, recurved, minutely-ſpinous ſcales.—Native of the lofty mountains of Nepaul, in the Eaſt Indies, where, according to Dr. Roxburgh, this *tree* grows to the height of 100 feet, bloſſoming about the beginning of the hot ſeaſon. It is marked as a green-houſe plant in Hort. Kew. and ſaid to have been introduced by Meſſrs. Gray and Wear, in 1801. Nothing can be more beautiful than the copious tuft of ſlender, pendulous, rough-edged *leaves*, near 18 inches long, as exhibited in Mr. Lambert's beautiful plate. The male *flowers* are rather capitate than ſpiked. *Cones* (of which a ſolitary perfect ſpecimen is given in a ſecond impreſſion of that plate, inſtead of two which prove to belong to a different and undeſcribed ſpecies, ſee p. 91,) ovate, four inches long, diſtinguiſhed by the unuſually prominent recurved points of their *ſcales*. The head of this lofty *tree* is ſaid to be round and ſmall, affording little ſhade.

17. P. *Strobus*. Weymouth Pine-tree. Linn. Sp. Pl. 1419. Willd. n. 20. Ait. n. 16. Purſh n. 17. Lamb. 31. t. 22. (P. americana, quinis ex uno folliculo ſetis, &c.; Hort. Angl. 57. t. 17. f. 1.)—Leaves five together. Cones cylindrical, imbricated, ſmooth, longer than the leaves. Creſt of the anthers of two minute awl-ſhaped briſtles. Found on the ſides of hills, in a fertile ſoil, from Canada to Virginia, flowering in May. It is the largeſt and moſt uſeful of all the American Pines, and the beſt timber for maſts, growing, in the ſtate of Vermont, to an enormous ſize. *Purſh*. The attention which lord Weymouth, afterwards marquis of Bath, gave to the cultivation of this valuable tree, has juſtly ſtamped it with his name. It is now generally diffuſed through every conſiderable plantation. Its timber is excellent. The *leaves* are very ſlender, and differ from all the preceding in growing five from each ſheath. In winter they approach the branch in an erect poſture; in ſummer they ſpread widely. The male *flowers* are diſtinguiſhed by the peculiar creſt of their *anthers*. The long, taper, ſmooth, deflexed *cones*, with broad flat ſcales, are very peculiar, and, in a green unripe ſtate, ſingularly elegant.

18. P. *Cembra*. Siberian Stone Pine-tree. Linn. Sp. Pl. 1419. Willd. n. 18. Ait. n. 17. Lamb. 34. t. 23, 24. Pall. Roſſ. v. 1. 3. t. 2. (P. maritima altera; Matth. Valgr. v. 1. 93. P. n° 30; Gmel. Sib. v. 1. 179. t. 39. P. n. 20; Duham. Arb. v. 2. 127. t. 32. P. ſylveſtris, cembro; Camer. Epit. 42.)—Leaves five together. Cones ovate, imbricated. Wing of the ſeeds obliterated. Creſt of the anther kidney ſhaped, crenate. Native of the alps of Siberia, Tartary, Switzerland, Italy, &c. In Switzerland it is known by the name of Aphernouſli. Mr. Aiton records it to have been cultivated in 1746, by Archibald, duke of Argyle. Being of extremely ſlow growth, only very ſmall plants of this ſpecies are uſually ſeen in collections. The fineſt we have obſerved were at Mill Hill; but after the deplorable havock made there by ignorant or negligent poſſeſſors, we know not whether theſe trees ſtill exiſt. (See COLLINSON.) They were ſuppoſed to be ſixty or ſeventy years old in 1802, when we ſaw them in fine flower and fruit, being then but juſt arrived at the vigour of their growth, and by no means at full maturity. The aſpect of the *tree* is not very handſome. The *leaves* are of a dull hue, fine and ſlender like the Weymouth pine, with which they agree in number. Male *flowers* copious, capitate; the *anthers* and their rounded creſts tipped with purple. *Cones* ovate, thick, two inches or more in length, purpliſh, with a plum-like bloom; their ſcales thick, obtuſe, with a ſomewhat corky ſurface. *Seeds*, which we have never ſeen perfected in England, almoſt deſtitute of a wing, obovate, reſembling thoſe of *P. Pinea*, like which they are eatable; but their ſhell is more eaſily broken.

19. P. *occidentalis*. Weſt Indian Pine-tree. Swartz Ind. Occ. v. 2. 1230. Lamb. 36. Willd. n. 19. (P. foliis quinis ab eodem exortu; Plum. Ic. 154. t. 161.)—Leaves five together, rough-edged, very long. Cones ovate, teſſellated, ſhorter than the leaves; their ſcales minutely ſpinous. Wing longer than the ſeed.—Native of the mountains of Hiſpaniola, according to Dr. Swartz, who never ſaw more than one tree of this ſpecies, and a nearly deſtroyed *cone*. He deſcribes it as fifty feet or more in height, with upright uneven rugged *branches*. *Leaves* crowded about the extremities of the branches, five from each ſheath, a ſpan long, linear-awlſhaped, triangular, with rough, or finely ſerrated, edges. *Cones* three inches long, deflexed. Plumier's figure agrees with this account, but it very diſtinctly ſhews the cone to be not, as Swartz ſubſequently ſays, imbricated, but teſſellated like moſt of the firſt-deſcribed ſpecies, each ſcale having an abrupt angular termination; whereas in *P. Strobus* and *Cembra*, the only two ſpecies beſides that have five leaves from one ſheath, the ſcales of the *cones* are truly imbricated over each other. The *ſeeds* moreover being, as far as we can judge from Plumier's plate, conſiderably winged, differ widely from thoſe of *Cembra*; as the whole *cone* does from that of *Strobus*, to which latter ſpecies Burmann, the editor of Plumier, moſt incautiouſly referred his plant.

Sect. 2. *Leaves ſolitary, ſcattered.* ABIES of Tournefort. Eleven ſpecies.

20. P. *Abies*. Norway Spruce Fir. Linn. Sp. Pl. 1421. Willd. n. 32. Ait. n. 18. Lamb. 37. t. 25. Fl. Dan. t. 193. Woodv. Med. Bot. t. 208. (Picea; Matth. Valgr. v. 1. 88. Camer. Epit. 47. P. major; Ger. Em. 1354.)—Leaves ſolitary, quadrangular. Cones cylindrical; their ſcales rhomboid, flattened, waved and notched. Common filament ſhorter than the bracteas.—Native of mountains in various parts of Europe, as well as the north of Aſia, in places watered by alpine rills, where it grows to a lofty height, and makes a magnificent appearance. Though not a native of this iſland, few trees have been more generally or longer cultivated here; its ſtately though formal growth, and eſpecially the fine colour of its evergreen leaves, rendering it very ornamental. The wood is alſo one of the moſt valuable ſorts of deal, and the foreſts of Norway afford it abundantly. Mr. Lambert however informs us, that what is grown in England is moſt durable, and particularly eſteemed for making ladders. Burgundy pitch is prepared from this ſpecies. The height of the tree is from 100 to 150 feet. It flowers in April. The long ſweeping fan-like branches, often broken down by loads of ſnow, and the effect of boiſterous winds, have a grand effect in alpine landſcapes, and have been well employed in the ſublime compoſitions of Salvator Roſa, and the German engravers. The *leaves* are copiouſly ſcattered all round the branches, aſcending, ſomewhat imbricated, each ſcarcely

an inch long, on a ſhort ſtalk, ſmooth, linear, curved, bluntiſh, with four rather unequal angles, and as many intermediate hollows. *Stipulas* none. *Flowers* terminal; the males moſt plentiful, of a tawny red; their *bracteas* numerous, ſpreading, longer than the common filament or baſis of the *ſtamens;* anthers yellow, their creſt crimſon, roundiſh kidney-ſhaped, deeply and acutely jagged. Female *catkins* ſeſſile, oblong, erect, of a rich crimſon. *Cones* pendulous, ſolitary at the end of each branch, a ſpan long, nearly cylindrical, light brown, ſmooth, of numerous, imbricated, flattiſh, rigid, rhomboid ſcales, waved at the edge, and notched at the point. *Seeds* ſmall, with large elliptic-oblong wings.

21. P. *alba.* White Spruce Fir. Ait. H. Kew. ed. 1. v. 3. 371. Lamb. 39. t. 26. Willd. n. 34. Ait. n. 19. Purſh n. 7. (Abies alba; Mich. Arb. For. v. 1. 133. t. 12. A. piceæ foliis brevioribus, conis parvis biuncialibus laxis; Hort. Angl. 2. t. 1. f. 3.)—Leaves ſolitary, quadrangular, incurved. Cones nearly cylindrical; their ſcales obovate, wavy, entire. Common filament drooping, twice as long as the bracteas.—Native of high mountainous tracts in the colder parts of North America, flowering in May. Cultivated in England by biſhop Compton before 1700. *Miller.* It vies with the laſt in general form, but not in loftineſs, but the *leaves* are rather ſmaller, more ſwelling upwards, and more incurved, with a glaucous hue, and the *bark* of the trunk is whiter. The *flowers* are all ſmaller; the males diſtinguiſhed by the great length of their common filament, which is quite pendulous. The *cones* are not above two inches long, their ſcales obovate, not rhomboid. Mr. Lambert ſtrongly recommends the planting of this tree, on a large ſcale, on mountainous barren heaths in England and Ireland. Mr. Purſh however ſays its wood is not ſo good as that of the following, nor the tree ſo lofty; neither are its branches fit for making ſpruce beer.

22. P. *nigra.* Black Spruce Fir. Ait. Hort. Kew. ed. 1. v. 3. 370. Lamb. 41. t. 27. Willd. n. 31. Ait. n. 20. Purſh n. 5. (Abies nigra; Mich. Arb. For. v. 1. 123. t. 11. A. piceæ foliis brevioribus glaucis, conis biuncialibus laxis; Mill. Ic. t. 1.)—Leaves ſolitary, quadrangular, ſtraight. Cones ovate; their ſcales elliptical, notched at the end. Common filament erect, the length of the bracteas.—Native of the tracts of high mountains, from the more northern parts of Canada to Carolina, flowering in May. *Purſh.* It was introduced into England at the ſame time as the laſt, but is not much cultivated here. The wood is ſaid by Mr. Purſh to be better than the White Spruce, and the young branches are uſed for making the well-known ſpruce beer. The *leaves* and *flowers* are ſomewhat ſmaller than the laſt; the males erect, orange-coloured, their common filament no longer than the erect *bracteas*, the creſt of their *anthers* rounded, finely fringed. The *cones* are ovate, hardly above an inch long, crowded about the ſides of the laſt-year's ſhoots, which have protruded beyond them, and before they become dry, are of a rich deep purple.

23. P. *rubra.* Red Spruce Fir. Lamb. 43. t. 28. Willd. n. 33. Ait. n. 21. Purſh n. 6.—Leaves ſolitary, awl-ſhaped. Cones oblong, obtuſe; their ſcales rounded, ſomewhat cloven, the margin entire. Common filament ſhorter than the bracteas.—Found in Nova Scotia, and about Hudſon's Bay, flowering in May. Though Miller appears to have known this tree in cultivation, it is at preſent rarely ſeen, nor does it excite attention, except from the more curious obſervers. It is of more humble growth than the *nigra,* which it moſt reſembles, except that the *leaves* are awl-ſhaped; the unripe *cones* of a pale purpliſh-green, and when ripe rather oblong than ovate, their ſcales rounded and not notched, but ſplit. The ſhoots are ſaid to make ſpruce beer.

24. P. *orientalis.* Oriental Fir. Linn. Sp. Pl. 1421. Willd. n. 35. Lamb. 45. t. 29. (Abies orientalis, folio brevi et tetragono, fructû minimo deorſùm inflexo; Tourn. Cor. 41. Voy. v. 2. 104. letter 17.)—Leaves ſolitary, quadrangular. Cones ovato-cylindrical, pendulous; their ſcales ſomewhat rhomboid.—Gathered by Tournefort, on lofty mountains above the convent of St. John, 25 miles ſouth-eaſt of Trebiſonde. The modern Greeks know this tree by the name of ελάτη, and it ſeems to be the only ſpecies of the ſpruce tribe that Tournefort found in the Levant. We know it merely from Mr. Lambert's plate, in which a copy of Aubriet's ſketch of an original ſpecimen, bearing two cones, is given; along with a coloured repreſentation of two other cones, from China, judged by Mr. Lambert to belong to the ſame ſpecies. The *leaves* of Tournefort's plant are very ſhort, being hardly half an inch long, ſomewhat incurved. *Cones* two inches long, ſtalked, quite pendulous, ovate and tapering, with rounded, entire, even ſcales; thoſe of the Chineſe plant are more ſeſſile, with more rhomboid wavy ſcales.

25. P. *Picea.* Silver Fir. Linn. Sp. Pl. 1420. Willd. n. 26. Ait. n. 22. Lamb. 46. t. 30. Woodv. Med. Bot. t. 209. (Abies mas; Ger. Em. 1363, 1364.)—Leaves ſolitary, flat, ſomewhat two-ranked. Cones cylindrical, erect, with long-pointed ſcales. Creſt of the anthers with two horns.—Native of the mountains of Siberia, Germany, and Switzerland; but not of Scotland, as Linnæus and Willdenow ſtate; nor of Sweden, as the latter erroneouſly borrows from the former, printing *Sueciæ* for *Sueviæ.* A tall and handſome tree, cultivated for ornament in England, and flowering in May. Its *bark* is ſmooth and whitiſh. *Branches* horizontal. *Leaves* copious, linear, either acute or emarginate, entire, ſpreading, more or leſs perfectly, in two ranks, and ſometimes curved toward one ſide; their upper ſurface of a dark, ſhining, rather glaucous, green; the under glaucous-white. Male *flowers* numerous, axillary, ſolitary, about as long as the leaves, yellow; their common filament the length of the toothed *bracteas; anthers* remarkable for their rounded two-lobed creſt, crowned with a pair of divaricated horns. Female *catkins* lateral, erect, cylindrical, green, one lip of each ſcale, much the narroweſt, diſtinguiſhed by a long, projecting, awl-ſhaped point, very conſpicuous in the full-grown *cones,* which are alſo erect, three or four inches long, cylindrical, of a reddiſh-green, till they turn brown in drying. Gmelin aſſerts that foreſts of this tree are conſidered, by the wandering Tartars, as a ſure indication of good ſprings, as it delights in moiſt rich ſituations; an obſtacle to its being planted much for profit in England.

26. P. *Balſamea.* Balm of Gilead Fir. Linn. Sp. Pl. 1421. Willd. n. 27. Ait. n. 319. Purſh n. 1. Lamb. 48. t. 31. (Abies balſamifera; Mich. Boreal-Amer. v. 2. 207. Mich. Arb. For. v. 1. 145. t. 14.)—Leaves ſolitary, flat, imperfectly two-ranked. Cones cylindrical, erect, with ſhort-pointed ſcales. Creſt of the anthers pointleſs.—Native of Canada, Nova Scotia, New England, and the Allegany mountains, in high cold ſituations, flowering in May. *Purſh.* It has long been cultivated for curioſity in England, but in general, though it grows to a conſiderable ſize and height, ſcarcely ſurvives above 20 years, which ſeems to be the natural period of its exiſtence. In this reſpect our obſervations agree with thoſe of Miller and Mr. Lambert; though the latter has been told of ſome older trees of this ſpecies at Wooburn and Warwick-caſtle. Its fragrant ex-

udation is the well-known Canada balſam, which ſome quacks celebrate as Balm of Gilead, to their own profit, if not to that of their patients. Combined with ſome kind of ſpirits, it makes a not unpleaſant dram. This tree and its foliage are not much unlike the laſt, but the above characters clearly diſtinguiſh it. The full-grown *cones* are of a beautiful violet hue, and exude plenty of candied turpentine or balſam, as does the trunk when wounded.

27. P. *Fraſeri.* Double-balſam Fir. Purſh n. 2.—Leaves ſolitary, flat, emarginate. Cones ovate-oblong, erect, their ſcales elongated, reflexed, oblong-wedgeſhaped, emarginate, ſhort-pointed, toothed. Found on the high mountains of Carolina, by the late Mr. Fraſer, by whom it has been introduced into England. Mr. Purſh, who met with the ſame ſpecies on the Broad-mountains, Pennſylvania, deſcribes it as a ſmaller tree than the laſt, with ſhorter more erect *leaves*, and *cones* not one-fourth ſo large.

28. P. *taxifolia.* Nootka Fir. Lamb. 51. t. 33. Willd. n. 29. Purſh n. 3.—Leaves ſolitary, flat, entire. Cones oblong. Anthers of two inflated lobes; their creſt minute, reflexed; common filament ſhorter than the concave fringed bracteas.—Gathered by Mr. Menzies at Nootka ſound; "by Mr. Lewis on the banks of the Columbia." *Purſh.* A tall elegant tree, bearing ſome reſemblance to the following, but the *leaves* are more than twice as long, and entire. The *anthers* too, as far as they could be made out from a dried ſpecimen, appear very different; and the *cones* are ſaid by Mr. Menzies to be longer, as well as differently ſhaped.

29. P. *canadenſis.* Hemlock Spruce Fir. Linn. Sp. Pl. 1421. Willd. n. 30. Ait. n. 24. Purſh n. 4. Lamb. 50. t. 32. (Abies canadenſis; Mich. Boreal-Amer. v. 2. 206. Mich. Arb. For. v. 1. 137. t. 13.)—Leaves ſolitary, flat, two-ranked, finely toothed. Cones terminal, ovate, ſcarcely longer than the leaves. Anthers capitate, beaked; common filament twice as long as the bracteas.—"Native of the moſt northern regions of Canada, and on the higheſt mountains, as far as South Carolina, flowering in May. A very elegant tree, growing in ſome ſituations to an enormous ſize; its bark is a fine ſubſtitute for oak-bark in tanning." *Purſh.* Peter Collinſon records his having introduced this tree, in 1736, to the Engliſh collections, and a fine ſpecimen of it is, or was, in his garden at Mill Hill. The aſpect of the Hemlock Spruce is rather gloomy, partaking more of the yew than of the fir. The male *flowers* are ſmall, conſiſting of very few *anthers*, in a round head on a long common filament. The *cones* are ſcarcely an inch long, ſmooth, pale, of but few ſcales, and hang ſolitary at the ends of the ſmall ultimate branches. The *leaves* are glaucous underneath in this, as well as in four ſpecies immediately preceding.

30. P. *lanceolata.* Lance-leaved Chineſe Pine-tree. Lamb. 52. t. 34. Willd. n. 28. Ait. n. 25.—Leaves ſolitary, lanceolate, flat, ſpreading, with taper pungent points. Cones globoſe, with pointed ſcales.—Gathered by the late ſir G. L. Staunton, bart. in the province of Chekiang, China, from whoſe ſpecimen Mr. Lambert at firſt publiſhed an uncoloured figure. A coloured drawing, with a diſſection of the *cone*, diſplaying the *ſeeds*, each of which is repreſented as encompaſſed with an oval wing, was ſubſequently ſent from Canton by an artiſt in the employment of the Eaſt India Company; by all which Mr. Lambert has profited. Living plants have alſo been brought to Kew in 1804, and are now cultivated in the green-houſes of that and ſome other choice collections, but have not yet bloſſomed. The aſpect of this *tree* or *ſhrub*, for we know nothing of its natural ſtature, is ſo unlike all other pines or firs, that its unripe *cones* were actually ſuppoſed to be excreſcences, or galls, owing to the attacks of inſects. The copious, deflexed, rigid, pungent *leaves*, near an inch and a half long, of a fine green, ſpread in every direction; they are entire, but rough-edged, and furniſhed with three ribs. *Cones* about as big as wall-nuts, ſeſſile, rather drooping, almoſt globular, of many ovate pointed ſcales.

Sect. 3. *Leaves numerouſly tufted from each ſheath.* LARIX of Tournefort. Four ſpecies.

31. P. *Larix.* Common, or White, Larch-tree. Linn. Sp. Pl. 1420. Willd. n. 24. Ait. n. 26. Lamb. 53. t. 35. Woodv. Med. Bot. t. 210. (Larix; Matth. Valgr. v. 1. 95. Ger. Em. 1365. Camer. Epit. 45, 46.)—Leaves tufted, deciduous. Cones ovate-oblong; the margins of their ſcales reflexed, jagged. Scales of the female catkin fiddle-ſhaped, prominent in the full-grown cone. Native of the alps of Switzerland, Italy, Germany, Siberia, &c., long cultivated very extenſively, and with great advantage in this country, flowering in March and April, before the leaves fully expand, in which ſtate it makes an elegant appearance. Mr. Lambert's plates of this and the following are no leſs beautiful pictures, than exquiſitely faithful botanical drawings. The ſame may indeed be ſaid of his whole work. The larch is a tree of ſtraight and lofty growth, as well as large bulk, with wide-ſpreading *branches*, whoſe extremities droop in the moſt graceful manner. In a wild ſtate its form is, of courſe, leſs regular, but more pictureſque. The *buds* are alternate, perennial, cup-ſhaped, ſcaly, each producing annually a pencil-like tuft of very numerous, ſpreading, linear, bluntiſh, entire, ſmooth, tender, bright-green, deciduous *leaves*, about an inch long, with no other *ſtipulas* than the ſcales of the bud. How many years each bud endures, we have not determined, but certainly above four or five. From ſimilar buds ſpring ſeparately, on the ſame branch, the male and female *flowers*, the latter only accompanied by a few leaves; but it ſeems to us, that the male buds become entirely leaf-buds, in the ſucceeding ſeaſons. *Bracteas* to each flower numerous, recurved, obtuſe, with fine fringe-like teeth, chaffy, red-brown, deciduous. Male *flowers* yellow, drooping, about half an inch long. Common *filament* much ſhorter than the *bracteas*; *anthers* crowded, deflexed, inflated, and two-lobed in front, with a ſhort recurved point. Female *catkins* erect, larger than the male *flowers*, beautifully variegated with green and pink; one lip of each ſcale orbicular; the other much larger, fiddle-ſhaped, reflexed, with a prominent, awl-ſhaped, green point. This lip becomes erect, and ſomewhat enlarged, projecting always beyond the orbicular one, which dilates greatly, hardens, and becomes the ſeed-bearing ſcale of the *cone*. The *cones* are erect, rather above an inch long, ovate; purple when young; reddiſh-brown when ripe, light, not ponderous, their ſcales ſpreading, orbicular, ſlightly reflexed, and jagged, or cracked, at the margin. Wing of each *ſeed* half-ovate.

32. P. *pendula.* Black Larch-tree. Tamarack or Hackmatack of the Americans. Ait. Hort. Kew. ed. 1. v. 3. 369. Lamb. 56. t. 36. Willd. n. 22. Ait. n. 27. Purſh n. 18.—Leaves tufted, deciduous. Cones oblong; the margins of their ſcales inflexed. Scales of the female catkin fiddle-ſhaped, concealed in the full-grown cone.—Found in low cedar ſwamps, from Canada to New Jerſey, flowering in April and May. *Purſh.* It was firſt raiſed in England by the celebrated P. Collinſon, whoſe original tree, one of the treaſures of the Mill Hill garden, was cut down about the year 1800, to make a rail, by its ſapient poſſeſſor. The abundance of ſeeds, which it annually produced, might

have been a far more laſting ſource of profit, as few exotic trees are more worthy of general cultivation. The wood is at leaſt equal to the European larch, and the bark excellent for tanning. The habit and *foliage* reſemble the preceding, but the female *catkins* are repreſented by Mr. Lambert of a more crimſon hue. The fiddle-ſhaped pointed lip of each of their ſcales is four or five times as big as the orbicular one, but never increaſes after the flowering period; ſo that it becomes entirely concealed, in the full-grown *cones*, by the enlarged orbicular lips, that conſtitute the proper ſcales of the *cones*, and twice exceed it in length. This circumſtance did not eſcape the excellent Solander, who firſt deſcribed the preſent ſpecies, from Mr. Collinſon's garden. The *fructification* for the moſt part agrees with *P. Larix*, inſomuch that it is difficult to find ſpecific diſtinctions. The *cones* however are ſmaller, more cylindrical, with rather fewer *ſcales*, whoſe edges are ſlightly inflexed, and this, added to the want of the pointed prominences ſeen in the foregoing, give the full-grown dark purple *cones* a peculiar neatneſs and ſmoothneſs of appearance.

33. *P. microcarpa*. Red Larch-tree. Lamb. 58. t. 37. Willd. n. 23. Ait. n. 28. Purſh n. 19. (P. pendula; Willd. Baumz. 215. Larix americana; Mich. Boreal. Amer. v. 2. 203. Mich. Arb. For. v. 3. 37. t. 4.)—Leaves tufted, deciduous. Cones roundiſh, of few ſcales; their margins inflexed. Scales of the female catkin oval, concealed in the full-grown cone.—Found about Hudſon's Bay, and on high mountains of New York and Pennſylvania, flowering in May. *Purſh*. Michaux, it ſeems, has confounded this with the laſt, as did Willdenow in his valuable German work on hardy trees and ſhrubs, publiſhed at Berlin in 1796. This is ſimilar to *P. pendula* in general appearance, but the *leaves* are rather ſmaller, and the *cones* conſiderably ſo, being rounder and compoſed of much fewer ſcales. The male *flowers* are more ſhort and tufted, their *anthers* ſcarcely projecting beyond the *bracteas*. The pointed lip of each ſcale of the female *catkin* affords the moſt clear diſtinction, being elliptical, not fiddle-ſhaped. The copious crimſon *cones*, fully grown but not ripe, make a beautiful appearance in ſummer. Such was the ſtate of the tree of this ſpecies, which Mr. Lambert, in company with the writer of the preſent article, found unprotected in the middle of a paſture at Whitton, near Hounſlow, where it had been planted by John duke of Argyle. It had however eſcaped injury, and was immediately ſecured from further danger. Both theſe American Larches are now in cultivation amongſt the nurſerymen, and deſerve the attention of planters.

34. P. *Cedrus*. Cedar of Lebanon. Linn. Sp. Pl. 1420. Willd. n. 21. Ait. n. 29. Lamb. 59. t. 37, *bis*. (Larix orientalis, fructu rotundiore obtuſo; Tourn. Inſt. 586. Duham. Arb. v. 1. 332. t. 132. Cedrus; Trew Ehret. 1, 28. t. 1, 60, 61. Camer. Epit. 57. C. Libani; Ger. Em. 1352. Matth. Valgr. v. 1. 114.)—Leaves tufted, perennial. Cones ovate, abrupt; their ſcales cloſe-preſſed. Creſt of the anthers ovate, flat, erect.—Native of mountains in the Levant, eſpecially of the famous Lebanon, from whence ſeeds were obtained, and plants raiſed in the Engliſh gardens, towards the latter part of the ſeventeenth century. Two of the oldeſt of theſe venerable gueſts remain at Chelſea, and others of ſomewhat younger growth at Chiſwick, Whitton, Pain's hill, &c. A very large one at Hillingdon was blown down above twenty years ago. The wide-ſpreading fan-like branches, and perennial *leaves* of this ſpecies, differ widely from the three foregoing. Its male *flowers* are extremely different, both in their long cylindrical form, and the erect ovate red creſt of their *anthers*, more agreeing with ſome of our firſt-deſcribed kinds. The female *catkins* are ovate, dull-purple; both lips of their ſcales nearly orbicular, and cloſe-preſſed. The larger has at its baſe, on each ſide, attached to the rudiments of the *ſeeds*, a pair of combined awl-ſhaped proceſſes, that might be taken for *ſtyles* or *ſtigmas*, could any analogous parts be found in other ſpecies of *Pinus*. Theſe are, for the firſt time we believe, repreſented in a fine plate by Mr. Sowerby, added to Mr. Lambert's work after its original publication. Which of theſe lips changes into each hardened dilated abrupt ſcale, of the large ponderous *cones*, we have not had an opportunity of obſerving. Something ſimilar to the above ſtyle-like proceſſes of the Cedar, is ſhewn in Mr. Lambert's plate of *P. pendula*, at the diſſected *ſcales* of the full-ripe *cones*; where however it has all the appearance either of pubeſcence, or of lacerated fibres.

Sect. 4. *Leaves oppoſite*. AGATHIS. Salis. Tr. of Linn. Soc. v. 8. 311. t. 15. One ſpecies.

35. P. *Dammara*. Amboina Pitch Pine-tree. Lamb. 61. t. 38. Willd. n. 25. Ait. n. 30. (Dammara alba; Rumph. Amb. v. 2. 174. t. 57.)—Leaves oppoſite, elliptic-lanceolate, ſtriated.—Native of Amboina, where a fine inflammable reſin exudes from the trunk when wounded, and is collected for ſome purpoſe, not clearly explained by authors. A kind of pitch is alſo ſaid to be made from this tree, much uſed in the Eaſt Indies. Of its botanical hiſtory we know little. The elliptic-lanceolate, thick, rigid, oppoſite *leaves*, near three inches long and one broad, are widely different from every known *Pinus*, and there is every reaſon to ſuppoſe the *Dammara* conſtitutes a diſtinct and dioecious genus; though all that has as yet been explained relative to its fructification is little more than conjecture. The ripe *cones* are globular, cloſe, hard, and woody, as big as a ſmall orange, with tumid, teſſellated, unarmed *ſcales*. Other cones bear ſomething like *anthers* at the baſe of each ſcale. Living plants of *P. Dammara* were procured by ſir J. Banks for Kew garden in 1804, and are kept in the ſtove.

PINUS, in *Gardening*, contains plants of the evergreen and deciduous tree kinds, of which the ſpecies cultivated are; the wild pine-tree (P. ſylveſtris); the pinaſter, or cluſter pine-tree (P. pinaſter); the Jerſey pine-tree (P. inops); the American pitch pine-tree (P. reſinoſa); the Aleppo pine-tree (P. halepenſis); the ſtone pine-tree (P. pinea); the torch pine-tree, or three-leaved Virginia pine (P. tæda); the ſwamp pine-tree (P. paluſtris); the Siberian ſtone pine-tree (P. cembra); the Weſt Indian pine-tree (P. occidentalis); the Weymouth pine-tree (P. ſtrobus); the cedar of Lebanon (P. cedrus); the black larch-tree (P. pendula); the common white larch-tree (P. larix); the ſilver fir-tree (P. picea); the balm of Gilead fir-tree (P. balſamea); the hemlock ſpruce fir-tree (P. canadenſis); the black ſpruce fir-tree (P. nigra); the Norway ſpruce fir-tree (P. abies); the white ſpruce fir-tree (P. alba); and the oriental fir-tree (P. orientalis).

The trunks of the firſt ſort of theſe afford maſts to our navy, and from them and the branches tar and pitch are obtained, as alſo by inciſion, barras, Burgundy pitch, and turpentine.

There are ſeveral varieties; as the Tartarian, which has a great reſemblance to it, but the leaves are broader, ſhorter, and their points are more obtuſe; they emit a ſtrong balſamic odour when bruiſed; the cones are very ſmall, as are alſo the ſeeds, ſome of which are black, and others white.

The mountain, or mughoe, which has very narrow green leaves, grows ſometimes by pairs, ſometimes by threes from the ſame ſheath, generally ſtanding erect; the cones are of a middling ſize, and pyramidal; the ſcales flat, having each a ſmall obtuſe riſing, but very compact till they are opened by the warmth of the ſun the ſecond ſpring; the ſeeds of this are much leſs than thoſe of the ſecond ſort, but larger than thoſe of the firſt. It is a native of the Swiſs mountains, where it is often called torch pine, growing to a great height.

The ſea pine, which has ſmooth leaves; the cones are very long and ſlender; and the ſeeds are about the ſame ſize with thoſe of the ſecond ſpecies. It grows in the maritime parts of Italy, &c.

Other varieties are likewiſe mentioned by writers.

Of the ſeventh ſort there are different varieties; as the three-leaved Virginia, which has the leaves long, generally three in each ſheath; the cones in cluſters round the branches, as long as thoſe of the ſecond ſort, but with rigid ſcales; the ſeeds alſo nearly as large as thoſe of it. It grows naturally in Virginia, and other parts of North America, where it riſes to a great height.

The other varieties differ but little from this.

The twelfth ſort, or cedar, is now ſo far naturalized to our country as to produce ripe ſeeds; we may, therefore, have ſupplies without depending on the cones from the Levant: but it is found that they are more apt to produce and ripen their cones in hard winters than in mild ones; which is a plain indication that they will ſucceed even in the coldeſt ſeaſons of the northern parts of the iſland, where, as well as in the other parts, they might be propagated to great advantage.

There are different varieties of the fourteenth ſort; the American, the Siberian, and the Chineſe, require a colder climate than England, for the trees are apt to die in the ſummer here, eſpecially if they are planted on a dry ſoil; the cones of thoſe which have been brought to England ſeem to be in general larger than thoſe of the common ſort; but there is ſo little difference between the trees in their characteriſtic marks, that they cannot be diſtinguiſhed as different ſpecies, though in the growth of the trees there is a remarkable difference. In the laſt, the cones are much larger than thoſe of the common ſort, and end in acute points; the ſcales prominent, like thoſe of the firſt ſpecies, and have little reſemblance to thoſe of the larch. They are of a ſhrubby, ſpreading growth, but ſo hardy as to thrive in the open air without any protection. But in the firſt, of which the branches are more ſlender, with a bark more inclining to yellow, and the ſcars more ſlender and cluſtered; the leaves are more tender, narrow, more glaucous, and the outer ones in each bundle ſhorter; cones only one-third of the ſize, blunt, with ſcales ſcarcely exceeding twelve in number, thinner, more ſhining, retuſe, emarginate; the wings of the ſeeds are ſtraight, more oblong, narrower, and, together with the ſeed itſelf, of a more diluted grey colour. And in the ſecond, the bark of the branches is of an aſh-coloured grey; the leaves a little wider, bright green, all nearly equal, commonly more than forty in a bundle; the cones an inch long, with above thirty woody, ſtriated, rounded, entire ſcales; the ſeeds browniſh-grey, with ſubtriangular wings, ſomewhat bent in. In both the cones are bent upwards, on very ſhort peduncles.

It is obſerved by the editor of Miller's Dictionary, that “no tree is more valuable; or better deſerves our attention in planting than the larch.” It is a native of the ſouth of Europe, and Siberia.

The timber is not only uſed in houſes but in naval architecture alſo. “It ſeems to excel,” he ſays, “for beams, doors, windows, and maſts of ſhips; it reſiſts the worm; being driven into the ground it is almoſt petrified, and will ſupport an incredible weight; it bears poliſhing excellently well, and the turners abroad much deſire it. It makes everlaſting ſpouts, pent-houſes, and feather-edge, which need neither pitch nor painting to preſerve them; excellent pails, poſts, rails, props for vines, &c.; to theſe we may add the palettes on which painters ſeparate and blend their colours.”

It has been obſerved in Ireland, that no tree grows ſo ſpeedily to ſo large a ſize as the fifteenth ſort, or the ſilver fir. Some at forty years growth, in a wet clay on a rock, meaſuring twelve feet in circumference at the ground, and ſeven feet and a half at five feet high; one tree containing ſeventy-ſix feet of ſolid timber. The earl of Fife alſo remarks that no trees make a greater progreſs than this and the larch. It is found to be excellent for boat-building.

The ſeventeenth ſort has very much the habit of the ſilver fir, but the leaves are wider and blunter, diſpoſed on each ſide along the branches like the teeth of a comb, but in a double row, the upper one ſhorter than the under; underneath marked with a double glaucous line, and each has eight rows of white dots, and are often cloven at top.

The appellations of white and black in the ſeventeenth and eighteenth ſorts are given from the colour of the bark, as there is little difference in the colour of the wood, and the leaves of the black are whiter on their under ſide than thoſe of the white. They are both natives of North America; the white upon the mountains; the black upon the low grounds, generally in bogs or ſwamps. The firſt is by much the largeſt tree. This (the black) ſort is eaſily known by its narrow leaves, placed on every ſide of the branches, and its long pendulous cones, which do not fall to pieces on the tree, but drop off entire the following ſummer; the ſcales open and emit the ſeeds on the firſt warmth of the ſpring.

There is a variety of this tree cultivated under the title of the long-coned Corniſh fir, in which the leaves are longer, broader, of a lighter colour, and fuller on the branches; the cones alſo longer.

In the nineteenth ſort there are two principal varieties; the white and the red, both of which afford the white deals. And *Burgundy pitch* is prepared from the reſin procured from this tree by boiling and ſtraining it through a cloth.

There is no tree that yields greater profit than the ſpruce fir in cold land; no tree is more beautiful ſtanding ſingle on turf in large plantations, or more uſeful for ſhelter in cold ſoils and ſituations.

Method of Culture.—In all the ſorts and varieties the increaſe is effected by means of ſeeds, which may be obtained from the well ripened cones by expoſing them to the heat of a gentle fire, or that of the ſun, in which way the cells open and the ſeeds may be readily taken out. When the cones are not made uſe of in this way, they will remain ſeveral years without the ſeeds being injured, eſpecially where they are cloſe.

They ſhould be ſown in the early ſpring months, as March or the following month, on beds of fine earth, in a north-eaſt aſpect, or in large pots or boxes for the purpoſe of being occaſionally removed into different ſituations as may be found neceſſary. They ſhould be covered with nets to prevent the birds from pecking off the tops of the young plants, while the huſks of the ſeeds are upon them; and be likewiſe ſcreened from the heat of the ſun at firſt.

All the ſorts, except the ſtone pine and a few others, the ſcales of the cones of which are very hard, ſoon come up; but theſe frequently remain more than a year; the ground ſhould therefore not be diſturbed, being only kept clean from weeds in ſuch caſes.

Soaking the ſeeds in theſe caſes may be uſeful, as well as ſowing them in ſhaded ſituations.

The young plants in all the ſorts ſhould be kept quite clean, and occaſionally refreſhed with water when the ſeaſon is dry, in a very gentle manner, ſo as not to diſturb the plants.

When they come up too cloſe, the plants ſhould be thinned out in the ſummer, the thinnings being planted out immediately in a ſeparate bed, in a ſhady place, being gently watered as there may be occaſion. They ſhould be ſet out in rows at the diſtance of four or five inches, and three or four in the rows. The tender kinds ſhould be ſheltered during the winter by frames or mats from the froſts, but with the others it is unneceſſary.

When the plants have remained in theſe beds a year or more according to circumſtances, they ſhould be removed into other rows in the nurſery at the diſtance of two feet, and one or more in the rows. In this ſituation they ſhould remain till the periods of their being finally planted out.

The beſt ſeaſon for the removal of the plants in all caſes is towards the latter end of March, or the beginning of the following month.

Where it can be done, it is the beſt way not to let them remain too long in theſe nurſery ſituations, as the plants are always found to ſucceed beſt when planted out before they have acquired too large a growth.

When large plantations are to be made, it is adviſed by ſome to raiſe the plants on a portion of the ſame ground, or as nearly ſimilar to it as poſſible.

It is advantageous when they are to remain, to have a large ſize to tranſplant them every two years, as by that means they form better roots, and ſuch as ſpread out more laterally, and of courſe the plants may be afterwards removed with greater ſafety.

In removing the plants, at all times great care ſhould be taken to preſerve the roots as much as poſſible, as well as all the branches, without cutting them.

When they have been finally removed, they require little more trouble, it being only neceſſary to keep them perfectly free from weeds, and ſupporting the larger ſorts of plants with proper ſtakes; all the ſorts ſhould be ſuffered to take their own natural growth; being careful to preſerve their tops perfectly entire, to ſhoot up as faſt as poſſible, and to branch out in their own way, as no pruning is wanted, unleſs in the lowermoſt branches in particular trees which are thought too low and ſtraggling, when theſe may be occaſionally trimmed, cutting them cloſe to the ſtem; but pruning ſhould be very ſparingly practiſed to theſe reſinous trees, as lopping the branches contributes to retard their growth as well as impair their beauty. In large foreſt plantations, where the trees are arrived to a large growth, it is, however, cuſtomary to lop their lower branches gradually for faggots, according as they begin to decay; for where theſe trees ſtand cloſe, the upper branches generally kill thoſe below, ſo that the lower tiers decay gradually and ſucceſſively; in which caſe theſe decaying lower branches may be lopped by degrees in winter.

After the plantations deſigned for timber-trees have had eight, ten, or twelve years' growth, it may be proper to begin to thin them; thoſe thinned out may ſerve for many ſmaller purpoſes, being careful in thinning to leave a ſufficiency of the fineſt plants ſtanding at proper diſtances to grow up for timber.

Theſe trees are all highly ornamental evergreens for the pleaſure-grounds.

In regard to the diſtribution or arrangement of the trees in the plantations, and mode of planting, thoſe deſigned for the ſhrubbery and for ornamental plantations may be diſpoſed both in aſſemblage with other trees, and to form clumps, and continued plantations. Thoſe intended as foreſt trees ſhould generally be diſpoſed alone in conſiderable plantations. The method of planting them is the ſame as in other hardy trees; but where large plantations in out-grounds are intended either for pleaſure or profit, there will not be any great neceſſity for a previous preparation of the ſoil, with reſpect to digging or ploughing, only juſt to dig a hole for each tree; the ſame rule may alſo be obſerved in planting clumps of them in lawns, parks, and other graſs-grounds, the mould being made fine in the bottoms of them. Thoſe deſigned principally for ornament ſhould be diſpoſed at ſuch diſtances as that their branches may extend freely every way; as the beautiful diſplay of the head is a great merit in theſe trees in ſuch plantations; but thoſe intended for timber plantations may be put only four or five feet diſtant, in order that they may draw one another up ſtraight and tall more expeditiouſly, and to admit of a gradual thinning after a few years' growth, for poles, &c.

The proper methods of raiſing and planting out all the different ſorts, in the view of affording timber or ſhelter in large plantations, may be ſeen in the new edition of Miller's Dictionary.

PINUS, in *Ornithology*, a ſpecies of *Certhia;* which ſee.

PIN-YANG, in *Geography*, a city of China of the firſt rank, in Chan-ſi; 337 miles S.W. of Peking. N. lat. 36° 6'. E. long. 111° 0'.

PIO, ALBERTO, in *Biography*, prince Carpi, ſon of Leonello, lord of Carpi, by a ſiſter of the celebrated Giovanni Pico of Mirandula, was born about the year 1475, and firſt ſtudied in the univerſity of Ferrara under Pomponazzo. He purſued his ſtudies with great ardour at Carpi, whither he had invited ſeveral learned men, among whom he diſtinguiſhed Aldo Manuzio as his particular inſtructor. After his father's death, he, with his brother Leonello, had a common dominion in the territories of Carpi, with Giberto and other ſons of Marco, another branch of the ſame family. This divided authority produced diſſenſions, which, from 1494 to 1500, occaſioned a bloody civil war. After a time, Alberto connected himſelf with the French party, and in 1510 he viſited the court of Lewis XII., and was diſpatched by him in a miſſion to pope Julius II., and ſome circumſtances now occurred which led him to believe that it was his intereſt to quit the French party, and to join that of the Imperial, the latter being the ſtronger in Italy, which he did not heſitate to ſay was the motive by which he was governed in his political alliances. He reſided a long time at Rome as the emperor's ambaſſador at the papal court, and was ſingularly eſteemed by Leo X., who conferred upon him ſeveral caſtles in Romagna. In the ſubſequent wars his principality was frequently taken by different parties, and Alberto was poſſeſſed and diſpoſſeſſed of the ſovereignty. He again adopted the French intereſt, which occaſioned the final loſs of Carpi, that was transferred by Charles V. to Alfonſo, duke of Ferrara. He was at Rome during its ſack in that year; and took refuge with Clement VII. in the caſtle of St. Angelo. Being afterwards delegated by the pontiff to Francis king of France, he was very handſomely received by that monarch, and died at his court in 1531, in the 56th year of his age. Notwithſtanding the viciſſitudes of his life, and his various political occupations, Alberto did not ceaſe the cultivation of letters; he was a zealous adherent to the ſee of Rome, and gave all the oppoſition in his power to the doctrines of the reformers. At this time Eraſmus made a conſiderable figure in the world, and Alberto ſpoke pretty freely of the tendency of his various

rious publications, and what he ſaid was reported with much aggravation to that celebrated man. In conſequence he wrote, in October 1525, a letter to Alberto, acquainting him in a friendly manner with what he had heard, and ſubjoining a ſhort defence of himſelf. To this Alberto replied in a long epiſtle, which, with Eraſmus's letter, was afterwards publiſhed at Paris. This led to farther diſcuſſion on both ſides, and in one of his letters, Alberto launched out into an examination of all the works and opinions of Eraſmus, and of thoſe of Luther, and the other innovators of the time. He died, while the work was printing, at Paris, but it appeared in the ſame year under the title of "Alberti Pii, &c. tres et viginti libri in locos lucubrationum variorum D. Eraſmi Rotter." This work is highly commended by Tiraboſchi, who ſays "it has none of the ſcholaſtic barbariſm, but is written with erudition, force, and not without elegance." It ſhould be obſerved, that he was ſuppoſed to have been aſſiſted by Sepulveda, and other learned men whom he kept in his houſe. His works have been collected and publiſhed in folio at Paris, and alſo at Venice.

PIOBBICO, in *Geography*, a town of the duchy of Urbino; 11 miles S. of Urbino.

PIOBRACH, a Gaelic term, denoting an air played upon the bag-pipe; and now more ſtrictly applied to the ancient Highland martial muſic. This air is ſaid to be peculiarly expreſſive. Piobrachs are either ſimple or compound; ſome of them conſiſt of a march, &c. and are beautifully varied, and highly characteriſtic.

PIOMBA, in *Geography*, a river of Naples, which runs into the Adriatic, N. lat. 42° 56′. E. long. 13° 9′.

PIOMBINO, a principality in the central part of Italy, conſiſting of a ſmall portion of the Italian ſhore, and the oppoſite iſle of Elba, ſubject, in the 13th century, to the Piſans, and after ſeveral revolutions transferred to the family of Appiano, as a detached principality, in 1399. In 1501 it was ſeized by Cæſar Borgia, but after the death of pope Alexander VI. returned to the houſe of Appiano. In the 16th century the iſle of Elba was repeatedly ravaged by the Turks. The principality recently paſſed to the houſe of Buoncompagni, that is, the dukes of Sora, a Neapolitan family, which owes its fortune to the pontiff Gregory XII., and in 1801 annexed to the new kingdom of Etruria. It is ſituated on a peninſula, in a bay of the Mediterranean, called "the gulf of Piombino." Piombino is a ſmall neglected town; 33 miles S.W. of Sienna. N. lat. 42° 57′. E. long. 10° 34′.

PIOMBO, SEBASTIAN DEL, in *Biography*, called alſo *Venetiano*, from Venice, the place of his birth, which occurred in 1485. He was renowned in early life as a muſician, and particularly for his ſkill in playing upon the lute. While he was yet in his youth, he abandoned that ſcience, and was taught the rudiments of the art of painting by Giovanni Bellini; but as Giorgione da Caſtel Franco had juſt then exhibited his improved mode of colouring and effect, Sebaſtian placed himſelf under his tuition; and in the end acquired a well merited and great renown, both in painting portraits and hiſtorical ſubjects.

His firſt eſſays were in the former claſs, and they were greatly admired for the ſtrength of reſemblance, and the ſweetneſs and fulneſs of ſtyle with which they were executed; and were frequently miſtaken for the work of Giorgione. His portrait of Giulio Gonzaga, the favourite of cardinal Hippolito di Medici, is by many writers ſpoken of with extreme delight, and called a divine performance, full of life and character. He finiſhed his works with great care; folding his draperies with great felicity, and giving great truth and exactneſs of action to the heads and hands.

By the perſuaſion of Agoſtino Ghizi, a rich merchant of Sienna, he was induced to go to Rome; where the novelty of his ſtyle, and his ſkill in execution, ſoon drew him into public notice. He there became an hiſtorical painter, and wrought equally well in freſco and in oil. In the conteſt of opinion which took place at that time concerning the ſuperiority in merit of Raphael, or M. Angelo, Sebaſtian gave the preference to the latter, and gained his eſteem and ſupport. In conſequence he was favoured by him on all occaſions; and ſo highly eſtimated, that he ſtimulated him to the raſh attempt of rivalling Raphael; particularly by painting a picture in competition with that great man's laſt great work, the Transfiguration; which had juſt been placed, with great éclat, in the church of St. Pietro à Montorio. The ſubject Sebaſtian choſe, was the reſurrection of Lazarus; for which Michael Angelo is ſuppoſed to have furniſhed the deſign, or at leaſt to have conſidered and retouched it. The picture is of the ſame ſize as Raphael's, and, when completed, was placed in the ſame Conſiſtory, and was very highly applauded. The cardinal di Medici ſent it to his biſhopric of Narbonne, and it became the property of the duke of Orleans. It is now in England, and in poſſeſſion of J. Angerſtein, eſq. who gave 2000 guineas for it to the proprietors of the Orleans collection. Although it is a work of profound ſkill, and highly preſerves the reputation of its author, yet, in our opinion, it is not to be compared with the great work it was intended to rival, either in deſign, in expreſſion, or effect; whatever may be ſaid of its execution.

Sebaſtian continued to exerciſe his talents, particularly in portraiture, with great induſtry and ſucceſs, till he obtained the office of Frate del Piombo; when he ceaſed to paint for profit; and was henceforward known by the name of Sebaſtian del Piombo. He lived in great eſteem with pope Clement VII., whoſe portrait he painted with great power and fidelity; as well as that of the ingenious ſatiriſt Aretine; and thoſe of many perſons of rank and renown. He obtained great praiſe for having diſcovered a mode of preventing oil colours, employed on plaiſter, from becoming dark; which he did, by applying, in the firſt inſtance, a mixture of maſtic and Grecian pitch. Having paſſed through a life of great honour and emolument to the age of 62, he then ſhared in the common fate of human nature, and died in the year 1547.

PIONEER, in *War*, a labourer employed in an army, to ſmooth the roads, paſs the artillery along, and to dig lines and trenches, mines, and other works.

Menage derives the word from the Latin *peditones*, a diminutive of *pedites*. Bochart deduces it from the Pæones, a people of Aſia, whoſe principal employment was to dig the earth in mines, &c.

Moſt of the foreign regiments of artillery have half a company of pioneers well inſtructed in their buſineſs. Our regiments of infantry and cavalry have three or four pioneers each, provided with aprons, hatchets, ſaws, ſpades, and pick-axes. They have alſo a cap with a leathern crown, and a black bear-ſkin front, on which is the king's creſt in white, on a red ground, and the number of the regiment on the back part of the cap.

PIONSAT, in *Geography*, a town of France, in the department of the Puy-de-Dome, and chief place of a canton, in the diſtrict of Riom; 22 miles N.W. of Riom. The place contains 1680, and the canton 8026 inhabitants, on a territory of 170 kiliometres, in 10 communes.

PIONTAK, a town of the duchy of Warſaw; 20 miles E.S.E. of Lencicz.

PIONY, in *Botany*. See PÆONIA.

PIORAS *Fort and Village, Old,* in *Geography,* are ſituated in the north-weſt territory of America, on the weſt ſhore of Illinois river, and at the ſouth end of Illinois lake; 210 miles from Miſſiſippi river. The ſtockaded fort commands a fine proſpect of the country to the eaſtward of the lake, to the point where the river enters it at the north end; to the weſtward are large meadows, and a level country full of ſwamps, and containing abundance of cherry, plum, and other fruit-trees. The lake, which is merely a dilatation of the river, 19½ miles long, and 3 broad, contains plenty of fiſh, and particularly ſturgeon and picannao. The Indians, at the treaty of Grenville, in 1795, ceded to the United States a tract of 12 miles ſquare at this fort. N. lat. 40° 53′. W. long. 91° 12′ 30″.

PIORIAS *Wintering Ground,* a tract of land in the Indiana territory, on the ſouth-eaſt ſide of Illinois river, about 40 miles above and north-eaſt of the Great Cave, on the Miſſiſippi, oppoſite to the mouth of the Miſſouri, and 27 below the iſland of St. Pierre. On a meadow, eaſt of the river, many miles long, and five or ſix broad, are many ſmall lakes, communicating with each other, and one of them with the Illinois river.

PIORIAS, an Indian nation of the Indiana territory, who, with the Mitchigamias, could furniſh, about 40 years ago, 300 warriors. They occupy the parts near the ſettlements in the Illinois country. A tribe of this name inhabit a village on the Miſſiſippi, a mile above fort Chartres. This tribe could furniſh, about the ſame period, 170 warriors of the Piorias and Mitchigamias.

PIOSSASU, a town of France, in the department of the Po; 10 miles W.S.W. of Turin.

PIOZZI, SIGNOR, in *Biography.* Though we have adhered as cloſely as poſſible to the rule of confining our remarks on muſical compoſers and performers to the dead, of whom an opinion may be given without fear of offence, if unfavourable, or of exciting envy by eulogies; yet ſignor Piozzi, though ſtill living (1814), may be excepted from this rule, as he has long retired from all profeſſional concerns, and as we had nothing but good to ſay of his talents.

He arrived in England about the year 1777. His voice was not ſufficiently powerful for a theatre, or ſpacious concert-room; but as a chamber-ſinger, both his voice and ſtyle were exquiſite. Previous to the arrival of Pacchierotti in England (1778), ſignor Piozzi, who heard him at Milan, gave no *l'avant gout* of his performance, by ſinging ſeveral airs after his manner, in a ſtyle that excited great ideas of his pathetic powers, and upon which ſignor Piozzi ſeems chiefly, and very judiciouſly, to have formed his own manner of ſinging.

PIP, in *Rural Economy,* a diſeaſe among poultry, conſiſting in a white thin ſkin, or film, growing upon or under the tip of the tongue, which hinders the feeding. It has been ſuppoſed to ariſe from the drinking of puddle-water, or eating filthy meat, by ſome; but this is not very probable. It is uſually cured by pulling off the film with the fingers, and waſhing the part with a ſolution of common ſalt in pure water. It is ſometimes written *pep.*

PIPA, in *Zoology,* a ſpeces of *Rana;* which ſee.

PIPA, in *Commerce.* See PIPE.

PIPAREA, in *Botany,* a name of Aublet's, of which no explanation is given; but this omiſſion is of ſmall importance, the genus being almoſt equally unintelligible. Aubl. Guian. v. 2. append. 30. Juſſ. 295.—Claſs and order unknown. Nat. Ord. ſuppoſed by Juſſieu to be akin to *Ciſtus,* or perhaps to his *Tiliaceæ.*

Eſſ. Ch. Capſule triangular, of one cell, and three valves. Seeds one, two, or three, clothed with cottony down, each inſerted into a fleſhy, white, fringed receptacle, attached to the middle of each valve.

1. P. *dentata.* Aubl. t. 386.—Gathered by Aublet in the foreſts of Guiana, bearing fruit in Auguſt. A ſmall *tree,* whoſe *trunk* is four or five feet high, and four or five inches in diameter, with a reddiſh, wrinkled, rough bark. *Wood* hard, cloſe-grained, whitiſh. *Branches* ſubdivided. *Leaves* alternate, nearly ſeſſile, ovate, blunt-pointed, crenate, firm, ſeven inches long at the moſt, and three wide; ſmooth and ſhining above; clothed with ſhort reddiſh down beneath; their midrib ſending off numerous tranſverſe veins. *Stipulas* ſmall, awl-ſhaped, deciduous, in pairs at the baſe of the ſhort *footſtalks.* *Fruit* axillary, ſeſſile, either ſolitary or in pairs, with two little ſcales at its baſe, conſiſting of a thin, brittle, red *capſule,* ſpotted with green, about as big as a filberd. The *ſeeds* are entirely covered with a very fine, pure white, cottony ſubſtance. Aublet never met with the *flowers,* nor has any ſubſequent traveller given any account of this plant.

PIPARS, in *Geography,* a town of Hindooſtan, in the circar of Joodpour; 20 miles S.W. of Meerta.

PIPE, a cloſe channel for the conveyance of water, or other fluids, is of ſuch extenſive uſe in building, &c. as to render the conſideration of its materials, and beſt means of forming its joints, a matter of importance to architects and engineers, that they may give ſtability and durability to their work, at the leaſt expence. Water-pipes are made of wood, iron, lead, copper, ſtone, or pottery; and each of theſe materials, in different ſituations, has its preference.

Wooden-pipes may be procured in all countries at a ſmall expence, are eaſily made, and joined together; but the great objection is their want of ſtrength to reſiſt a ſtrong preſſure without breaking, and their liability to decay. For water-works they are uſually made of elm, or alder; oak, though far preferable, being too expenſive. They are beſt made from ſmall trees of the proper ſize; and then the bark, being left on, is thought to preſerve them. The paſſage is bored out by a long auger, turned round by one or two men; whilſt the tree is ſupported in a convenient poſition on treſſels, and bound faſt down upon them by ropes, to which weights are attached.

In towns where water-works are eſtabliſhed, the demand for pipes is ſuch as to render this method too expenſive; and machines are uſed to bore them, turned by horſes, water, or ſteam-engines. The pipe-boring machine is extremely ſimple. A pit is firſt dug, ſimilar to a ſaw-pit; on each ſide of this a long timber is fixed, and the two being united, at various points, by croſs framing, forms the bed, on which the ſledge ſlides backwards and forwards as great a diſtance as the length of the tree which is to be bored. The ſledge is a frame of wood, upon which the tree is laid when it is to be bored, and is firmly held upon it by chains paſſed over it, and drawn exceedingly tight with windlaſſes fixed in the ſledge. Wedges of wood are uſed to ſupport it from rolling ſideways, and to raiſe it up to ſuch a height, that the borer will paſs through the centre of the tree. The borer is fixed at the extremity of a ſpindle, ſupported by bearings, on blocks raiſed from the croſs framing of the bed at one end, and which are adjuſted, that the line of the borer will be exactly parallel to the bed and ſledge: the ſpindle is put in motion by wheel-work from the mill, ſo as to revolve 30 or 40 times *per* minute. The ſledge with the tree is advanced towards the borer by ropes, which are conducted over proper pullies, from each end of the ſledge, to the barrel of a wheel, with handles on its circumference, ſimilar to the ſteering-wheel of a ſhip: therefore, a man, by turning the wheel one way, advances the ſlider, with the tree towards the borer, which penetrates into the end of it; but on turning the wheel in an oppoſite direction, it is withdrawn, to clear the chips of wood. This is repeated till the pipe is bored through. The borer can be detached from the ſpindle, to employ another of greater or leſſer diameter, when the pipes require it. The elm pipes employed in the ſtreets of London for the diſtribution of water, are made by this means, except ſuch trees as are crooked: theſe are bored by hand augers, becauſe they muſt be pierced from both ends to meet in the middle, which the machine will not readily do.

The lengths of pipe are joined together, by enlarging the bore at one end in a conical form, with a ſort of auger, and cutting the oppoſite end taper, to drive into the conical end of the adjacent pipe, which is hooped to prevent it from ſplitting. This method is a very bad one, very ſoon decaying, even when the taper end is fitted perfectly, becauſe the thickneſs of the wood at the taper part is ſo very ſmall. In the uſual mode of fitting them, by merely ſhaping the conical part with the axe and drawing-knife, whilſt the workmen are perhaps over ſhoes in mud, and expoſed to bad weather, it is ſcarcely reaſonable to expect them to be very attentive; but the joint is fitted in haſte, and diſpatched as quick as poſſible: the conſequence is, that the conical part being correctly bored, whilſt the taper is made to an irregular and more obtuſe cone, the joint fits only at a very narrow point; but if well driven, will make a tight fitting at firſt, and, when buried, eſcapes detection; but in the courſe of a very few years, the vacant ſpace round the end of the taper accumulates mud, which haſtens the decay of the wood, and the joint fails. From theſe circumſtances, the pavement of the ſtreets is conſtantly broken up, the way impeded, and the ſupply of water ſuſpended. The Society of Arts have, under theſe conſiderations, offered a handſome premium, for ſeveral years paſt, to procure a complete remedy for theſe defects. Mr. Hornblower propoſed a tool, or bit, to form the taper end of the pipe, with the ſame certainty as the cone which is bored. It conſiſted of a wooden plug, fitted to the bore of the pipe, and having through its centre a hole, for the reception of a round iron rod or axis, which has a croſs handle at the end, like an auger, to turn it round by. Near the handle, its ſize is ſufficiently enlarged to have a mortiſe, for the admiſſion of an iron arm, which can be fixed in it by a wedge. This arm turns down, and carries a ſteel knife, the edge of which, by the bending, ſtands inclined to the round rod, in the angle the conical taper is to have: therefore, by turning the handle round, the edge of the knife deſcribes the ſurface of the cone, and cuts away the wood of the pipe to that form; the round rod, being of conſiderable length, can ſlide freely in the plug at the end of the pipe, and allow the cutter to be thruſt up, to cut by degrees, till it reduces the taper. The uſe of this tool would enſure the perfect fitting of the joints; but ſtill the plan is defective, as before mentioned, from the ſmall quantity of wood round the joint. Another kind of joints have, therefore, been propoſed: in theſe the adjacent ends of the pipes to be joined are both bored out, by a taper bit, to hollow cones; and the two are united by a ſhort iron tube, which is made in form of two truncated cones joined at their baſes, and of dimenſions correſpondent with the conical baſes in the ends of the pipes. This plan is very far preferable to the former, both in ſtrength and durability; and as the tubes are made of caſt-iron, it is not an expenſive one.

Meſſrs. Eckhardt and Lyon obtained a patent in 1806, for a method of making wooden pipes by ſeparate ſtaves, reſembling a barrel, but of leſs curvature, and greater proportional length, ſo as to approach near to a cylindrical form, particularly withinſide. They are to be bound by iron hoops, made faſt either by driving them on from the ends, or by ſcrewing the hoops together: the lengths are to be joined together, by forming one end of each taper, and enlarging the correſponding ends of others to receive them: the ſtaves are to be fitted by tongues, rabbiting, or dovetailing. We have not heard of this method having been practiſed to any extent: it would, we think, be very expenſive, and have all the defects of wood pipes; being liable to ſpeedy decay, when buried in the ground. And it generally happens, that in their rotten or decayed parts they generate inſects and animalculi in vaſt numbers; which may always be diſcovered in water that has paſſed through wood pipes or pumps, which have been long in uſe. Dr. Buchan obſerves, that ſuch water becomes putrid by the corruption of the animal and vegetable bodies with which it abounds.

Iron-pipes are caſt at the iron-founderies of any dimenſions; and for durability and ſtrength combined, are greatly ſuperior to any other material: they may be procured in lengths of ten feet, and united by nuts and ſcrews paſſed through flaunches, caſt on the ends of them. Moſt of the great Companies for ſupplying London with water have, within theſe few years paſt, adopted caſt-iron pipes for their mains, and are daily increaſing them, under the conviction that their permanency will compenſate for the firſt expence. They are uſually caſt in lengths of ten feet, one end with an enlarged ſocket of ſufficient ſize to receive the end of the next pipe. As theſe joints cannot be driven cloſe, to fit like wooden joints, they require ſome cement. To apply this, they firſt caulk it, by driving a ſmall quantity of hemp down to the bottom of the joint with a blunt chiſſel, and then fill the remainder of the ſocket with iron cement; which is a compoſition of borings or turnings of caſt-iron, mixed up with ſulphur and ſal ammoniac. This is moiſtened with water, and rammed into the cavity; and the rapid oxydation of the iron borings unites them into one maſs, and at the ſame time expands the bulk of the cement, ſo as to fill up all the ſpace very cloſely. The hemp, firſt driven into the joint, is only to prevent the cement getting into the pipe, and to keep the water from it till it is ſet firmly; after which, the joint is as ſolid as any other part of the pipe. Another method, much uſed for large pipes, is to have two ears projecting from each pipe at the joint, through which ſcrew-bolts are paſſed, to draw them cloſe together. The joints are ſometimes filled with lead run in, whilſt melted; and others have uſed the Roman cement to bed the joints in.

Within theſe few years immenſe quantities of iron pipes have been laid in all parts of London, for the conveyance of water, which no ſooner became generally known, than great prejudices were excited againſt them, under the idea that they would give the water a metallic taſte, which would be injurious to the health of the inhabitants. This is clearly an error, as any one may aſcertain, by examining an old ciſtern, or veſſel of caſt iron, which has only had freſh Thames water in it; and they will find it coated with a ſort of japan, or ſmooth ſurface of a black colour, which is a very thin oxyd, and does not penetrate any depth: though if the water is of ſuch a quality as to produce red ruſt, the iron is corroded very faſt, but is ſtill a very harmleſs mixture. Water having any lime in it, depoſits a thin coat or incruſtation withinſide iron pipes, and thus completely defends them from corroſion; nor is there any danger, as ſome have ſuppoſed, of this incruſtation increaſing ſo as to ſtop the pipes in courſe of time, becauſe the water only depoſits the ſtony matter from the attraction of the iron, which being once covered with a ſlight thickneſs, the water has no longer acceſs to the iron. We have heard of an expedient of putting lime into the water, when it was found that the water was ſo corroſive as to become tinged by running through iron pipes newly laid down. A rapid current of this lime-water being cauſed through the whole length for a few days, the pipes became coated with the calcareous matter. At firſt, after this, the freſh water taſted of lime, but it became pure in a ſhort time, becauſe, in the firſt inſtance, more lime was depoſited than could be combined with the oxydated ſurface of the iron, and this exceſs would of courſe be carried away again by the freſh water, but no more.

Stone Pipes.—The prejudice the public at firſt entertained againſt iron pipes, induced many projectors to find out other ſubſtances, which would have the ſtrength and durability of metal. Sir George Wright propoſed ſtone, and invented a machine for cutting out cones from the hollow of the pipe. He firſt employs a boring or drilling machine, to pierce a ſmall hole through the centre of the block of ſtone, in the axis of the intended pipe. Another machine is then uſed, conſiſting of a ſaw applied in a frame, which revolves on a round iron rod, paſſed through the central hole previouſly drilled: the frame gives the means of fixing the ſaw at any required diſtance from the rod, and attaching it firmly thereto at each end: its edge will of courſe, when turned round, deſcribe the ſurface of a cylinder, of the diameter of the intended pipe. The ſaw and central rod are rather longer than the block of ſtone, which permits them to be moved backwards and forwards endways, to give the motion of ſawing with ſand and water in the uſual manner. In their operation, the block of ſtone is placed with the rod horizontal; the ſaw is entered at another hole, previouſly drilled through the ſtone, and as the ſaw cuts, the central rod guides it round on a centre, till it ſeparates the core all round, and this being taken out, leaves a pipe or tube. Sir George obtained a patent for this invention in 1805, and it was practiſed for ſome time, and many large ſtone pipes were laid; but great difficulties aroſe in making good joints: they were attempted by Roman cement, which adhered ſo well, as to make them perfect, if the pipes were well bedded; but the continual tremor of heavy carriages paſſing over them ſoon diſturbed many joints, and broke the bond of the cement. Mr. Samuel Hill took out a patent in 1810, for uniting theſe pipes together at every joint by a collar of ſtone, into which the extremities of two pipes are made to fit, ſo that about two inches of each ſhall enter it, and reach to its centre, where they are to meet. A ſufficient quantity of cement is to be ſpread on the ends of each pipe, and in the internal part of the collar, before they are inſerted into it, to prevent water from paſſing through the joints. Although this obviates one difficulty, ſtill the expence of ſtone pipes is prodigious; at leaſt in London, where the price of materials alone, without any coſt of workmanſhip, would be too great. In ſituations where that material is plentiful, they may be uſed, and the labour of making them will be reduced very low by a machine invented by Mr. Murdoch, and for which he had a patent in 1810: it is very ſuperior to the above, which is only applicable to large pipes; beſides, the trouble of previouſly drilling two ſmall holes the whole length of the pipe is wholly ſaved.

When it is intended to form a pipe or hollow cylinder of ſtone by Mr. Murdoch's machine, inſtead of reducing the whole inſide to powder, it is ſawed in the form of a core, or ſolid cylinder, the diameter of which is about half an inch leſs than the diameter of the inſide bore of the pipe. In like manner, when a ſolid column or cylinder is to be formed, the outſide and ſuperfluous parts of the ſtone are taken away by a ſimilar proceſs, and the core forms the column or cylinder required. When the ſtones are large enough to leave the outſide parts of a proper thickneſs, they may be uſed as pipes; or the cores cut out of large pipes may be uſed as columns, or formed into ſmaller pipes, ſo that in ſome caſes ſeveral may be cut out one within another. The method by which theſe are formed is the following:

The block of ſtone, out of which the pipe is to be formed, is placed in a vertical poſition, and a plug of wood or metal is fixed in the top of the block, at the centre of the intended pipe; this plug has a hole in its centre, for receiving the lower pivot of a vertical ſpindle or axis, which is made longer than the pipe is required to be. The rod is of an uniform thickneſs, and made either ſquare, triangular, or any other ſhape that will admit of ſockets ſliding freely up and down, without turning round upon it. On the upper part of this ſpindle a ſocket is fitted, having on the middle part of its outſide a pulley or a ſmall-toothed wheel, by which the axis or ſpindle may be turned round. The upper and lower extremities of this ſocket are cylindrical, and ſerve as gudgeons, upon which it turns in a frame, and ſteadies the axis. Near the lower end of the vertical axis a wheel with arms is fixed, having the circumference like a hoop two or three inches broad; and its diameter a little leſs than the diameter of the pipe to be bored: it fits to the inſide of a tube of metal, which is attached to the ſpindle, and kept concentric with it, by being fitted over the wheel. The upper part of the ſpindle is perforated to a little below where the above-mentioned ſocket is fixed, and then the perforation comes out obliquely. The tube is of a diameter nearly equal to that of the pipe to be formed, and exceeding it in length about two feet: this pipe is made as truly cylindrical as poſſible, and is attached to the axis by another wheel acroſs, ſimilar to that at the bottom, which is fixed in the tube at the upper end, and fits upon the ſquare ſpindle, to ſlide freely up and down, without turning round upon it; this tube being, as before-mentioned, guided by fitting on the wheel fixed at the lower part of the ſpindle. On the lower edge of the tube a rim of proper metal is fixed, which is ſo much thicker than the tube, that the groove it makes in the ſtone may admit the tube to move freely. This hoop being intended to grind or ſaw the ſtone, has its lower edge either left ſmooth, or formed like the ſaws uſed by ſtone-cutters. The wheel or croſs, which is fixed on the vertical tube, near its upper end, has a ſmall cord or chain faſtened to one of its arms, and paſſes upwards through the perforation in the upper part of the axis, and then over a pulley fixed at a convenient diſtance above it: it ſerves to raiſe the tube on its axis when required. On the upper part of the tube weights are fixed, for the purpoſe of making it act more forcibly upon the ſtone, if neceſſary. When the apparatus is to be put in motion by the force of man, the above-mentioned pulley, fixed in the ſocket near the upper part of the axis, is generally made about double the diameter of the pipe to be bored, and a rope paſſes round it, each end of which is conducted over a vertical pulley, fixed at a convenient diſtance, on each ſide of the machine; by which means the ends of the rope turn downwards, and having handles fixed to them, are pulled alternately by a man at each end, ſo as to cauſe the tube to make a reciprocating rotative motion about its axis or ſpindle: or the apparatus may be put in motion by any other power, only if the pulley and cord be retained, a ſpring or a ſufficient weight acts at one end, while the power operates on the other by means of a crank, or other ſimilar contrivance. Or, inſtead of the pulley, a toothed wheel or pinion is ſubſtituted, and acted upon by a reciprocating toothed wheel, belonging to the mill, engine, &c. connected with the moving power, or by a reciprocating rack or ſector, put in motion by the ſame power or machinery. A ciſtern is placed at ſome convenient height above the tube, by means of which, a mixture of water and ſand is conveyed into the tube, and forces its way under the ſaw, when in motion, and cauſes it to abrade or grind away the ſtone, and form in it a circular groove, concentric with the axis. As the groove becomes deeper, the water accumulates in the tube, and forces the ſand with it under the ſaw and both are diſcharged over the outer edge of the tube, in the form of mud or ſludge, and the motion of the tube may be thus continued as long as the moving power is maintained. When any circumſtance cauſes this to ſtop, the tube muſt be drawn up by means of the cord and pulley for that purpoſe, or the ſand will ſet faſt round the tube, and will not be eaſily freed again.

Copper-pipes are too expenſive to be employed except in particular ſituations. They are made of copper plate turned up and ſoldered, and are much uſed in diſtillers' work, becauſe they can be tinned withinſide, and then communicate no taint to what paſſes through them.

Lead-pipes are univerſally employed for all ſmall water pipes, chiefly from the facility of bending them in any direction and ſoldering their joints. Although ſome kinds of water corrode the metal by degrees, this will not produce ſo much harm as iron under the ſame circumſtances, but would be a moſt dangerous poiſon if it was uſed in ſufficient quantities to have any effect at all.

The greateſt proportion of the leaden pipes uſed in water-works, was, till of late years, made of ſheet lead wrapped round an iron or wooden core, and the joint ſoldered up. The expence and trouble of this method was conſiderable, and the pipes thus made extremely liable to burſt at the joint, particularly if bent with a ſudden angle. Theſe defects ſuggeſted the idea of caſting the lead in the form of pipes, by which means the trouble of previouſly caſting and laminating the lead into ſheets would be ſpared, and alſo the uncertainty of the ſoldered joints. Such pipes are caſt in an iron mould, made in two halves, forming, when put together, a hollow cylinder, of the ſize of the intended pipe. A core, or iron rod, the ſize of the bore of the pipe, is adapted to this hollow mould when the halves are put together, and ſecured by ſcrews or wedges, ſo that it exactly occupies the centre of the hollow mould, leaving therefore an equal ſpace all round between them. A ſpout, or entry for the admiſſion of the melted lead, is made by a correſponding notch cut in each half of the mould, and at another place is a ſimilar vent for the eſcape of the air. This mould is fixed down upon a long bench; and a rack, moved by toothed wheels and pinions, is fitted up at one end of it, in a line with the centre of the mould. A hook at the end of the rack, being put into an eye at the end of the core of the mould, affords the means of drawing out the core, when the pipe is caſt round it by pouring the melted lead into the mould, with the core in it: when the lead is cold, the core is drawn out very nearly to the end of the pipe, by the rack and wheel-work before mentioned. The halves of the mould are then ſeparated, and the pipe moved along in the mould, ſo that only an inch or two of its end remains in the mould, the halves of which are again faſtened together with the core between them, and its end entered an inch or two into the firſt piece of pipe. The mould is now filled with melted lead, the heat of which fuſes and unites it with the end of the firſt piece, ſo as to double its length. The core is again drawn out a ſecond time, and another length caſt to the former. This method produces pipes of any length in one piece, but they are liable to have air-bubbles in them, which produce holes when the metal is thin, and the joinings of the different lengths are not always perfectly ſound.

The method which is now very generally adopted, is to caſt the lead in an iron mould, upon a cylindrical iron rod of the ſize for the bore of the intended pipe, the lead being three or four times the thickneſs of the intended pipe, and in ſhort lengths, which are then drawn through holes in pieces of ſteel, in the manner of wire drawing, till the pipe is reduced to the intended thickneſs, and drawn out to the proper length. Another method is to reduce the pipe by repeatedly paſſing it through the two rollers of a flatting mill, in each of which a number of ſemi-circular notches are formed all round, ſo that the two rollers, when put together, have a number of circular cavities between them, which gradually diminiſh in diameter from one end of the rollers to the other. Drawings of ſuch rollers will be found in our plates of *Iron Manufacture*. The pipe is firſt rolled between the largeſt of theſe cavities, then in a ſmaller, and ſo on to the laſt, which extends the pipe to its proper length, and diminiſhes its ſubſtance to the proper thickneſs, at the ſame time by condenſing the metal hardens it, and makes a very ſtrong tube with very little metal. Mr. John Wilkinſon of Broſely, the celebrated iron manufacturer, took out a patent, in 1790, for the laſt mentioned method, which he practiſed on a very extenſive ſcale: he was not, however, the original inventor, the ſame thing having been propoſed, in 1728, by M. Fayolle; ſee "Machines Approuvés par l'Academie Royale," vol. v. p. 50. Since the expiration of this patent many manufactories of this article have been eſtabliſhed, ſome employing rollers, and others the draw-bench, for extending the pipes.

We have given a repreſentation of one of the latter machines in *Plate* XL. *Mechanics*. *Figs.* 1 and 2 are ſections of the mould for caſting the pipes; A A is the bench, ſupported on legs like a ſtool in an inclined poſition; B, B, are the two halves of the mould, fitted into each other with double rebates, as ſhewn in the ſection *fig.* 1, that they may come together correctly, and are held ſo by the ſcrews D, D, fitted through pieces of iron E, E, faſtened to the bench; the halves of the moulds have at each end a flat ſide beneath, which reſts upon the iron plate connecting the two pieces E, E; F is the core, held in its poſition by collars at each end of the mould embracing it; G is the rack, and H I K the wheel-work for drawing out the core; *d* is the entry for the metal, raiſed up to the ſame level as the higheſt point the metal is intended to run into. The intention of the inclined poſition for the mould is, that the metal may run in at the loweſt point of the mould, and expel the air as it riſes, at a vent in the higheſt point of the mould, which is *e*. By this means the danger of air-bubbles in the pipe is avoided. The interior ſurface of the mould is bored out truly cylindrical, and the core being turned in the lathe, they are certain when put together to leave an equal ſpace all round, a circumſtance which is eſſential to form a good pipe, as the ſucceeding proceſs of drawing will tend to make an error of this kind worſe. The core, F, is ſeen in *fig.* 2 to have a neck or ſmaller part at the end *d*: the treblet or core *a g*, *fig.* 3, upon which the pipe is to be drawn, is of the ſame ſize, and has a ſimilar neck, ſo that the pipe, when put upon it, fits it in every part, as is ſhewn in *fig.* 3, and the ſhoulder of the neck prevents the treblet being drawn through the pipe in the direction from *g* to *a*, as it was put in by the oppoſite direction. Beyond the neck the treblet has a notch cut in each ſide at *g*, leaving a neck; and by this it is ſeized in a ſort of claw belonging to the draw-bench, which is exhibited in *figs.* 4 and 5, the former being a plan, and the latter a ſection. In theſe L, M, are two ſtrong timbers, bolted to uprights N, O, at one end of each, and to a croſs beam, W, at the other end; the uprights ſupport bearings for the gudgeons of a ſtrong iron ſpindle, which has the cog-wheel, *k*, fixed upon its end, and is turned round by the pinion *l*, receiving a rotative motion from a ſteam-engine or water-wheel; P is a roller, fitted on the ſpindle ſo as to ſlip round freely upon it; it has two claws affixed into it at one end, which are ſeized by the ends of an iron bar, *m*, fixed faſt upon the ſpindle. By this means, when the roller is thruſt towards *m*, it is engaged with its arms, and compelled to turn round with the ſpindle, but when drawn back from *m*, it is at liberty to ſlip round independent of it; Q is a lever affixed to a vertical axis; it is forked at the end, and embraces a collar upon the end of the roller, ſo as to draw it backwards or forwards, and by this means engage or diſengage it from the ſpindle at pleaſure; R is another lever on the ſame ſpindle, to the end whereof a long rod, S, is jointed, and this has ſeveral handles fixed to it, as ſhewn in *fig.* 5, by which it can be moved, and the machine ſtopped or put in motion by a man ſtanding at any part of the long bench L M; the roller, P, has a pair of ſpiral grooves formed on its circumference, for the reception of two chains, *n*, *n*, which wind upon it; the ends of theſe chains are hooked to a little carriage, *p*, running upon two wheels, and having in its hinder part a fork or double claw, to catch in the notches at the end of the treblet T, alſo ſhewn in *fig.* 3; X is a caſt-iron frame, ſecurely bolted down upon the croſs beam W; it has a notch in its upright ſide, which is neareſt the roller, to allow the treblet and pipe to paſs through, but at the ſame time forms a lodgment for the ſteel plate, through which the pipe is to be drawn. The workmen are provided with a great number of theſe plates, one of which is ſhewn in *fig.* 6; they are called whirtles: the ſizes of the holes through them diminiſh very gradually, from the diameter of the rough caſt pipe, to the ſize to which it is intended to be reduced. The holes through them are made rounding at each ſide, as is ſhewn in the ſection Z, *fig.* 6, to facilitate the exit and entry of the pipe. The bench is continued beyond the beam W, and has a number of rollers in it, to ſupport the pipe as it is drawn along.

The proceſs of drawing is as follows: the lead pipe being fitted upon the treblet, as in *fig.* 3, is laid upon the rollers in the bench, and the end of the treblet being put through the largeſt of the ſet of whirtles, its end is hooked into the claws in the carriage *p*, and the whirtle lodged againſt the cheeks of the frame X: the rod, S, is now pulled, which engages the roller with the ſpindle (ſuppoſed to be all the while in motion); this winds up the double chains *n*, drawing the pipe through the whirtle, by which it diminiſhes its ſize and lengthens it out: when the pipe is drawn quite through, the roller is caſt off by puſhing the rod S; the treblet is unhooked from the carriage, and puſhed back upon the rollers in the bench to its former poſition; another ſmaller whirtle is put on; the carriage is drawn back by hand (the roller turning round on its ſpindle), and the pipe is drawn through it as before. In this manner the buſineſs proceeds till the pipe is finiſhed.

Sometimes the pipe is drawn through twelve ſized whirtles in this caſe; the ſecond time, and alſo the laſt time but one, it is drawn through a whirtle ſuch as Y, *fig.* 6; it is not rounded off at the entrance, but having a ſharp edge, it cuts off ſhavings from the ſurface of the lead, making it perfectly ſmooth and true: this makes it paſs more eaſily through the ſucceeding whirtles. Lead pipes are by this proceſs drawn out to ten or twelve-feet lengths, three of which are united into one, by what is called *burning*. For this purpoſe an iron core is put through one pipe, and entered a few inches into the other: a ſmall iron mould is now put together in two halves over the ends of the two pipes which are brought in contact, the mould exactly fitting both; melted lead is poured into the mould, and it runs out again at a hole in the bottom. This is continued till it is ſuppoſed the heat of the lead has fuſed the ends of both the pipes; the hole in the bottom is then ſtopped by a ſlider for the purpoſe, and the mould remains full: when cold it is taken off, and the pipes are perfectly united. The core is now withdrawn, to facilitate which, it only fits the bore of the pipe at a few inches of the end. Theſe joints are very good if the pipe remains ſtraight, but are apt to leak if a bend is made at one of them.

In 1804, Mr. Alderſon took out a patent for lead pipes which were to be lined with tin, for the conveyance of beer, water, or other fluids which were in danger of receiving a taint from the corroſion of the lead. This he accompliſhed by caſting a lead pipe in the manner above-deſcribed, then withdrawing the core, and throwing into the pipe a ſmall quantity of powdered roſin. Another core ſmaller than the former is next inſerted into the centre of the pipe, and melted tin poured in to fill up the ſpace. The pipes are caſt in a vertical poſition, and the roſin melting by the heat floats upon the ſurface of the tin, and acts as a flux to unite it with the lead. This pipe of lead, lined with tin, is now to be drawn or rolled to length, as before-mentioned. We are informed Mr. Alderſon employs rollers to extend them inſtead of the draw-bench.

Mr. Bramah's method of making lead pipes is very ingenious; it is performed by a proceſs of pumping or forcing the metal, in its fluid ſtate, through proper moulds. A boiler or kettle is fitted up over a fire-grate, with flues for the fuſion of the metal; in the centre of this boiler a force pump is fixed up, its ſuction valve drawing in the melted lead contained in the boiler: the forcing pipe of the pump proceeds through the ſide of the boiler, and conducts the lead to the mould, which is fixed on the end of the pipe outſide of the boiler: it conſiſts of a tube, bored perfectly ſmooth and cylindrical, its interior diameter being equal to the outſide of the pipe intended to be made; the end of the mould neareſt the boiler expands into a conical mouth, larger than the mould itſelf, and acroſs this wideſt part a croſs bar is fixed, to ſupport a core or mandrel, of a diameter equal to the bore of the intended pipe, and ſituated exactly in the centre of the mould, leaving an equal ſpace all round between them: the core is ſlightly conical, being rather leſs at its extremity, which terminates at the ſame length with the external mould. There muſt be ſufficient openings left at the ſides of the croſs bar ſupporting the core, to allow the lead to paſs freely by, that it may unite again after paſſing the croſs and completely fill the mould. The mould paſſes through one of the fire flues ſurrounding the boiler, that it may be kept ſo hot as to procure the lead in its fluid ſtate, till it arrives nearly at the point of the mould, which is immerſed in a ciſtern of hot water. The operation is ſimple: the pump, being worked, forces the lead through the mould, the heat and length of which are ſo regulated, that the lead may chill a little before it quits the extremity of the mould, and iſſues forth in a ſolid ſtate into the water ciſtern, forming a pipe of any length. Mr. Bramah took out a patent for this method in 1797.

Pipes of pottery ware are uſually made of that coarſe kind of brown ſtone pot, which is very hard and durable; they can only be made in ſhort lengths, and have one end enlarged to receive others. To cloſe the joints tow and pitch are uſed, but they can never be made to bear any preſſure, are liable to be broken by accident, and being very expenſive, have no other recommendation than preſerving the purity of the water they convey.

We have ſeen ſome water conduits from an old Roman building, which were very ſlight pottery tubes, buried in a maſs of mortar, that by ages had acquired a hardneſs and cloſeneſs ſufficient to reſiſt a ſtrong preſſure.

In 1808 Mr. W. Bell obtained a patent for a new kind of pipes for conveying water, which were to be made of ſuch ſubſtances as to give no taint to the water paſſing through them. He propoſed tubes of porcelain pottery, and various compoſitions which are vitrifiable, and are not liable to corroſion or decay: theſe tubes are formed in ſuch a way at the ends as to fit one within the other, and are to be made water tight by cement; they are to be encloſed in caſt-iron caſes, to give them ſtrength to reſiſt the internal preſſure of water, as well as to defend them from accidental violence; or the caſes may be made of wood.

Pipe, *Tobacco*, an implement uſed in the ſmoaking of tobacco, conſiſting of a long tube, made of a particular kind of clay baked hard: at one end a little cavity or furnace is formed, called the *bowl*, which is for the reception of the tobacco when burning, and the fumes are drawn by the mouth through the other end of the tube. The making of tobacco pipes forms a conſiderable trade in London and other great towns; they are made of various faſhions, long, ſhort, plain, worked, white, varniſhed, unvarniſhed, and of various colours, but the ſame proceſs is followed for all of them. The clay is found in the iſle of Purbeck, in Dorſetſhire, and is diſtinguiſhed from others by its perfect white colour, and its great adheſion to the tongue when baked, occaſioned by its great affinity for water: even in the raw ſtate it has this property in a ſlight degree. The clay is prepared by diſſolving it in water in large pits, and the ſolution being well ſtirred, is run off into another pit, where it depoſits the clay, which, when the water has become clear and run off, is taken up for uſe, all impurities of ſmall ſtones, ſand, &c. being ſeparated from it and left in the firſt pit. The clay is now divided into portions, each ſufficient to form one pipe, which are rolled on a table, under the hand, into long rolls, each with a bulb at the end, to form the bowl; and theſe are laid by a day or two, to dry ſufficiently for the preſſing. This is done in an iron mould, conſiſting of two halves, which when put together leave a cavity of the ſhape of a pipe; a wire is thruſt up the roll of clay, to form the bore of the pipe, and in this ſtate it is placed between the two halves of the mould, which are then put into a kind of preſs or vice, by the ſcrew of which the two halves are forced together, and the figure of the pipe imprinted on the clay included between them; a lever is next brought down, which is ſo ſituated as to introduce a ſtopper into the bowl of the pipe whilſt ſtill in the mould, and force it down ſufficiently to form the cavity thereof: the wire is thruſt backwards and forwards, to prick the tube completely into the bowl; it is then wholly withdrawn, the parts of the mould ſeparated, and the pipe taken out, the ſuperfluous clay removed with a knife, and they are laid up to dry a day or two, after which they are ſcraped and poliſhed with a piece of hard wood, the tubes of the pipes curved as they are intended to be, and they are then carried to the furnace to bake, which is done in ſeven or eight hours for fifty groſs of pipes. This furnace is fully deſcribed at the end of our article Furnace.

The Turks uſe pipes of three or four feet in length, made of ruſhes, or of wood, bored at the end; they have a bowl or pot of baked earth to contain the tobacco, which they ſeparate from the tube when they leave off ſmoking. To make the tube tight, ſome kinds are made of ſpiral wire covered with leather. This at the ſame time leaves them flexible, and the bowl can ſtand on the ground, whilſt the ſmoker inhales its fumes through an ivory or ſilver mouth-piece at the end of the tube. Of this kind is the *hookah*, or *houkar*, uſed by the luxurious Eaſt Indians; it is a complete furnace or chafing-diſh, with grate-bars, aſh-pit, &c.; and has a tight cover over the top, with one of theſe flexible pipes attached to it. An officer of the court of a petty eaſtern prince is called *houkar boudar*, and is ſolely employed in managing this machine; which, having lighted and prepared, he preſents the mouth-piece of the tube to his maſter after his dinner. In ſome inſtances, the bowl is kept in an adjacent cloſet, the pipe being conducted through a hole in the wall. Some of thoſe which are moſt complete have another peculiarity; the ſmoke, before it goes into the tube, is made to paſs under water, by bubbling up through it. This is found to give the ſmoke a mild and agreeable flavour, by depriving it of its acrid and pungent taſte; and, indeed, it is for the ſame end of condenſing theſe particles, that the tubes are made of ſuch great length. We are not informed how the ſmoke is made to paſs under the water, but have ſeen a ſimple experiment, which any one may try, to experience the improvement of the ſmoke by this proceſs. Procure a common decanter or glaſs bottle, fill it half full of water, and fit a cork to it, which has two holes made through it by burning, ſufficiently large to admit tightly the tube of a tobacco pipe: in one of the holes fit a pipe with a bowl, the tube end projecting ſo far down into the bottle, that it will be an inch below the ſurface of the water: into the other hole, fit a pipe without a bowl, not reaching to the water, but ſufficiently curved or inclined to come conveniently to the mouth. Make all the joints tight by wax, fill the bowl of the pipe with tobacco, and light it; then by ſucking air through the mouth-pipe, it will be drawn out of the bottle, and rarefy that within; the atmoſpheric air then preſſes through the burning tobacco in the bowl of the pipe, and carries the ſmoke down the tube through the water, and it riſes in bubbles to the ſurface of the water in the bottle, from whence it can be inhaled through the mouth-pipe, by continuing to ſuck at it. The ſmoke is by this proceſs cooled, and rendered very agreeable, by the ſeparation of certain principles which are of a very unpleaſant flavour: the exiſtence of theſe principles will be ſhewn by the water in the bottle becoming yellow in a ſhort time, and having a very diſagreeable taſte. This method of ſmoking may be uſeful to invalid ſmokers, who from cough, or inflammation of the lungs, are unable to continue a practice which, by long habit, has become quite an eſſential comfort to them.

Pipe, in *Commerce*, a meaſure of wine in England, Spain, and Portugal. (See Measure.) The pipe is $= 1\frac{1}{2}$ puncheon $=$ 2 hogſheads $=$ 3 tierces $=$ 126 gallons $=$ 504 quarts $=$ 1008 pints; and 2 pipes are equal to a tun of wine. The ſtandard gauge for foreign wines at the cuſtom-houſe of London is as follows: the pipe of port is 138 gallons; of Liſbon, 140; of Madeira, 110; of Barcelona, 120; of Vidonia, 120. The butt of ſherry is 130 gallons, and of mountain, 120. The hogſhead of claret is 58 gallons, and of tent 63. The aum of hock is 36 gallons. The gallon uſed here is ſeven inches in diameter, and ſix inches deep. The tonnalada of Liſbon is 2 pipas; the pipa is 26 almudes, 312 canadas, or 1248 quartillos. The baril is 18 almudes. The pipe of the ſtandard gauge of Liſbon at the London cuſtom-houſe is reckoned at 31 almudes, and the almude at $4\frac{1}{2}$ Engliſh gallons nearly. A pipe in Spain is 27 arrobas of wine, or $34\frac{1}{2}$ of oil; and as a Spaniſh botta contains 30 arrobas of wine, or $38\frac{1}{2}$ of oil, the botta is = $127\frac{1}{2}$ Engliſh gallons, and the pipe $114\frac{3}{4}$.

Pipe, *Pipa*, in *Law*, is a roll in the exchequer, called alſo the *great roll.*

Pipe-*Office*, is an office in which a perſon called the *clerk of the pipe*, makes out leaſes of crown lands, by warrant from the lord-treaſurer, or commiſſioners of the treaſury, or chancellor of the exchequer.

Clerk of the pipe makes up all accounts of ſheriffs, &c. and gives the accomptants their *quietus eſt.* To this office are brought all accounts which paſs the remembrancer's office, and remain there; that if any ſtated debt be due from any perſon, the ſame may be drawn down into the great roll of the pipe, from the form of which he derives his name; upon which the comptroller iſſues out a writ, called the "ſummons of the pipe," for recovery thereof. And if there be no goods and chattels, the clerk then draws down the debts to the lord-treaſurer's remembrancer, to write eſtreats againſt their lands.

All tallies, which vouch the payment of any ſum contained in ſuch accompts, are examined, and allowed, by the chief *ſecondary of the pipe.*

Beſides the chief clerk, and his deputy, in this office are a firſt and ſecond ſecondary, ſix attornies, or ſworn clerks, and a comptroller, deputy and clerk, board-end clerks, and bag-bearer.

Pipe, in *Mining*, is where the ore runs forwards endways in a hole, and doth not ſink downwards, or in a vein.

Pipe, *Air*. See Air-*pipe.*

Pipe, *Bag*. See Bag-*pipe.*

Pipe-*Clay*. See Clay.

Pipe-*Clay* and *Whiting*, in *Military Language*, a compoſition which ſoldiers uſe for the purpoſe of keeping their croſs-belts, &c. clean. Every ſoldier belonging to the infantry of the line, and to the fencible infantry ſerving at home, has 4*s*. 4*d*. annually ſtopped from his pay for ſupplying himſelf with this compoſition.

Pipe-*Drains*, in *Agriculture*, ſuch as are made in the more ſuperficial parts of the earth, as a foot or more from the ſurface, by means of ſome ſort of tool or implement, ſuch as a thick iron ſpike, pin, or bolt, which is drawn through the ground in a horizontal manner at ſuch depths. The improved mole plough is a very good tool for effecting theſe purpoſes, and is that which is moſt commonly employed in the buſineſs.

This is an excellent method of management for cold retentive graſs lands, which lie in too flat and ſwampy a manner to ſhoot off their ſurface waters, with any degree of readineſs, and which are free from ſtones. But though it may be found of general benefit in theſe caſes, it is more eſpecially ſo, it is conceived by ſome, for moiſt ſheep paſtures; it has alſo been found uſeful in ſome inſtances in arable land. When it is performed by the plough juſt noticed, the great ſtrength and weight of draught which are required, eſpecially where the older ſorts of theſe ploughs are had recourſe to, may form ſome objection to it. Theſe tools have, however, much merit, and are very ſimple in their conſtructions, particularly the improved kinds, which only demand a little power of draught. See Mole Plough.

Pipe-*Fiſh*, in *Ichthyology*. See Acus and Syngnathus *Typhle.*

Pipe, *Horn*. See Horn-*Pipe.*

Pipes, *Organ*. See Organ.

Pipe, *Tail*, in *Gunnery*, a ſmall braſs pipe fixed at the ſwell of the muſket, which receives the ram-rod.

Pipe, *Trumpet*, a ſmall braſs pipe near the muzzle of the firelock, through which the ram-rod is let down; ſo called from its reſemblance to the mouth of a trumpet. The Pruſſians have no pipes to their muſkets; the ram-rod being received into a cylinder which runs parallel with the barrel.

Pipe-*Tree*, in *Botany*. See Philadelphus and Lilac.

Pipe-*Tree*, *Pudding*. See Cassia.

PIPELGONG, in *Geography*, a town of Hindooſtan, in Baglana; 14 miles N.W. of Chandor.—Alſo, a town of Hindooſtan, in the circar of Aurungabad; 32 miles W. of Aurungabad.

PIPELO, a town of Hindooſtan, in the circar of Rantampour; 33 miles W.S.W. of Rantampour.

PIPEMAKER's Creek, a river of the ſtate of Georgia, which runs into the Savannah, N. lat. 32° 8′. W. long. 81° 15′.

PIPER, in *Botany*, Pepper, is enumerated by Linnæus, among the Greek names of doubtful origin. The Greek πεπερι is generally ſuppoſed to have been derived from πεπτω, *to cook*, or *digeſt*. But the beſt authors give it as a primitive word; and profeſſor Martyn rightly ſuggeſts that it is probably of Indian origin. De Theis alſo obſerves, that as the Greeks derived the knowledge and uſe of pepper from the oriental nations, the ſource of its name is to be ſought in their languages, and its appellation in Arabic, *bâbâry*, is the evident original of πεπερι.—Linn. Gen. 19. Schreb. 26. Willd. Sp. Pl. v. 1. 159. Vahl. Enum. v. 1. 312. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 1. 69. Juſſ. 405. Lamarck Illuſtr. t. 23. Gærtn. t. 92. (Peperomia; Fl. Peruv. v. 1. 29. Saururus; Plum. Gen. 51. t. 12.)—Claſs and order, *Diandria Trigynia.* Nat. Ord. *Piperitæ*, Linn. *Urticæ*, Juſſ.

Gen. Ch. *Cal.* none. *Cor.* none. *Stam.* Filaments none; anthers two, oppoſite, at the baſe of the germen, roundiſh. *Piſt.* Germen larger than the anthers, ovate; ſtyle none; ſtigmas from one to three, rough. *Peric.* Berry roundiſh, of one cell. *Seed* ſolitary, globoſe.

Eſſ. Ch. Calyx none. Corolla none. Berry with one ſeed.

A very extenſive and ſingular tropical genus, remarkable for the ſimplicity of its *flowers*, which almoſt vies with that of the *Hippuris.* The number of *ſtamens* however is, in ſome caſes, more than two, and in ſome the *ſtigma* is ſolitary. Several botaniſts have taken the *flower* to be gynandrous, becauſe, at a very early period, before the *germen* is fully formed, the two *anthers* look as if ſeated on its ſummit, cloſe to the *ſtigma;* but Juſſieu well obſerves that they become lateral, or rather inferior, as it advances towards maturity. Linnæus has but twenty ſpecies of *Piper* in the ſecond edition of Sp. Pl. to which five only are added in Syſt. Veg. ed. 14. Willdenow has 52; but the moſt complete botanical view of this genus is found in Vahl's Enum. Plant., where 136 ſpecies are defined, and well deſcribed. This author properly unites the *Piper* and *Peperomia* of the Flora Peruviana, there being no ſolid generic difference between them; and he gives the following excellent ſketch of the habit.

Stem round. *Leaves* ſimple, undivided, entire. *Spikes* lateral and terminal, ſtalked, ſimple, round. *Flowers* minute, crowded. *Sheaths* deciduous. In the firſt ſection, conſiſting of 73 ſpecies, the *ſtem* is ſhrubby, climbing, branched, jointed; the joints more or leſs knotty, and often ſending forth roots: *leaves* ſtalked, alternate; ſome of them furniſhed with many nerves, proceeding, in alternate order, from the main rib, (Vahl terms ſuch ſpecies *venoſo-nervoſi*); others having almoſt all the nerves originating from the baſe of the leaf (theſe he calls *nervoſi*): *footſtalks* channelled,

with

with a claſping baſe : *ſpikes* oppoſite to the leaves, and moſtly ſolitary. The ſecond ſection compriſes 60 ſpecies, whoſe *ſtem* is herbaceous, fleſhy, jointed, not knotty: *ſpikes* either axillary or terminal. The third ſection has but two ſpecies, diſtinguiſhed by having no *ſtem*. The fourth contains one doubtful ſpecies only, *P. pinnatum* of Loureiro, Cochinch. 31, whoſe *leaves* are pinnate, *ſtem* prickly, and *flowers* unknown, ſo that it probably belongs to ſome other genus.

We ſhall follow Vahl's arrangement, in ſelecting a few examples.

P. *æquale*. Vahl n. 10. Ecl. Amer. v. 1. 4.—" Leaves elliptic-lanceolate, attenuated, ſmooth ; equal at the baſe ; without dots beneath. Spikes ſtraight."—Native of the Weſt Indies. We have it from Dr. Swartz. The *branches* are poliſhed, ſomewhat zigzag, knotty at the joints. *Leaves* four inches long, we ſhould rather call them preciſely ovate, and pointed, very ſmooth, with many lateral curved ribs, ſpringing from the main one, and connected by fine interbranching veins. *Spikes* an inch or more in length, exactly cylindrical, obtuſe, ſolitary, oppoſite to each leaf, their *ſtalks* about the length of the *footſtalks*, which is uſually a quarter of an inch.

P. *aduncum*. Hooked Pepper, or Spaniſh Elder. Linn. Sp. Pl. 41. Vahl n. 24. Willd. n. 17. Ait. n. 6. Jacq. Ic. Rar. t. 210.—Leaves ovate-oblong, or elliptic, pointed, rough ; unequal at the baſe. Spikes hooked.—Native of the Weſt Indies, as well as of the continent of South America. The *leaves* are a ſpan long, rough on both ſides to the touch, like a fine file, with many ſtraight tranſverſe ribs. *Spikes* three inches long, remarkably incurved. *Flowers* regularly whorled. Sloane ſays in his Hiſtory of Jamaica, v. 1. 135, that the *root* is very famous, reſembling ginger in taſte, colour, and ſmell, and when freſh not inferior to it.

P. *ariſtolochoides*. Lamarck Illuſtr. 80. Vahl. n. 43.—Leaves heart-ſhaped, acute, dotted with numerous radiating ribs. Footſtalks bordered. Spikes axillary, ſomewhat aggregate, from a lanceolate ſheath. Gathered by Commerſon in the iſland of Mauritius. The *leaves* are the ſize and ſhape of *Ariſtolochia Sipho* ; the *ſtalks* and *branches* roughiſh, but we do not find them villous. *Spikes* ſmall, two or more together. This plant is very near Forſter's *methyſticum*, Vahl. n. 66, and perhaps not different from it.

P. *nigrum*. Black Pepper. Linn. Sp. Pl. 40. Vahl. n. 52. Willd. n. 1. Ait. n. 1. Mill. Illuſtr. t. 5. Woodv. Med. Bot. t. 187. Ger. Em. 1538.—Leaves broad-ovate, pointed, coriaceous, ſmooth, with ſeven ribs. Joints of the ſtem tumid.—Native of the Eaſt Indies. Said in Hort. Kew. to have been introduced into the Engliſh ſtoves, in 1790, by Meſſrs. Lee and Kennedy. The three central ribs, in our ſpecimens, are combined at the baſe for about an inch. M. Poiret, in Lamarck's Dict. v. 5. 458, juſtly remarks that J. Miller alone, in his Illuſtr. of the Linn. Syſt. has deſcribed a *corolla*, or *calyx*, of one leaf, with three notches, in this plant. No perſon has been able to verify this repreſentation, nor is it known whence Miller procured his drawing, unleſs perhaps from his ſon, a botanical artiſt, who viſited India. His plate has always been conſidered as a valuable addition to the hiſtory of a plant ſo imperfectly known to botaniſts, and it is pity any uncertainty ſhould be attached thereto. Woodville's figure is a copy of Miller's. More than one ſpecies perhaps has been confounded under *P. nigrum*, particularly the *ſylveſtre* of Loureiro, Lamarck, and Vahl n. 45 ; nor have we materials to clear up this confuſion.

P. *Cubeba*. Cubebs. Linn. Suppl. 90, Vahl. n. 61. Willd. n. 3. Gærtn. t. 92. (Piper caudatum ; Ger. Em. 1540. Cubeba ; Woodv. Med. Bot. v. 4. 165.)—Leaves elliptic-lanceolate, pointed, ſmooth, five-ribbed ; contracted and unequal at the baſe ; the middle ribs combined half way up. Berries on partial ſtalks. Native of Sierra Leone, from whence we have ſpecimens, gathered by profeſſor Afzelius and his companion Borone, in leaf and fruit ; ſo that no further doubt can remain as to the identity of the plant. There are others, without name or mark, in the Linnæan herbarium. We know of no figure of any part except the *fruit*, as above cited. The *ſtem* is round, ſmooth, zig-zag, ſtriated, with rather tumid joints. *Leaves* two or three inches long, and one broad, ſolitary at each joint, on ſhort ſtalks ; furniſhed with three principal ribs from the baſe, and with two more, which ſpring very irregularly and variouſly from the central one, towards the middle of the leaf. The baſe of the *leaves* in the Linnæan ſpecimen is more dilated, and viſibly unequal, than in thoſe from Sierra Leone, but we ſcarcely think it indicates a ſpecific difference. The *cluſters* are two inches long ; partial ſtalks half an inch.

The ſpecies of Vahl's ſecond ſection are uſually of humble growth, and a ſhining, pellucid, ſucculent habit. Such is

P. *obtuſifolium*. Blunt-leaved Pepper. Linn. Sp. Pl. 42. Willd. n. 31. Vahl. n. 79. Ait. n. 13. Trew Ehret. t. 96. —Leaves obovate ; ribleſs beneath.—Native of the Weſt Indies. The Linnæan ſpecimen came from Jamaica. Vahl confounds with this the *cluſiæfolium*, Jacq. Ic. Rar. t. 212, but they are kept ſeparate in Hort. Kew. The *ſtem* is moſt ſpotted in *obtuſifolium* ; the *leaves* darker in *cluſiæfolium*, with more conſpicuous lateral ribs. Theſe ſpecies and many others of this ſection, want a thorough inveſtigation, and a careful compariſon with each other, to be well underſtood; neither is the whole genus ſo completely ſettled as could be wiſhed, notwithſtanding the labours of Vahl, which have not extended ſufficiently to the ſynonyms.

Piper, in *Gardening*, contains plants of the herbaceous, ſhrubby, perennial, exotic kinds, of which the ſpecies cultivated are ; the black pepper (P. nigrum) ; the rough-leaved pepper (P. amalago) ; the long pepper (P. longum) ; the intoxicating pepper, or ava (P. methyſticum ;) the netted-leaved pepper (P. reticulatum) ; the hooked-ſpiked pepper (P. aduncum) ; the pellucid-leaved pepper (P. pellucidum) ; and the blunt-leaved pepper (P. obtuſifolium).

On the firſt ſort Martyn obſerves, that " white pepper was formerly thought to be a different ſpecies from the black ; but it is nothing more than the ripe berries deprived of their ſkin, by ſteeping them about a fortnight in water ; after which they are dried in the ſun. The berries falling to the ground when over-ripe, loſe their outer coat, and are ſold as an inferior ſort of white pepper.

Method of Culture.—All theſe plants may be increaſed by ſeeds, procured freſh from the countries where the plants grow naturally, which ſhould be ſown upon a good hot-bed in the ſpring ; and when the plants come up and are fit to tranſplant, be each put into a ſeparate ſmall pot filled with light freſh earth, and replunged into a hot-bed of tanners' bark, ſhading them every day from the ſun till they have taken freſh root, when they muſt be treated in the ſame way as other tender exotic plants, admitting freſh air to them daily in proportion to the warmth of the ſeaſon, to prevent their drawing up weak ; and when the nights are cold the glaſſes of the hot-bed ſhould be covered with mats.

They all require the conſtant protection of a hot-houſe.

As the ſtalks of moſt of them are tender when young, they ſhould not have much wet, which rots them ; and when water is given it muſt be with caution, not to beat down the plants; for when that is the caſe they ſeldom riſe again afterwards.

In ſome of the ſorts they may be raiſed from layers or cuttings.

In the after-management of the plants, they muſt be plunged into the tan-bed of the bark-ſtove in the autumn, and during the winter be ſparingly watered; they require the ſame warmth as the coffee-tree. In the ſummer a large ſhare of freſh air muſt be admitted in hot weather, and they muſt be conſtantly kept in the ſtove, as already ſuggeſted.

They afford ornament and variety in ſtove collections.

Piper *Chiapæ*, in *Botany*, a name given by ſome authors to the clove-berry-tree, or caſſia caryophyllata.

Piper, *Jamaica*. See Myrtus *Pimenta*.

Piper *Nigrorum*, *Negro pepper*. The plant called at preſent by this name is the *capſicum*, or *Guinea pepper*, a remarkable herb, bearing large pods as red as coral, of which the Cayenne butter is made in America. But this is not the plant that was anciently known by this name. Avicenna and Serapion both mention a plant, which they call *fulſul alſuaden*, the Engliſh of which is, the *pepper of the black people*. But this was properly what has been ſince called the *Ethiopian pepper;* a ſort of hot ſeeds approaching to the nature of the common pepper, and containing ſeveral together in pods.

It is not eaſy, from the accounts we have left, to ſay what it is; but they have left deſcription enough of it for us to ſay what it is not, and to find that they have all been miſtaken, who have ſuppoſed it to be either the root tarſi, or the bulbus of the Arabians, which laſt was as large as a pear. See Capsicum.

Piper *Tavaſci*, the clove-berry-tree, or caſſia caryophyllata; a tree whoſe bark is uſed in medicine.

Piper, *Sand*, in *Ornithology*. See Arenaria and Tringa *Interpres*.

Piper, in *Ichthyology*, the Engliſh name of a ſpecies of *trigla*, called by the generality of authors *lyra*. See Trigla *Lyra*.

PIPERAH, in *Geograghy*, a town of Hindooſtan, in Bahar; 22 miles S.S.W. of Patna.

PIPERAPIUM, an old name of a plant found in Apuleius, and ſaid to have its name from its heat to the taſte; which was ſo offenſive to the bees, that if a piece of it were hung up in the hive, it would drive them all out.

This is a very ſtrange account: and as we meet with nothing to countenance it in any other author, there is reaſon to ſuſpect it to be an error; and there ſeems this foundation for it. The acorus root is ſaid by Dioſcorides to be the root of a plant allied to the papyrus, or paper-reed of the river Nile; and is thence called by that author *papyraceous*. Avicenna and Serapion copy this, and liken the acorus plant to the papyrus; but in all the copies of the Greek author, it is often found written ϖεπερακιον. This word *peperacion* may have been formed by Apuleius into *piperapium*, by way of amendment, and all the reſt might be occaſioned by this.

PIPERI, in *Geography*, a ſmall iſland in the Grecian archipelago; ſix miles N. of Serpho.

PIPERIDGE Tree, in *Botany*. See Berberis.

PIPERINO, in *Mineralogy*, a ſubſtance that ſeems to be a concretion of volcanic aſhes, and is ſaid to be that which covers Pompeii. Its colour, grey, or reddiſh-brown; its luſtre and tranſparency, 0; its fracture earthy, contains fragments of white marble, feldſpar, mica, garnets, ſcoriæ, gypſum, ſhorl, granite, &c.; its hardneſs, 6; ſometimes magnetic, ſometimes not.

It ſeems to differ from tufas, in containing more heterogeneities, being in fact a kind of porphyry or breccia, and being more eaſily decompoſed by expoſure to moiſture and the open air, but if preſerved from moiſture, it hardens when expoſed to the air. Kirwan.

PIPERITIS, in *Botany*, a name given by ſome authors to the momordica, or male balſam apple.

PIPERIVORA Avis, in *Ornithology*, a name given by ſome authors to the toucan, or Braſilian magpye, from its feeding on pepper.

PIPERNO, in *Geography*, a town of Italy, in the Campagna di Roma, formerly the ſee of a biſhop, but in 1225, on account of its poverty, united to Terracina. It was built out of the ruins of the ancient *Privernum*, which ſee; nine miles N.N.W. of Terracina.

PIPEROONE, a town of Hindooſtan, in Bahar; 25 miles N. of Durbungah.

PIPERRY, a town of Hindooſtan, in Candeiſh; 32 miles S.S.E. of Chuprah.

PIPILE, in *Ornithology*, a ſpecies of *Penelope;* which ſee.

PIPING, in *Sea Language*. See Call.

Piping-*Tree*, in *Geography*, a town of America, in Virginia; nine miles E. of Newcaſtle.

PIPIRI, in *Ornithology*, a name given by Buffon to the Lanius *Tyrannus;* which ſee.

PIPISTRELLUS, in *Zoology*, a ſpecies of *Veſpertilio;* which ſee.

PIPLERCHE, in *Ornithology*. See Alauda *Criſtata*.

PIPLEY, in *Geography*, a town of Hindooſtan, in Baglana; ſix miles N.W. of Bahbelgong.—Alſo, a town of Hindooſtan, in the country of Berar; 18 miles N. of Jaffierabad.—Alſo, a town of Hindooſtan, in Bengal, near the borders of Oriſſa, on a branch of the Ganges, and formerly a place of trade, having an Engliſh and Dutch factory; but the trade declined, and the factories were removed to Hoogly and Calcutta; 22 miles N.E. of Balaſore.

PIPPARAH, a town of Hindooſtan, in Oude; 42 miles N.W. of Lucknow.—Alſo, a town of Hindooſtan, in Oude; 48 miles E. of Bahraitch.

PIPRA, the *Manakin*, in *Ornithology*, a genus of birds of the order Paſſeres. The generic character is; bill ſhort, ſtrong, hard, nearly triangular at the baſe, and ſlightly incurved at the tip; the noſtrils are naked, the feet formed for walking, the tail is ſhort. Theſe birds are very ſimilar to the genus of Titmice, and are almoſt all peculiar to South America. In Gmelin there are thirty-one ſpecies enumerated; Latham mentions but twenty-five.

Species.

Rupicola; Rock Manakin. Creſt erect, edged with purple; the body is of a ſaffron colour; the tail-coverts are truncate. It inhabits the rocky parts of South America, and is the ſize of a ſmall pigeon. It is extremely ſhy, but may be tamed if taken very young; it feeds on ſmall wild fruits, and builds in the clefts of the moſt remote rocks. It lays two white eggs at a time. The female, and the male alſo when young, are brown; the lower wing-coverts are rufous and orange.

Peruviana; Peruvian Manakin. Body ſaffron-red; greater wing-coverts cinereous; quill and tail-feathers black; the coverts of the latter are not truncate. It is a native of Peru, and of the ſame ſize as the laſt.

Pareola; Blue-backed Manakin. Creſt blood-red, body black; back blue. It inhabits South America, and is four inches and a half long.

Superba; Superb Manakin. Deep black; middle feathers of the crown longiſh, and of a flame colour; beneath the wings are pale blue lunular blotches; primary quill-feathers browniſh. It is larger than the Aureola, to be noticed hereafter.

Cristata; Purple Manakin. Creſt pale yellow; body purple. It inhabits Braſil and New Spain, and is three inches and a half long.

Picicitli; Mexican Manakin. Cinereous; head and neck black; round the eyes is a whitiſh ſpot, which ends in a point at the breaſt. It is very ſmall, and found in Mexico.

Rubetra; Yellow Manakin. Creſt pale yellow; body teſtaceous; quill and tail-feathers blue. It is found in Braſil and Cayenne. The bill is yellow; the chin brown, and the neck is marked with a golden colour.

Torquata; Collared Manakin. Black; head ſcarlet; quill feathers and coverts blue. It inhabits Braſil, and is about three inches and a half long.

Miacatototl; New Spain Manakin. Black, with a few whitiſh feathers; belly pale; wings and tail beneath cinereous.

Punctata; Speckled Manakin. Greyiſh-brown, waved with duſky; top of the head and wings black, ſpeckled with white; tail-coverts red. Found in New Holland.

Grisea; Grey Manakin. Grey, beneath yellow; hind-head creſted; greater wing-coverts red; quill-feathers and tail grey-aſh; the front is marked with a yellow ſpot.

Albifrons; White-faced Manakin. Creſt white; body teſtaceous; back black. There is a variety with a ruſty-teſtaceous body; creſt is long and unequal. They are found in divers parts of South America.

Erythrocephala; Gold-headed Manakin. Black; head and arm-pits tawny. There is a variety of this ſpecies which is black; the head and bracelets red.

Aureola; Red and black Manakin. Black; head and breaſt ſcarlet; quill-feathers with a white ſpot on the fore-part. A variety has the head, lower part of the neck, breaſt, belly, and edges of the wings, orange; the quill-feathers have a white ſpot within. It inhabits Guinea. The *firſt* has a black bill, with legs and claws red; the *ſecond* has them brown.

Caudata; Long-tailed Manakin. Blue; crown ſcarlet; wings black; two middle tail-feathers long and pointed. It inhabits South America; the ſides and neck are tinged with a bright green luſtre.

Leucocephala; White-headed Manakin. Black, with a white head. It is a native of Surinam, and is the ſize of a warbler.

Leucocilla. Duſky-black; cap white; a variety is duſky-black; cap white; bracelets red. It is found among the reedy places of South America.

Gutturalis; White-throated Manakin. Black, throat white. It is a native of the hotteſt parts of South America.

Serena; White-fronted Manakin. Black; front white; rump blue; belly tawny. It is a native of Guiana and Cayenne.

Manacus; Black-capped Manakin. Black, beneath white; ſpot on the wings and neck above white. A variety of this ſpecies is without the ſpot on the wings.

Minuta; Little Manakin. Grey; head black, ſpeckled with white. It inhabits India, and is the ſize of a wren.

Striata; Striped-head Manakin. Beneath yellowiſh; upper part of the head and nape black, the feathers with a white ſtreak lengthways; the quill-feathers are black, the third very ſhort.

Nævia; Spotted Manakin. Brown, beneath tawny; chin and throat black; breaſt bifid, band on the wings, and tips of the tail-feathers white. It is about four inches long.

Leucotis; White-eared Manakin. Varied with olive and rufous, beneath rufous; belly grey; crown brown; temples and chin black; on each ſide the neck is a tuft of long ſnowy feathers. This is nearly five inches long.

Atricapilla; Black-crowned Manakin. Pale aſh-colour, beneath grey-white; bill, crown, greater wing-coverts, and quill-feathers black, the latter edged with grey; the front and cheeks are of a grey-white. It is ſix inches long, and inhabits Guiana. It avoids the open plains, and haunts the ſkirts of woods in ſmall flocks. The birds of this ſpecies are found in the neighbourhood of ant's neſts, from which they are ſometimes ſeen to ſpring as if ſtung by the inſects, uttering, at the moment, a cry ſimilar to the noiſe made by cracking a nut.

Papuensis; Papuan Manakin. Greeniſh-black, beneath whitiſh; breaſt with an oblong orange blotch; middle tail-feathers very ſhort. It is a native of New Guinea.

Hœmorrhea; Crimſon-vented Manakin. Deep black, beneath white, vent with a red ſpot.

Nigricollis; Black-throated Manakin. Blueiſh-black; throat and vent black; belly white.

Capensis; Orange-bellied Manakin. Duſky-black, beneath pale orange; edge of the quill-feathers pale, of the wings pale yellowiſh-orange.

Cinerea; Cinereous Manakin. Cinereous; belly whitiſh.

Musica; Tuneful Manakin. Black, beneath orange; the front and rump yellow; the crown and nape blue; chin and throat black. This is a native of St. Domingo, and is about four inches long. It is extremely ſhy, and eaſily eludes the vigilance of thoſe who attempt to catch it; its note is very muſical, and forms a complete octave, one note ſucceeding another. The bill and legs are black.

Pipra, a name given by Ariſtotle, and other ancient writers, to the *picus varius major*, the great ſpotted woodpecker, or witwall.

PIPRAH, in *Geography*, a town of Hindooſtan, in Viſiapour; 13 miles S.E. of Poorunda.—Alſo, a town of Hindooſtan, in Rohilcund; 17 miles S.E. of Budayoon.—Alſo, a town of Hindooſtan, in Oude; 38 miles N.N.E. of Manickpour. N. lat. 26°. E. long. 82° 18′.

PIPRIAC, a town of France, in the department of the Ille and Vilaine, and chief place of a canton, in the diſtrict of Rédon; 10 miles N. of Rédon. The place contains 3150, and the canton 12,161 inhabitants, on a territory of 245 kiliometres, in 9 communes.

PIPROW, a town of Hindooſtan, in the circar of Bopal; 10 miles S. of Bopaltol.

PIQUE, in *Natural Hiſtory*, a name given by the Spaniards to an inſect of the ſize of a flea, called by the Indians *tung*. It is common in the Eaſt and Weſt Indies, and eats its way into the fleſh under the nails, &c.

Pique, or *Piquemontvallier*, in *Geography*, the higheſt mountain among the Pyrenees.

PIQUERIA, in *Botany*, commemorates Andrew Piquerio, a Spaniſh phyſician and philoſopher, whoſe works have often been republiſhed at Venice and Amſterdam, and whoſe merits are highly celebrated by Cavanilles, the author of the name; though without any mention of his botanical pretenſions, which would have been, in this caſe, moſt to the purpoſe.—Cavan. Ic. v. 3. 18. Willd. Sp. Pl. v. 3. 1748. Ait. Hort. Kew. v. 4. 501.—Claſs and order, *Syngeneſia Polygamia-æqualis*. Nat. Ord. *Compoſitæ diſcoideæ*, Linn. *Corymbiferæ*, Juſſ.

Gen. Ch. *Common calyx* ſimple, priſmatic, of four or five converging, concave, keeled, equal ſcales. *Cor.* compound, diſcoid. Florets few, all fertile, uniform, crowded; tube very ſhort; limb in five ſpreading ſegments. *Stam.* Filaments five, very ſhort; anthers united into a cylinder. *Piſt.* Germen turbinate, with five angles; ſtyle thread-ſhaped; ſtigmas divaricated, tumid. *Seeds* ſolitary, minute, turbinate, with five angles, abrupt at the ſummit. *Crown* or *down* none. *Receptacle* naked.

Eſſ. Ch. Receptacle naked. Calyx with four or five equal leaves, and as many florets. Seeds five-ſided. Down none.

1. P. *trinervis.* Three-ribbed Piqueria. Cavan. Ic. v. 3. 19. t. 235.—Leaves ovato-lanceolate, ſerrated, three-ribbed. Panicle ſmooth.—Native of Mexico. Seeds were brought from Spain to England in 1798, by the marchioneſs of Bute. The plant is biennial, flowering in the greenhouſe in July and Auguſt. The *ſtems* are herbaceous, four feet high, round, leafy, with oppoſite branches, panicled and many-flowered. *Leaves* oppoſite, on ſhort ſtalks, ſmooth, like every other part of the plant. *Flowers* very ſmall and numerous, white, on capillary, panicled, terminal ſtalks. Leaves of the *calyx* four, obovate. *Florets* four.

2. P. *pubeſcens.* Rough Piqueria.—Leaves dilated, three-lobed, cut. Panicle corymboſe, downy.—Native of Peru. A ſpecimen of this, without any name or mark, was found in the herbarium of the younger Linnæus, amongſt a number of Peruvian plants. Its *ſtem* ſeems rather ſhrubby, with oppoſite, round, leafy *branches*, clothed with fine, ſhort, denſe, ruſty, rigid down. *Leaves* fan-ſhaped, acute, nearly ſmooth, variouſly cut, and more or leſs regularly three-lobed, an inch or more in length, on rough *ſtalks* about half as long. *Panicle* terminal, corymboſe, denſe, many-flowered. *Calyx-leaves* five, narrower than in the former. *Florets* about five. In other reſpects this plant anſwers to the generic character given of the former by Cavanilles. This genus ranges next to ETHULIA; ſee that article.

PIQUET. See PICKET.

PIQUETTE, among the *Floriſts*, a term uſed for a certain ſort of carnations, which have always a white ground, and are ſpotted, or, as they call it, pounced with ſcarlet, red, purple, or other colours.

PIQUICA, in *Geography*, a town of Peru, in the dioceſe of La Plata, on the coaſt of the Pacific ocean; 85 miles S.W. of Atacames. S. lat. 27°.

PIQUITINGA, in *Ichthyology*, the name of a ſmall American fiſh, the ESOX *Hepſetus*, which ſee. It ſeldom exceeds two inches in length; its mouth appears very ſmall, but it can at pleaſure open it to a great width; its eyes are very large and black, with a ſilvery iris; it has ſix fins beſides the tail, which is forked; its head is of a ſilvery white; its back olive-colour, and its belly and ſides are covered with ſilvery ſcales; the fins are all white, and the ſide-lines are broad, and very bright and ſhining. Marcgrave.

PIRA, in *Geography*, a town of Auſtria; ſix miles S.S.E. of St. Polten.

PIRA-*Aca*, in *Ichthyology*, a name by which Marcgrave and ſome other authors have called the BALISTES *Sinenſis* of others.

PIRA-*Acangata*, the name of a Braſilian fiſh, reſembling the perch in ſize and ſhape. It is of a ſmall ſize, ſeldom exceeding four or five inches in length; its mouth is ſmall; its tail is forked; and it has on the back only one long fin, which is ſupported by rigid and prickly ſpines; this it can depreſs at pleaſure, and ſink within a cavity made for it in the back; its ſcales are of a ſilvery white. It is a wholeſome and well-taſted fiſh. Marcgrave.

PIRA-*Coaba*, the name of an American fiſh of the truttaceous kind, much eſteemed for the delicacy of its flavour. It grows to about twelve inches in length; its noſe is pointed, and its mouth large, but without teeth; the upper jaw is longer than the other, and hangs over it in form of a cartilaginous prominence; its eyes are very large, and its tail forked; under each of the gill-fins it has a beard made of ſix white filaments, and is covered all over with ſilvery ſcales. Marcgrave.

PIRA-*Guiba.* See ECHINEIS *Naucrates.*

PIRA-*Jurumenbeca*, the name of a Braſilian fiſh, called by many the *bocca molie.* It lives in the muddy bottom of the American ſeas, and it is a long-bodied not flatted fiſh; it grows to a vaſt ſize, being ſometimes caught of nine, and ſometimes even of ten or eleven feet long, and two feet and a half thick; it has one long fin on the back, the anterior part of which is thin and pellucid; and has a cavity on the back, into which the creature can depreſs the fin at pleaſure; its tail is not forked; its ſcales are all of a ſilvery colour and brightneſs. It is a very well-taſted fiſh. Marcgrave.

PIRA-*Metara*, a name given by Marcgrave and others to a variety of the MULLUS *Surmuletus.*

PIRA-*Pebe*, the name given by Marcgrave to the TRIGLA *Volitans*; which ſee.

PIRA-*Pixanga*, the name of a Braſilian fiſh of the turdus or wraſſe kind, and called by ſome the *gatviſch.* Its uſual length is four or five inches; its mouth is conſiderably large, and furniſhed with very ſmall and ſharp teeth; its head is ſmall, but its eyes large and prominent; the pupil of a fine turquoiſe colour, and the iris yellow and red in various ſhades; the coverings of the gills end in a triangular figure, and are terminated by a ſhort ſpine or prickle; its ſcales are very ſmall, and ſo evenly arranged, and cloſely laid on the fleſh, that it is very ſmooth to the touch; its tail is not forked, but rounded at the end; its whole body, head, tail, and fins, are of a pale yellow, variegated all over with very beautiful blood-coloured ſpots; theſe are round, and of the bigneſs of hemp-ſeed on the back and ſides, and ſomething larger on the belly; the fins are alſo ſpotted in the ſame manner, and are all marked with an edge of red. It is caught among the rocks, and about the ſhores, and is a very well taſted fiſh. Marcgrave.

PIRÆUS, or PYRÆUS, in *Ancient Geography*, a celebrated and capacious harbour of Athens, about 35 or 40 ſtadia from the city, but joined to it by walls about five miles in length; that on the north was built by Pericles, and that on the ſouth by Themiſtocles. This was made the port of Athens by the latter commander, who obſerving that the ancient port of Phalerum was narrow and inconvenient, conſtructed the Piræus, which he made the moſt capacious haven in Greece, and conceiving it inexpedient that the port ſhould be made a part of the city, becauſe, as he knew that ſailors are generally diſſolute, he was afraid their mixing with the citizens would produce a corruption of manners, he built it at a diſtance, and connected it with the city by long walls. The ſcite of this port was originally a village of Attica; and in order to render it ſecure it was encompaſſed by ſtrong walls. The whole of its circuit was 60 ſtadia, including the "Munychia," which was a promontory near it, and which being naturally very ſtrong, was rendered ſtill ſtronger by artificial fortification. On the walls that joined the Piræus with the city, were erected turrets, which were afterwards converted into dwelling-houſes for the accommodation of the Athenians, whoſe large city became in proceſs of time too ſmall for them. It was after the battle of Salamis, which happened in the firſt year of the 75th olympiad, 480 years B.C., and by which Athens was elevated to a very high degree of glory, that Themiſtocles projected the ſcheme of conſtructing this new harbour. Accordingly in the laſt year of the 75th olympiad, 477 years B.C., he explained to the citizens the plan which he had conceived for eſtabliſhing their power and increaſing their wealth. In order the more effectually to ſecure their concurrence, after ſtating the advantages that would reſult to them from the execution of his plan, he requeſted them to appoint two perſons of rank and talents, to whom he might freely communicate the whole of his project. The aſſembly of the citizens appointed Ariſtides and Xanthippus, to whom Themiſtocles imparted, without reſerve, his ſcheme of rendering the Piræus a ſafe and capacious harbour. To theſe he demonſtrated how eaſily his ſcheme might be accompliſhed, if his intentions were kept ſecret, and at the ſame time informed them how dangerous it would be for the Spartans to be appriſed of his deſign. Ariſtides and Xanthippus aſſured the people, that the project of Themiſtocles was of the utmoſt advantage to the ſtate, and yet that it might be performed with the greateſt eaſe. Nevertheleſs the people entertained ſuſpicions of ſome ſiniſter deſigns, and recommended Themiſtocles's application to the ſenate, who having obtained their conſent ſent ambaſſadors to Sparta, intimating how fit it would be for the Greeks to have ſome great port, where a fleet might continue in ſafety, to watch the deſigns of the Perſians. Having thus prepared the Lacedæmonians not to take offence at their firſt preparations for enlarging and eſtabliſhing the harbour of Piræus, Themiſtocles took ſuch care that every thing was finiſhed, and the place in a poſture of defence, before it was well known in Sparta what the Athenians were about.

The entrance of the Piræus is narrow, and formed by two rocky points, one belonging to the promontory of Eetion and the other to that of Alcinous. Within were three docks or ſtations for ſhipping, Cantharos, Aphrodiſium, and Zea; the firſt ſo called from an ancient hero, the ſecond from the goddeſs Venus, who had there two temples, and the third from bread-corn. In this port were alſo five porticos, which, joining together, formed one great arcade, called "Macra Stoa," or the grand portico. There were likewiſe two large markets or fora, one near the long portico, and one near the city. The walls were formed of hewn ſquare ſtones, and united without cement, merely by lead and iron, which ſerved to hold together the exterior ranges or facings. They were ſo wide that loaded carts might paſs upon it in different directions, and their height was about 40 cubits. Theſe long walls were repaired by Conon, deſtroyed almoſt wholly by Lyſander, the Lacedæmonian, and partly reconſtructed by Conon, and perfected by Callicrates, during the government of Pericles.

The Piræus, as long as Athens flouriſhed, became the emporium of all Greece. The architect was Hippodamus celebrated for the conſtruction of other buildings.

At the Piræus were a theatre, a temple, or chapel, in which were two ſtatues, one of Jupiter with a ſceptre in his hand, and one of Minerva with a pike, and others of Venus, &c. The cavities and windings of the Munychia, both natural and artificial, were filled with houſes; and the whole ſettlement comprehending Phalerum and the ports of the Piræus, with the arſenals, the ſtore-houſes, the famous armoury of which Philo was the architect, and the ſheds for 300, and afterwards 400, triremes, reſembled the city of Rhodes, which had been planned by the ſame Hippodamus. The ports, on the commencement of the Peloponneſian war, were ſecured with chains, centinels were ſtationed, and the Piræus was carefully guarded.

It was with great difficulty that the Piræus was reduced by Sylla, who demoliſhed the walls, and ſet fire to the armoury and arſenals. In the civil war it was in a defenceleſs condition. Calenus, lieutenant to Cæſar, ſeized it, inveſted Athens, and ravaged the territory. Strabo, who lived under the emperors Auguſtus and Tiberius, obſerves, that by many wars the long walls had been deſtroyed, together with the fortreſs of Munychia, and that the Piræus had been contracted into a ſmall ſettlement by the ports and the temple of Jupiter the Saviour. This fabric was then adorned on the inſide with pictures, the works of illuſtrious artiſts, and on the outſide with ſtatues. In the ſecond century, beſides houſes for triremes, the temples of Jupiter and Minerva remained, with their images in braſs, and a temple of Venus, a portico and the tomb of Themiſtocles, whoſe bones were conveyed hither by his friends from Magneſia.

The port of the Piræus has been named "Porto Lione," from its marble lion, and alſo "Porto Draco." The lion has been deſcribed as a piece of admirable ſculpture, ten feet high, and repoſing on its hinder parts. Near Athens, in the way to Eleuſis, was another, in a couchant poſture, probably the companion of the former. Both theſe were removed to Venice by the famous general Moroſini, and placed before the arſenal. At the mouth of the port are two ruined piers. It is frequented by a few veſſels, which are, for the moſt part, ſmall craft. The buildings are a mean cuſtom-houſe, with a few ſheds, and by the ſhore, on the eaſt ſide, a warehouſe belonging to the French and a Greek monaſtery dedicated to St. Spiridion. On the oppoſite ſide is a rocky ridge, on which are remains of the ancient wall and of a gateway towards Athens. By the water-edge are veſtiges of building; and between the cuſtom-houſe and the city on the right hand of the road are traces of a ſmall theatre on the ſide of the hill of Munychia.

PIRAGUIRI, in *Geography*, a town of Braſil, in the government of Para, on the Xingi; 85 miles S.W. of Curupa.

PIRANHA, in *Ichthyology*, a name given to the American fiſh, more commonly known by the name piraya.

PIRANO, in *Geography*, a ſea-port town of Iſtria, ſituated partly on an eminence, and partly on an iſthmus; nine miles S.W. of Capo d'Iſtria. N. lat. 45° 37′. E. long. 13° 36′.

PIRAQUIBA, or IPIRAQUIBA, in *Ichthyology*, a name originally Braſilian, by which ſome authors expreſs the remora, or ſucking-fiſh.

PIRATE, PYRATE, *Pirata*, *Rover*, a perſon, or veſſel, that robs on the high ſeas, or makes deſcents on the coaſts, without the permiſſion or authority of any prince or ſtate.

The colours uſually diſplayed by pirates are ſaid to be a black field, with a death's head, a battle-axe, and an hour-glaſs.

By the ancient common law, piracy, if committed by a ſubject, was held to be a ſpecies of treaſon, and by an alien to be felony only; but now, ſince the ſtatute of treaſons, 25 Edw. III. cap. 2. it is held to be only felony in a ſubject. Formerly it was only cognizable by the admiralty courts, which proceed by the rules of the civil law; but the ſtatute 28 Hen. VIII. cap. 15. eſtabliſhed a new juriſdiction for this purpoſe, which proceeds according to the courſe of the common law. The offence of piracy, by common law, conſiſts in committing thoſe acts of robbery and depredation upon the high ſeas, which, if committed upon land, would have amounted to felony. But, by ſtatute, ſome other offences are made piracy alſo; as by 11 & 12 W. III. cap. 7. if any natural born ſubject commits any act of hoſtility upon the high ſeas, againſt others of his majeſty's ſubjects, under colour of a commiſſion from any foreign power, this, which would be only an act of war in an alien, ſhall be conſtrued piracy in a ſubject. And farther, any commander, or other ſea-faring perſon, betraying his truſt, and running away with any ſhip, boat, ordnance, ammunition, or goods, or yielding them up voluntarily to a pirate, or conſpiring to do theſe acts; or any perſon confining the commander of a veſſel, to hinder him from fighting in defence of his ſhip, or to cauſe a revolt on board, ſhall, for each of theſe offences, be adjudged a pirate, felon, and robber, and ſhall ſuffer death, whether he be a principal or acceſſory. By 8 Geo. I. cap. 24. the trading with known pirates, or furniſhing them with ſtores or ammunition, or fitting out any veſſel for that purpoſe, or in anywiſe conſulting, combining, confederating, or correſponding with them; or the forcibly boarding any merchant veſſel, though without ſeizing or carrying her off, and deſtroying or throwing any of the goods overboard, ſhall be deemed piracy; and all acceſſories to piracy are declared to be principal pirates and felons, without benefit of clergy. Commanders or ſeamen wounded, and the widows of ſuch as are ſlain, in any piratical engagement, ſhall be entitled to a bounty, to be divided among them, not exceeding one-fiftieth part of the value of the cargo on board; and ſuch wounded ſeamen ſhall be entitled to the penſion of Greenwich hoſpital. And if the commander ſhall behave cowardly, by not defending the ſhip, if ſhe carries guns or arms, or ſhall diſcharge the mariners for fighting, ſo that the ſhip falls into the hands of pirates, ſuch commander ſhall forfeit all his wages, and ſuffer ſix months' impriſonment.

In different parts pirates are differently denominated; as in the Weſt Indies, *buccaneers*, *free-booters*, &c. In the Mediterranean, *corſairs*, &c.

Alexander, reproaching a pirate with his condition, was anſwered, "If I am a pirate, it is becauſe I have only a ſingle veſſel; had I a fleet, I ſhould be a mighty conqueror."

Pirate was alſo anciently uſed for the perſon to whoſe care the mole, or pier of a haven, which, in Latin, was called *pira*, was entruſted.

Pirate was ſometimes too, according to Spelman, uſed for a ſea-captain, or ſoldier. Aſſer, in the life of king Alfred, tells us, "juſſit naves longas fabricari, impoſitiſque piratis in illis vias maris cuſtodiendas commiſit."

PIRATIAPIA, in *Ichthyology*, the name of a Braſilian fiſh, approaching to the nature of the turdus or wraſſe. Its body is oblong, not flatted, and very thick; it is a large fiſh, and ſometimes grows even to fifty pounds weight. It is a very delicate and valuable fiſh. Marcgrave.

PIRATIA-PUA, the name of an American ſea-fiſh, which grows to a very large ſize, and, while young, is eaten and accounted a delicacy; but when full grown, is too coarſe, rank, and ſtrong: it has ſix fins beſides the tail, which is made of a very large fin, of a ſomewhat ſquare figure, and is not at all forked: it is all over of a duſky orange colour, but more obſcurely ſo on the back than elſewhere; and its ſides are variegated with grey ſpots, ſo diſpoſed as to repreſent a ſort of net-work. Piſo.

PIRAUGY, in *Geography*, a river of Brazil, S.S.E. of Rio Grande and Point Negro.

PIRAUMBU, in *Ichthyology*, the name of a Braſilian fiſh, ſomewhat approaching to the nature of the turdus, and called by the Portugueſe *chayquarona*. It is of the figure of the carp, and its uſual length is ſix or ſeven inches, and its breadth in the broadeſt part about three inches, but gradually diminiſhing to the tail. It is caught among the rocks, and near ſhores, and is a well taſted fiſh. Marcgrave.

PIRAY, in *Geography*, a river which runs into the Paraguay.

PIRAYA, a town of Paraguay; 20 miles S.E. of Aſſumption.

Piraya, in *Ichthyology*, the name of a fiſh caught in the American rivers. There are two kinds of it: the one growing to a foot long, and very broad in proportion; this loves the muddy bottoms of rivers; the other is much of the ſame ſize, but has two fins on its back, whereas the other has but one; this loves the ſandy bottoms of rivers. There is alſo a ſmaller ſpecies of this: all three are eatable fiſh.

PIRAZZETA, in *Geography*, a town of Naples, in Baſilicata; 14 miles N.E. of Turſi.

PIRDE, a river of Pruſſia, which runs into the Memel, four miles W. of Tilſit.

PIRETIBBI, a lake of Canada, 240 miles N. of Quebec. N. lat. 51°. E. long. 69° 40′.

PIRGIA, a town of Aſiatic Turkey, in Caramania; 112 miles S.W. of Cogni.

PIRGO, a town of Albania, at the mouth of the river Polonia; 20 miles N. of Valona.

PIRHALA, a town of Hindooſtan, in Lahore; 108 miles N.W. of Lahore. N. lat. 32° 36′. E. long. 71° 56′.

PIRI, a province of Africa, in the N. part of the kingdom of Loango.

PIRIATIN, a town of Ruſſia, in the government of Kiev; 68 miles E.S.E. of Kiev. N. lat. 51° 18′. E. long. 32° 42′.

PIRIG, a town on the S. coaſt of the iſland of Luçon. N. lat. 13° 39′. E. long. 122° 24′.

PIRIGARA, in *Botany*, Aubl. Guian. t. 192, 193. See Gustavia.

PIRIN's Island, in *Geography*, an iſland near the coaſt of Africa, in the mouth of the river Olibato; eaſtward of cape Lopez Gonſalvo, about five miles in circumference.

PIRIOUTI, a town of Thibet; 60 miles E. of Panctou.

PIRIPEA, in *Botany*, an unexplained, probably barbarous, name. Aubl. Guian. v. 2. 627. Juſſ. 100.—Claſs and order, *Didynamia Angioſpermia*. Nat. Ord. *Perſonatæ*, Linn. *Pediculares*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, its orifice in five unequal acute ſegments. *Cor.* of one petal, ſalver-ſhaped; tube cylindrical, curved, twice the length of the calyx; limb ſpreading, in five deep, unequal, obovate ſegments; mouth cloſed with oblong glands. *Stam.* Filaments four, thread-ſhaped, inſerted into the middle of the tube, two of them longer than the reſt, all encloſed within the tube; anthers erect, oblong, of two cells. *Piſt.* Germen ſuperior, oblong, quadrangular; ſtyle ſhort; ſtigma ſwelling, acute. *Peric.* Capſule oblong, compreſſed, of two cells, and two valves. *Seeds* numerous, minute, inſerted into the partition.

Eſſ. Ch. Calyx tubular, with five unequal teeth. Corolla ſalver-ſhaped, curved; limb in five obovate, unequal ſegments; mouth cloſed with glands. Capſule of two cells. Seeds numerous, minute.

1. P. *paluſtris*. Aubl. Guian. t. 253.—Native of the meadows of Courou in Guiana, flowering and ripening fruit in September.—*Root* ſmall, fibrous, apparently annual. *Stem* a foot high, erect, ſlender, leafy, ſtriated, ſomewhat branched. *Leaves* ſcattered, ſeſſile, linear, acute, very narrow, channelled, finely toothed, ſmooth. *Flowers* in looſe, terminal, ſimple *ſpikes*. *Bracteas* three, fringed, at the baſe

of each flower. *Flowers* hardly an inch long, purpliſh; the glands at the mouth white. A pretty delicate plant, thought by Juſſieu to conſtitute a diſtinct genus, akin to *Erinus*, *Buchnera*, *Manulea*, *Bartſia*, &c. We have ſeen no ſpecimen. Swartz cites it as a ſynonym to his *Buchnera elongata*. See Buchnera.

PIRIQUETA, Aubl. Guian. t. 117. See Turnera.

PIRIT, in *Ornithology*, a name given by the people of the Philippine iſlands to a peculiar ſpecies of ſparrow, which is very common with them. It is much ſmaller than our common ſparrow, and feeds only on the ſeeds of the canary-graſs, which is very commonly wild there.

PIRITU, in *Geography*, a ſmall iſland in the Caribbean ſea, near the coaſt of South America. N. lat. 10° 10′. W. long. 65° 26′.

PIRITZ, a town of Hinder Pomerania, which was the firſt town of the country that embraced Chriſtianity, and alſo the doctrines of Luther; 32 miles N. of Cuſtrin. N. lat. 53° 13′. E. long. 15° 4′.

PIRLIPO, a town of European Turkey, in Macedonia; 20 miles N.N.E. of Toli.

PIRMAKAN, a town of Bengal; 15 miles S.W. of Purneah.

PIRMASENS, a town of France, in the department of Mont Tonnerre, and chief place of a canton, in the diſtrict of Deux-Ponts; 12 miles S.E. of Deux-Ponts. The place contains 3205, and the canton 8147 inhabitants, in 21 communes.

PIRNA, a town of Saxony, in the margraviate of Meiſſen, advantageouſly ſituated on the Elbe for commerce; 11 miles S.E. of Dreſden. N. lat. 50° 58′. E. long. 13° 56′.

PIRNITZ, or Botnitz, a town of Moravia, in the circle of Iglau; 10 miles S.E. of Iglau.

PIROGUIS, a name given by the Americans to their war-boats, which were a ſort of canoes, ſo large as to carry 40 or 50 men.

PIROM, or Tuicce, an iſland in the Red ſea. N. lat. 15°. E. long. 42° 40′.

PIROMALLI, Paul, in *Biography*, an Italian Dominican, who flouriſhed in the 16th century, and whoſe labours have greatly contributed towards the promotion of Oriental literature, was a native of Calabria. He was ſent as a miſſionary into the Eaſt, and was ſaid to have converted great numbers of the Eutychians to the Catholic faith. From Armenia he paſſed into Georgia and Perſia, and upon his return into Italy by ſea, he was taken and carried captive to Tunis. Being ranſomed, he went to Rome, where he gave an account of his miſſion, and received marks of favour from pope Urban VIII. By this pontiff he was ſent into Poland, with the character of papal nuncio, and is ſaid to have been very ſucceſsful in reſtoring union and harmony among the ſects in that country. The ſame pope employed him in reviſing the Armenian verſion of the bible; and afterwards ſent him a ſecond time into the Eaſt, where, in 1655, he was promoted to the biſhopric of Nackſivan, in Armenia. Over this ſee he preſided nine years, and then returned to Italy, where he was nominated biſhop of Biſignano, in Calabria. Here he died in 1667. He was author of a "Latin and Perſian Dictionary;" "An Armenian and Latin Dictionary;" "A Grammar of the Armenian Tongue;" and ſome treatiſes in controverſial divinity.

PIRON, Alexis, a poet and man of wit, was born at Dijon in 1689. He paſſed the firſt twenty-five years of his life in obſcurity, remote from decent company, and devoted very much to low pleaſures. A licentious ode, of which he was the author, obliged him to quit Paris, where, for ſome years, he had ſupported himſelf by the mechanical labours of his pen as a copying clerk. His firſt literary efforts were as a writer for the comic opera, in which inferior ſtation he diſplayed talents that recommended him to the directors of the Theatre François. His firſt effort, entitled "Les Fils ingrats," afterwards changed into "L'Ecole des Pères," was not at all ſucceſsful. He next tried his powers in tragedy, and produced his "Calliſthenes," and his "Cortes," neither of which has kept a place on the ſtage, though containing parts ſtrongly written. His "Guſtave" was more ſucceſsful, though critics thought it too much overcharged with buſineſs; at length, in 1738, he preſented his comedy of "La Metromanie," which raiſed him to the height of reputation. He alſo wrote "Les Courſes de Tempe," an ingenious paſtoral; ſeveral odes, poems, tales, and epigrams. In this laſt kind of compoſition he was particularly happy, as might be expected, conſidering that he was the moſt famous for repartees and bon mots of any of the Pariſian wits. Of theſe ſeveral are given in the General Biography. He frequently made cauſtic remarks upon the French Academy, and afterwards exerted himſelf to obtain admiſſion into it, but was excluded by means of the abbè d'Olivet, who revived the memory of his juvenile ode, for which officiouſneſs he was recompenſed by a ſevere epigram. Piron never forgave the Academy for their rejection of him, and compoſed the following epitaph:

"Ci git Piron, qui ne fut rien,
Pas même academicien."

He died at the advanced age of 83, having been long regarded as a very eſtimable character. His works were publiſhed collectively in ſeven volumes.

PIROS, in *Geography*, a juriſdiction of Peru, on the ſides of the Maragnon; 160 miles N.N.E. of Lima.

PIROT, a town of European Turkey, in Bulgaria; 40 miles N.W. of Sophia.

PIROTE, a town of Hindooſtan, in Malwa; 21 miles N.W. of Chanderee.

PIROUETTE, or Pyrouet, in the *Manege*, a turn or circumvolution which a horſe makes, without changing his ground; his haunches remaining firm in the centre, and his ſhoulders furniſhing and deſcribing the circle. In this action the inner hind leg muſt not be lifted from the ground, but turned round in the ſame place, like a pivot: while the other three legs and the body of the horſe turn and wheel round it at the ſame time.

The word is French, and literally ſignifies a whirligig.

Pirouettes are either of *one tread*, or *piſte*, or of *two*. The firſt is an entire ſhort turn, which the horſe makes upon one tread, and, almoſt, in one time; in ſuch a manner as that his head comes to the place where his tail was, without putting out his haunches. In the pirouette of *two treads*, or *piſtes*, he takes a ſmall compaſs of ground, almoſt his length, and marks both with the fore part and the hind.

PIRRAWARTH, in *Geography*, a town of Auſtria; 14 miles N.N.E. of Vienna.

PIRUZABAD, a town of Perſia, in Mecran; 30 miles S.S.E. of Kieh.

PISA, in *Ancient Geography*, a town of the Peloponneſus, in that part of the Elide called Triphylia, N. of Olympia, and, according to Herodotus, 1485 ſtadia diſtant from Athens. It was ſituated on the right of the river Alpheus, and even after its deſtruction the inhabitants of this diſtrict bore the name of Piſantins; and here was alſo a fountain called "Piſa." The inhabitants of this town, founded, as it is ſaid, by one of the grandſons of Eolus, were for a long time the moſt powerful people of the Elide. Pauſanias ſays, that vines covered the ſcite of Piſa.

PISA, in *Geography*, a city of Etruria, and capital of a territory, ſtands in a fertile plain, bounded by the neighbouring Apennines on the N., and on the S. open to the Tyrrhenian ſea. If we may rely on the authority of Strabo, we may trace the origin of Piſa to the period that followed the Trojan war, and thus connect its hiſtory with the fate of the Grecian chiefs, and particularly with the wanderings of the venerable Neſtor. At all events the

"Alpheæ ab origine Piſæ
Urbs Etruſca ſolo,"

enjoys the double glory of being one of the moſt ancient cities of Etruria, and of deriving its name and its origin from the Olympic Piſa, on the banks of the Alpheus. Although this city was always conſiderable, as forming one of the Etruſcan tribes, or afterwards honoured with a Roman colony, A. U. C. 474; yet it did not arrive at the zenith of its fame till the records of ancient times were cloſed, and the genius of Rome and liberty ſeemed for ever buried under the ruins and barbariſm of the middle ages. At that period, apparently ſo unpropitious, the flame burſt forth, and again kindled the ſlumbering ſpirit of Italian freedom. Piſa was not the laſt that rouſed itſelf to activity; it aſſerted its independence at an early period, and in the 10th century blazed forth in all the glory of a mighty and victorious republic. Its numerous fleets rode triumphant on the Mediterranean; and Corſica and Sardinia, the Saracens on the coaſt of Africa, and the infidel ſovereign of Carthage, bowed beneath its power. Captive kings appeared before its ſenate; the Franks in Paleſtine and in Egypt owed their ſafety to its proweſs, and Naples and Palermo ſaw its flags unfurled on their towers. Pontiffs and emperors courted its alliance, and acknowledged its effective ſervices, and the glory of Piſa, twenty centuries after its foundation, eclipſed the fame of its Grecian parent, and indeed rivalled the achievements of Sparta herſelf, and of all the cities of Peloponneſus united. During this era of glory, commerce, as well as conqueſt, introduced opulence and ſplendour into the city; its walls were extended and ſtrengthened; its ſtreets widened and adorned with palaces, and its churches rebuilt in a ſtyle of magnificence, that even now aſtoniſhes the traveller, and atteſts the former fortunes of Piſa. A population of 150,000 inhabitants filled its vaſt precincts with life and animation, and ſpread fertility and riches over its whole territory. Such was its ſtate during the 11th, 12th, and great part of the 13th centuries, after which the uſurpation of domeſtic tyrants firſt, and next the victories of the Genoeſe, broke the ſpirit of its citizens. Then the treachery of its princes, with the interference and deceitful politics of France, undermined its freedom, and at length the intrigues of the Medici completed its ruin, and enſlaved it to its rival Florence, about the year 1228. While the neighbouring Lucca, not ſo glorious but more fortunate than Piſa, ſtills retains its opulence and its population. The latter, enſlaved and impoveriſhed, can count only 15,000 inhabitants within the whole circumference of her walls:—a number which, in the days of her proſperity, would have been inſufficient to man one-half of her gallies, or guard her ramparts during the watches of the night.

Piſa covers an incloſure of near ſeven miles in circumference; the river divides it into two, nearly equal, parts; the quays on both ſides are wide, lined with edifices in general ſtately and handſome, and united by three bridges, the middle one of which is of marble. The ſtreets are wide, particularly well paved with raiſed flags for foot paſſengers, and the houſes are lofty, and of good appearance. Here are ſeveral palaces, not deficient either in ſtyle or magnificence. Among its churches, there is a ſingular edifice on the banks of the Arno, called "Santa Maria della Spina," ſuppoſed to have been built A. D. 1230, and repaired A. D. 1300. ſo called from part of our Saviour's crown of thorns ſaid to be preſerved there, ſquare, low, and of a groteſque and whimſical, rather than beautiful appearance. It is caſed with black and white marble. This building is a ſpecimen of that ſpecies of architecture which the Italians call "Gotico Moreſco," introduced into Italy in the 11th century, and, as its name ſeems to import, probably borrowed from the Eaſt by the merchants of the commercial republics. We ſhall here obſerve, that there are in Italy two ſpecies of Gothic, the "Gotico Moreſco," and the "Gotico Tedeſco;" the former may have been imported from the Eaſt; the latter ſeems, as its name implies, to have been borrowed from the Germans. It is thought to be an improvement of the former.

The fineſt group of buildings of the above deſcription, perhaps, in the world, is that which Piſa preſents to the contemplation of the traveller in her cathedral, and its attendant edifices, the baptiſtry, the belfry, and the cemetery. The cathedral is the grandeſt, as it is the moſt ancient; it was begun in the middle, and finiſhed before the end of the 11th century. We ſhall reſtrict ourſelves to a deſcription of the campanile or belfry, which is the celebrated leaning tower of Piſa. It ſtands at the end of the cathedral, oppoſite to the baptiſtry, and conſiſts of eight ſtories, formed of arches ſupported by pillars, and divided by cornices. The elevation of the whole is about 180 feet. The form and proportion of this tower are graceful, and its materials, being of the fineſt marble, add to its beauty; but its grand diſtinction, which alone gives it ſo much celebrity, is a defect which diſparages the work, though it may enhance the ſkill of the architect, and by its novelty forcibly arreſt the attention; we allude to its inclination, which exceeds fourteen feet from the perpendicular. Many aſcribe this architectural phenomenon to deſign, and this is now the generally received opinion. The quantity of marble contained in the four immenſe edifices above-mentioned, and the number of pillars employed in their decoration, are truly aſtoniſhing. It does not appear that they belonged to any edifices in this city or its vicinity. They may have been imported by the Piſan gallies in their triumphant returns from Majorca, Sardinia, Corſica, Carthage, Sicily, and Naples, and may perhaps be conſidered rather as monuments of the victories of this once powerful republic, than as remains of its municipal magnificence under the Romans. Although the ſtyle of this group of edifices has been called Gothic, it is, in fact, a compoſite ſtyle formed of Roman orders, corrupted and intermingled with Saracenic decorations. Piſa has ſeveral other churches, beſides the cathedral, that are magnificent and much admired. Its baths are about four miles from the city, and ſpring up at the foot of "Monte St. Giuliano;" they were frequented anciently, perhaps, more than at preſent. The remains of an ancient aqueduct may be ſeen at a little diſtance, but they are eclipſed by a modern one of 1000 arches, erected originally in order to ſupply Piſa, and now carried on to Leghorn. The univerſity of Piſa was one of the nurſeries of reviving literature, and under the auſpices of republican liberty, rivalled the moſt celebrated academies in Italy, when they all teemed with genius and ſcience. Upon the ſubjugation of Piſa to the Florentines, it ſunk into inſignificance; but it was afterwards reſtored by Lorenzo de Medici: it again declined, and was reſtored by the grand duke Coſmo I. Since that period it has continued the ſeat of many eminent profeſſors, though it has never regained the number of its ſtudents, or all its ancient celebrity. It has more than forty public profeſſors, who are reſident, and men of high reputation in their reſpective departments. It is well furniſhed with all the apparatus of an academy;—colleges, libraries, an obſervatory, with all the aſtronomical inſtruments in great perfection, and an extenſive, well-ordered botanical garden. Piſa is, indeed, the ſeat of Tuſcan education, and frequented by the ſubjects of the Florentine government.

Piſa is only four miles from the ſea; its port was anciently at the mouth of the Arno, and a place of ſome fame and reſort. It thus gave its name to a bay which extended from the promontory of Populonia, now Piombino, to that of Luna or of Venus, Porto de Venere, and was called the "Sinus Piſanus." According to Strabo, the Auſar flowed into the Arno at Piſa, though it now falls into the ſea at the diſtance of at leaſt ten miles from it. Piſa and Leghorn are connected by a canal, 16 Italian miles in length; 42 miles W. of Florence. N. lat. 43° 42′. E. long. 10° 15′.

PISAN, Ikan, in *Ichthyology*. See Centriscus *Scutatus*.

PISANG, in *Geography*. See Pulo *Piſang*.

PISANIA, called alſo *Kuttijar Factory*, a town of Africa, in the kingdom of Yani, ſituated on the banks of the river Gambia, about 200 miles from its mouth, where the Engliſh have eſtabliſhed a factory. N. lat. 13° 35′. W. long. 13° 28′. This was the outſet of Mr. Park's journey for diſcoveries in Africa, under the direction of the African Aſſociation, and the reſidence of Dr. Laidley, who deſerves mention on account of his kind and hoſpitable treatment of the adventurous traveller, whom he received into his houſe, and attended for many weeks during a ſerious illneſs; and whom he furniſhed with every neceſſary for his journey, when he was diſappointed of the goods requiſite for his expences, taking bills upon the Aſſociation for the amount. From Piſania, Mr. Park proceeded eaſtward to Medina, the capital of Wolli, and thence to the E.N.E. through the countries of Bondou, Kajaaga, and Kaſſon, the two latter of which are ſeparated by the river Senegal. In his way, he took obſervations of latitude at Kolor (N. lat. 13° 49′), Koorkoorany (13° 53′), and Joag (14° 25′. W. long. 9° 37′), on this ſide the river. From Joag he proceeded to Kooniakarry (14° 34′), and from Kooniakarry by Kanjee (14° 10′), both in the country of Kaſſon, and Feſſurah (14° 5′) in Kaarta, to Jarra (15° 5′, long. 7° 13′), in the country of Ludamar. Here he was plundered of his ſextant, which accident of courſe put an end to his obſervations of latitude; and thus, unfortunately, left the remaining half (very nearly) of his geography in a ſtate of uncertainty as to parallel. Mr. Park purſued his journey from Jarra by Waſſiboo (14° 49′, and 95 geographical miles E. of Jarra), Diggani (lat. 14° 17′, and 266.1 geographical miles E. of Jarra), to Sego, the capital town of Bambara (lat. 14° 10′ 30″, and long. 2° 26′ W. of Greenwich.) Having at length reached the banks of the long ſought for river Niger (or Joliba), near which the city of Tombuctoo ſtands, Mr. Park proceeded along it ſeveral days' journey towards this city, on a courſe, which places Silla, the extreme point of his expedition, in lat. 14° 48′, and long. by reckoning corrected 1° 24′ W. of Greenwich. Here then terminates his journey eaſtward, at a point ſomewhat more than 16° E. of Cape Verd, and preciſely in the ſame parallel. Jinné, a large town, lies two ſhort journies below Silla and Tombuctoo, twelve ſtill lower down; and it would appear that all the journies were conceived to be ſhort, as Mr. Park allows only 200 geographical miles for the aggregate of the fourteen journies of the caravan. (See Tombuctoo.) For other particulars we refer to Proceedings of the Aſſociation for promoting the Diſcovery of the Interior Parts of Africa; containing an abſtract of Mr. Park's Account of his Travels and Diſcoveries, abridged from his own Minutes, by Bryan Edwards, eſq.—Alſo, Geographical Illuſtrations of Mr. Park's journey, and of North Africa at large, by Major Rennell, 1798.

PISAQUA, a town of Peru, in the dioceſe of Arequipa, on the coaſt; 40 miles S. of Arica.

PISATELLO, a river of Italy, which riſes in the department of the Rubicon or Rouagna, and being joined by two other ſtreams, runs into the Adriatic, between Rimini and Cervia. See Rubicon.

PISCA Pignatara, a town of Naples, in the county of Moliſe; 15 miles N.W. of Moliſe.

PISCADORE Islands, a cluſter of iſlands in the North Pacific ocean. N. lat. 11° to 11° 20′. W. long. 192° 30′ to 193°.

PISCADORES, or Fishers, two huge rocks on the coaſt of Peru, near the broken gap between Attico and Ocona. S. lat. 16° 48′.

Piscadores. See Pong-hu.

Piscadores, ſix rocks near the coaſt of Peru; 5 leagues N.N.W. of Callao. S. lat. 12° 14′.

PISCARY, Piscara, in our *Ancient Statutes*, the liberty of fiſhing in another man's waters.

This differs from a free fiſhery, which is an excluſive right: in this laſt the man has a property in the fiſh before they are caught; in a common of piſcary, not till afterwards.

PISCATAQUA, or Pascataqua, in *Geography*, the only large river whoſe courſe is in New Hampſhire, riſing in a pond in the N.E. corner of the town of Wakefield, and purſuing a general S.S.E. courſe of about 40 miles to the ſea. It divides New Hampſhire from York county, Maine, and is called Salmon Fall river from its head to the lower Falls at Berwick, where it aſſumes the name of Newichawannock, which it bears till it meets with Cocheco river, which comes from Dover, when both run together in one channel to Hilton's Point, where the weſtern branch meets it; from this junction to the ſea the river is ſo rapid, that it never freezes. At the lower falls in the ſeveral branches of the river are landing places, whence lumber and other country produce are tranſplanted, and veſſels and boats from below diſcharge their lading. This river, by its form, and the ſituation of its branches, is very favourable to the purpoſes of navigation and commerce. A light-houſe ſtands at the entrance of Piſcataqua harbour, in N. lat. 43° 41′, and long. 70° 41′.

PISCATAWAY, a townſhip of New Jerſey, in Middleſex county, on Rariton river, ſix miles from its mouth. In 1810 it had 2475 inhabitants; three miles and a half N.E. of New Brunſwick.—Alſo, a ſmall poſt-town of Prince George's county, Maryland, on the creek of its name which runs W. into Patowmac river, oppoſite to mount Vernon in Virginia, and 14 miles S. of Waſhington. The town is 16 miles S.W. of Upper Marlborough.

PISCES, in *Aſtronomy*, the twelfth ſign, or conſtellation of the zodiac.

The ſtars in Piſces, in Ptolemy's Catalogue, are 38; in Tycho's, 36; in Hevelius's, 39; in the Britannic Catalogue, 113. See Constellation.

Pisces, in *Natural Hiſtory*, is the name of the fourth of the claſſes into which Linnæus has diſtributed the animal kingdom; and the ſcience treating of the orders, genera, ſpecies, &c. of this claſs, is denominated *Ichthyology*. From this word we referred to the preſent article, meaning to give a very brief ſketch of the ſcience, ſo much having been already ſaid of the ſtructure, the anatomy, and functions of fiſhes under the article Fish, to which we refer our readers for abundant of intereſting information on the ſubject.

The element in which fiſhes live prevents us from following their motions with exactneſs, from coming to any very accurate knowledge of their habits and inſtincts, and from noting with fidelity their ſpecific differences. Their colours, which ſometimes are very brilliant, frequently vary, with the accidental circumſtances of age, ſex, climate, ſeaſon, &c., and often vaniſh by expoſure to air, or with the principle of life. Hence the natural hiſtory of fiſhes has ever been involved in greater obſcurity than that of land animals, which are more readily ſubjected to the inveſtigation of the learned and curious. Hence the earlier writers on this ſubject, as Ariſtotle, Pliny, and Ælian, have mingled as much fable as truth in their accounts, ſo that they afford few facts that can be depended upon in a ſcientific point of view. The claſſical reader may, however, derive entertainment and ſome inſtruction from a peruſal of their books, with the comments of the learned upon them. Athenæus alſo diſcourſes of fiſhes in the ſeventh book of his Deipnoſophiſtæ, as does Oppian in his Halieuticon, a Greek poet, who flouriſhed under the reign of Caracalla. (See Oppian.) Auſonius, a native of Bourdeaux, in the fourth century, in his poem on the river Moſelle, has not paſſed its inhabitants unnoticed. In the dark and middle ages, no writer of note appeared in this department of natural hiſtory. The firſt perſon who laid the foundation of ichthyological arrangement was Pierre Belon, a French phyſician, who flouriſhed in the ſixteenth century, and who is known by his travels in Judea, Greece, and Arabia, as well as by his writings in natural hiſtory. Some of his diviſions are deduced from natural reſemblances, but others are more fanciful. Belon was an induſtrious and acute obſerver, and will be deſervedly held in eſtimation when it is conſidered how few the reſources were of which he could avail himſelf. (See Belon.) His hiſtory of fiſhes appeared in 1551; that of his countryman Rondelet was publiſhed three years afterwards, and exhibited more accurate deſcriptions, and better executed figures, with many excellent remarks, the reſult of his own obſervation. He had the merit of exciting a general taſte for the ſtudy of ichthyology, and was rapidly followed by Salviani, Boſſueti, Conrad Geſner, Piſon, &c.

Aldrovandus, in 1605, who publiſhed a large compilation of Natural Hiſtory, diſtributed the fiſhes according to the nature of their reſidence: thus he treats, in his *firſt* book, of thoſe that frequent rocks; in the *ſecond*, of thoſe that live cloſe to the ſhores, &c. The labours of this naturaliſt, and of others in the ſame department, were eclipſed by thoſe of Willoughby, whoſe work, entitled "De Hiſtoria Piſcium," was printed at Oxford in 1686, and unfolded many new and accurate notions relative to the anatomy and phyſiology of fiſhes. His arrangement may be conſidered as an improved modification of that of Belon. Ray publiſhed, in 1707, his "Synopſis Methodica Piſcium," which may be regarded as an abridged and corrected view of Willoughby's larger work, and as indicating, rather than fixing, a ſeries of genera. This valuable deſcriptive catalogue continued to be appealed to as a ſtandard, till Artedi and Linnæus effected important changes in the ſcience of ichthyology. The former of theſe died before he could mature the plan on which he was engaged, and Linnæus, his friend and coadjutor, put the finiſhing hand to his papers, and then publiſhed them in two vols. 8vo. under the titles of "Bibliotheca Ichthyologica," and "Philoſophia Ichthyologica," which in 1792 were republiſhed in four vols. On this account we may aſcribe to Artedi the merit of having firſt traced the outlines of that claſſification of fiſhes which is now generally received among the ſtudious and learned in Europe. He firſt inſtituted the orders and genera, and defined the characters on which theſe diviſions are founded. Independently of the cetaceous tribes, which are now claſſed with the Mammalia, the method of Artedi conſiſted of four great diviſions, *viz.* 1. The *Malacopterygian*, which denoted thoſe fiſhes which have ſoft fins, or fins with bony rays, but without ſpines: this order included 21 genera. 2. The *Acanthopterygian*, or thoſe with ſpiny fins, containing 16 genera. 3. The *Branchioſtegous*, which correſponds to the *amphibia nantes* of Linnæus, which want the operculum, or branchioſtegous membrane; and 4. The *Chondropterygian*, which anſwers to that part of the amphibia nantes, which have not true bones, but only cartilages, and the rays of whoſe fins ſcarcely differ from a membrane. In the firſt edition of the Syſtem of Nature, Linnæus wholly adopted the method of Artedi, but more reflection led him to thoſe changes which he afterwards adopted, and which he matured into that luminous and beautiful ſyſtem, of which we have ſo greatly availed ourſelves in the courſe of this work.

We may, before we mention the ſyſtem of Linnæus as it now ſtands, obſerve, that other perſons of great learning, of deep reſearch, and accurate obſervation, have propoſed different modes of arrangement, but when they have gone contrary to the method of the Swediſh naturaliſt they have uſually been deficient in ſimplicity. Thus Klein, who attempted to rival him, diſtributed fiſhes into three ſections, according as they had lungs, and viſible or inviſible gills; but his ſub-diviſions were ſo numerous and complex, that his ſcheme has never been adopted. That of Gronovius, which laſted but a few years, was founded principally on the preſence or abſence, and the number or the nature of the fins. The firſt claſs includes all the cetaceous animals, and the ſecond all the fiſhes properly ſo called. The chondropterygian, and the oſſeous or bony, form two great diviſions, and the oſſeous are ſub-divided into branchioſtegous and branchial. Theſe laſt are grouped according to the Linnæan rules, but in the formation of the genera, the number of the dorſal fins is admitted as a character. Brunnich laboured, but unſucceſsfully, to combine the original method of Artedi with the improved one of Linnæus. Scopoli ſtruck out a new path, and aſſumed the poſition of the *Anus* as the baſis of his three primary diviſions; and his ſecondary characters ſometimes coincided with thoſe of Gronovius, and ſometimes with thoſe of Linnæus; while his third ſeries of diſtinctions was drawn ſometimes from the form of the body, and ſometimes from the teeth. Another ichthyologiſt, Gouan, the profeſſor of botany at Montpelier, preſerved the Linnæan genera, but formed his greater diviſions from the union of thoſe of Linnæus and Artedi. His chief ſections are of fiſhes with *complete*, and of thoſe with *incomplete* gills. The firſt of theſe is divided into two others, *viz.* *Acanthopterygian*, and *Malacopterygian*, in each of which are arranged the apodal, the jugular, and abdominal ſpecies; and a ſimilar proceſs is followed in the ſecond ſection, which includes the *Branchioſtegous* and the *Chondropterygian*. All the authors to which we have thus briefly referred, excepting Belon, Rondelet, and Gronovius, publiſhed their works without any regular ſeries of plates illuſtrative of their deſcriptions; but there are others who have embelliſhed their volumes with very valuable figures, among whom is Seba, in his collection of ſubjects belonging to natural hiſtory; Cateſby, in his Natural Hiſtory of Carolina; Brouſſonet, in his Ichthyologia; and Bloch, in his Natural Hiſtory of Fiſhes, firſt publiſhed at Berlin in German, and afterwards reprinted in French in 1785, forming a part of the Hiſtoire Naturelle de Buffon. The original work of Bloch included about 600 ſpecies of fiſhes, which are generally deſcribed with accuracy, and figured according to the beſt means which he poſſeſſed, of the natural ſize, and beautifully coloured. In the hiſtorical departments he dwells with minuteneſs on thoſe that afford food for man, or which ſuggeſt facts worthy of remark. He followed the Linnæan method, and made conſiderable additions to the number of genera. La Cépéde, the friend and continuator of Buffon, has executed an elaborate and extenſive work on the natural hiſtory of fiſhes. This claſs of animals he divides into two ſecondary claſſes, *viz.* the cartilaginous and the oſſeous; each of theſe conſiſts of four diviſions, taken from the combinations of the preſence or abſence of the operculum, and of the branchial membrane: thus, according to this ſyſtem, the firſt diviſion of the cartilaginous includes thoſe fiſhes which have neither operculum nor branchial membrane; the ſecond, which have no operculum, but a membrane; the third, which have an operculum, but no membrane; and the fourth, thoſe that have both. The ſame characters, ſtated in an inverſe order, determine the diviſions of the oſſeous ſpecies. Each of theſe diviſions is again diſtributed into the Linnæan orders, and theſe in their turn are divided into the Linnæan genera, though the latter do not always correſpond exactly to thoſe of the Swediſh naturaliſt.

According to the Linnæan ſyſtem of ichthyology, as it is now arranged, and which is generally followed in the New Cyclopædia; the fins of fiſhes are named from their ſituation on the animal, *viz.* the *dorſal* or back-fin; the *pectoral* or breaſt-fins; the *ventral* or belly-fins; the *anal* or vent-fin; and the *caudal* or tail-fin. The *ventral-fins* are conſidered by Linnæus as analogous to feet in quadrupeds, and it is from the ſituation, preſence, or abſence of theſe fins, that he inſtituted the firſt four orders of fiſhes; the other two orders were formed from the nature of their *gills:* thus,

Orders.

I. Apodes are fiſhes entirely deſtitute of ventral fins.

II. Jugulares are fiſhes that have the ventral fins *before* the pectoral.

III. Thoracici are fiſhes that have the ventral fins *under* the pectoral.

IV. Abdominales are fiſhes that have the ventral *behind* the pectoral.

V. Branchioſtegous are fiſhes whoſe *gills* are deſtitute of bony rays.

VI. Chondropterygious are fiſhes whoſe *gills* are cartilaginous.

The *generic* character is taken from the ſhape of the body, the covering, ſtructure, figure, and parts of the head, but principally from the branchioſtegous membrane (ſee Fish); and the *ſpecific* character is taken from the cirri, jaws, fins, ſpines, lateral line, digitated appendages, tail, and colour.

In more modern ſyſtems of ichthyology, the laſt two orders in the Linnæan ſyſtem are included in the order Piſces cartilagenei, or cartilaginous fiſhes, which differ from others in having a cartilaginous inſtead of a bony ſkeleton. (See Cartilaginous *Fiſhes*.) This method is adopted in Dr. Shaw's very inſtructive and entertaining work, entitled "General Zoology," to which our readers are referred.

Mr. Pennant, "in his Britiſh Zoology," deſcribes the fiſhes under the three great diviſions of *cetaceous*, *cartilaginous*, and *bony*. The latter, which is by far the moſt numerous, he ſub-divides into four ſections, *viz.* the *apodal*, *thoracic*, *jugular*, and *abdominal*.

PISCH, in *Geography*, a river of Poland, which runs into the Narew, near Pultuſk, in the duchy of Warſaw.

PISCHMA, a river of Ruſſia, which runs into the Tura, near Tiumen.

PISCHSTEIN, a town of Pruſſia, in Ermeland; 11 miles S.E. of Heilſberg.

PISCIDIA, in *Botany*, from *piſcis*, a fiſh, and *cædo*, to ſlay or deſtroy, becauſe it is uſed for the purpoſe of intoxicating fiſh, ſo that they are eaſily caught.—Linn. Gen. 367. Schreb. 486. Willd. Sp. Pl. v. 3. 909. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 4. 253. Juſſ. 358. Lamarck Illuſtr. t. 605.—Claſs and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, bell-ſhaped, with five teeth; the two uppermoſt neareſt each other. *Cor.* papilionaceous. Standard aſcending, emarginate. Wings equal to it in length. Keel creſcent-ſhaped, aſcending. *Stam.* Filaments ten, united into a ſheath ſplit along its upper ſide; anthers oblong, incumbent. *Piſt.* Germen ſuperior, ſtalked, compreſſed, linear; ſtyle thread-ſhaped, aſcending; ſtigma acute. *Peric.* Legume ſtalked, linear, with four longitudinal membranous angles, of one cell, ſeparated into ſeveral diviſions by a kind of plaits. *Seeds* few, nearly cylindrical.

Eſſ. Ch. Stamens all connected. Stigma acute. Legume with four wings.

1. P. *Erythrina.* Jamaica Dog-wood, or Fiſh-bean. Linn. Sp. Pl. 993. Willd. n. 1. Ait. n. 1. Jacq. Amer. 209. Swartz Obſ. 276. (Piſcipula Erythrina; Leoffl. It. 275. Ichthyomethia n. 1; Browne Jam. 296. Pſeudo-acacia, ſiliquis alatis; Plum. Ic. 229. t. 233. f. 2. Coral arbor, &c.; Sloane Jam. v. 2. t. 176.)—Leaves pinnate; leaflets ovate.—Native of the Weſt Indies. By road ſides in Jamaica, on dry chalky hills. The bruiſed leaves and branches being thrown into water where there are fiſh, the latter become ſo intoxicated as to be eaſily taken by the hand, as they float on the ſurface. Many other Weſt Indian plants poſſeſs the ſame property. *Jacquin.* (See Phlomis.) A large ungraceful *tree*, twenty-five feet high, eaſily recogniſed at a diſtance by its irregular and ſingular form of growth. *Leaves* alternate, deciduous, pinnate with an odd leaflet; large, downy, the leaflets ovate, or rather obovate, entire. *Cluſters* numerous, erect, many-flowered, lateral or terminal. *Flowers* white, the ſize of a common peaſe-bloſſom. They come out in March and April, before the leaves. *Legume* four or five inches long, with very broad wings.—*P. carthaginenſis*, Jacq. Amer. 210. Linn. Sp. Pl. 993. Willd. n. 2, for which Pluk. Phyt. t. 214. f. 4. is quoted, appears evidently to be merely a variety, with more obovate *leaves*. Jacquin cites for this the above figure of Plumier, which other authors make *P. Erythrina*.

2. P? *punicea*. Scarlet Fiſh-bean. Cavan. Ic. v. 4. 8. t. 316. Willd. n. 3.—Leaves abruptly pinnate; leaflets obtuſe.—Native of South America. It has borne flowers and ſeed in the garden of Madrid. The *ſtem* is ſhrubby, four or five feet high. *Leaves* alternate, of numerous, uniform, ſmooth, elliptical leaflets, each about an inch long, glaucous beneath. *Cluſters* axillary, drooping, ſimple, ſolitary. *Flowers* crimſon, the ſize of the foregoing. *Legume* pointed, with narrow wings. Cavanilles deſcribes the *ſtamens* as perfectly diadelphous, an exception to the generic character; and this circumſtance, added to the abruptly pinnate *leaves*, and whole habit, make it probable that the plant is a *Robinia*. The ſame may be preſumed of *P. longifolia*,

folia, Willd. n. 4. (Æſchynomene longifolia; Cavan. Ic. v. 4. 8. t. 315.) This is a native of New Spain, and has alſo flowered at Madrid. The habit is very like the *punicea*, but the *leaflets* are acute, and *flowers* yellow. *Legume* not obſerved by Cavanilles.

Piscidia, in *Gardening*, furniſhes plants of the exotic tree kind, of which the ſpecies cultivated are the Jamaica dogwood tree (P. erythrina); and the Carthaginian piſcidia (P. carthaginienſis).

Method of Culture.—Theſe plants are capable of being increaſed by ſeeds, when they can be obtained freſh from the countries where they grow naturally. They ſhould be ſown upon a good hot-bed in the ſpring, and when the plants come up and are fit to tranſplant, be each planted in a ſmall pot filled with light earth, and plunged into a hot-bed of tanners' bark, and afterwards treated in the ſame way as the other tender exotics of the ſame kind.

They afford variety in the ſtove.

PISCINA, in *Antiquity*, a large baſon in an open public place or ſquare, where the Roman youth learnt to ſwim: and which was ſurrounded with a high wall, to prevent the caſting of filth into it.

The word is formed from the Latin *piſcis*, *fiſh*; becauſe men here imitated fiſhes in ſwimming, and becauſe fiſhes were actually kept in ſome of theſe places.

Piscina was alſo uſed for the ſquare baſon in the middle of a bath.

Piscina *probatica* was a pool or reſervoir of water, near the court of Solomon's temple; ſo called from the Greek προβατον, *ſheep*; becauſe here they waſhed the cattle, which were deſtined for ſacrifice.

By this piſcina it was, that our Saviour wrought the miraculous cure of the paralytic. Davilier obſerves, there are ſtill remaining five arches of the portico, and part of the baſon of this piſcina.

Piscina, or *lavatory*, among the Turks is a large baſon placed in the middle of the court of a moſque, or under the porticos that encompaſs it.

Its form is uſually a long ſquare. It is built of ſtone or marble, furniſhed with a great number of cocks, wherein the Muſſulmans waſh themſelves before they offer their prayers; as being perſuaded, that ablution effaces ſin.

Piscina, the perforated ſtone uſually found in a niche on the right hand ſide of the altar in our ancient churches and chapels, into which the water uſed in waſhing the hands of the officiating prieſts and other ſacred ablutions was caſt.

Piscina, in *Geography*, a town of Naples, in Abruzzo Ultra, the ſee of a biſhop; 18 miles S. of Aquila.

PISCIOTA, a town of Naples, in Principato Citra; 16 miles W. of Policaſtro.

PISCIPULA, in *Botany*. See Piscidia.

PISCIS, in *Ichthyology*. See Fish.

Piscis *Auſtralis*, in *Aſtronomy*. See Australis.

Piscis *Foſſilis*, in *Ichthyology*, a name given by Johnſton to a kind of the cobitis, found buried in the ſand, and dug out by the people in many parts of Germany for food. It is called by many authors the *muſtela foſſilis*, and by ſome the *pœcilia*. It is properly a ſpecies of cobitis, and is called by Artedi the *blueiſh cobitis*, with five longitudinal black lines on each ſide of the body. See Cobitis.

Piscis *Sancti Petri*, a name given by Jovius and ſome other authors to the *faber* or *John Doree*. It is properly a ſpecies of *zeus*.

Piscis *Volans*, the *Flying Fiſh*, in *Aſtronomy*, is a ſmall conſtellation of the ſouthern hemiſphere, unknown to the ancients, and inviſible to us in theſe northern regions. See Constellation.

PISCIVOROUS Animals are ſuch as feed on fiſh. See Bird.

PISÇO, in *Geography*, a town of Peru, in the archbiſhopric of Lima and juriſdiction of Iça, Piſco, and Naſca, formerly ſituated on the coaſt of the South ſea, but now a quarter of a league from it. An inundation of water, occaſioned by an earthquake, in October 1682, deſtroyed the old town, the ruins of which are ſtill viſible. The whole town contains about 300 families, moſt of whom are Meſtizoes, Mulattoes, and Blacks; the whites being the ſmalleſt number. The road of Piſco is ſufficiently ſpacious to accommodate a royal navy, and ſheltered from the uſual winds, which are thoſe between the S.W. and S.E.; 110 miles S.S.E. of Lima. S. lat. 13° 55'. W. long. 76°.

Pisco, a town of European Turkey, in Moldavia, on a lake; 85 miles S. of Jaſſi. N. lat. 45° 45'. E. long. 27° 38'.

Pisco *Pagani*, a town of Naples, in the province of Baſilicata; ſeven miles N.W. of Muro.

PISCOBAMBA, a town of South America, in the juriſdiction of Guamalies.

PISCOPIA, or Tilo, a ſmall iſland in the Mediterranean; 16 miles N.W. of Rhodes. This iſland lies nearly in the middle of the interval which ſeparates the iſle of Rhodes from that of Stancho; and is ſomewhat larger than Limonia and Narki. It has a tolerably good harbour, and ſeveral anchorages, which are uſeful accommodations for ſhips that frequent theſe ſeas. The ancients called it Telos, and they highly eſteemed the perfumes which were there prepared. This branch of trade is loſt; but it proves the goodneſs of the ſoil of Piſcopia, and the mildneſs of its climate; circumſtances the moſt favourable to the expanſion of the ſweet odour of plants and flowers. N. lat. 36° 34'. E. long. 27° 9'.

Piscopia, or *Epiſcopi*, a town of the iſland of Cyprus, near a river anciently called "Lycus." In its vicinity are ſome magnificent ruins, ſuppoſed to be thoſe of the ancient city of Curias. The environs furniſh cotton and fruit trees in abundance.

PISDRI, a town of the duchy of Warſaw; 22 miles S. of Gneſna.

PISE', a term applied to a peculiar mode of forming buildings of different kinds, but more eſpecially thoſe deſigned for farm purpoſes, with ſome ſort of ſtiff earthy materials of a loamy quality. It is an eaſy, economical, and convenient method, which had its riſe on the continent, and which has been had recourſe to, for ſome time, in ſome parts of this kingdom, as in Bedfordſhire, Lancaſhire, &c. See below.

Pisé, *Building in*, in *Rural Economy*, the name of a method of building with loamy or other earthy matters, which has long been practiſed with great ſucceſs, and in a very cheap manner, in ſome departments of France, and which is now had recourſe to with ſimilar advantage in ſome parts of this country. It has been deſcribed, delineated, and recommended by Mr. H. Holland in the firſt volume of Communications to the Board of Agriculture, and is to be managed ſomewhat in the manner directed below.

Sorts of Implements neceſſary for.—In this ſort of work, in addition to the common tools, ſuch as ſpades, trowels, baſkets, watering pots, a plumb rule, hatchet, hammer, and nails, a mould and rammer are likewiſe required. The following are the different conſtituent parts. In the plate on piſé buildings and implements, *fig.* 1. is an outſide view of the mould; *fig.* 2, inſide ditto; *fig.* 3, the head of the mould, ſeen without; *fig.* 4, the other face, ſeen within; *fig.* 5, wedges; *fig.* 6, a round ſtick termed the wall-gage ; *fig.* 7, poſt to be ſet upright, but ſeen flatwiſe, with its tenon ; *fig.* 8, the ſame on its back, alſo with its tenon ; *fig.* 9, joiſts in which the mortiſes are cut, ſeen flat ; *fig.* 10, the ſame, with the ſide and bottom ſeen ; *fig.* 11, a mould put together, all the parts ſeen, as well as a ſmall rope ; *fig.* 12, the rammer, or piſoir, for ramming the earth in mould ; *fig.* 13, the ſide view of the ſame on a large ſcale ; *fig.* 14, the plan of the inſtrument, ſeen on the top.

And in conſtructing the mould, it is adviſed to take ſeveral planks of light wood, each ten feet long, in order that the mould may be eaſy to handle ; deal is the beſt, as being leſs liable to warp, to prevent which the boards ſhould be ſtraight, ſound, well ſeaſoned, and with as few knots as poſſible. They ſhould be ploughed and tongued, and planed on both ſides. Of theſe planks, faſtened together with four ſtrong ledges on each ſide, the mould muſt be made two feet nine inches in height ; and two handles ſhould be fixed to each ſide, as at *figs.* 1 and 2. The head of the mould, which ſerves to form the angles of the building, muſt be made of two narrow pieces of wood, ploughed, and tongued, and ledged ; in breadth eighteen inches, and in height three feet ; and it ſhould be planed on both ſides, as at *figs.* 3 and 4, where it will be remarked, that this part of the mould diminiſhes gradually to the top, in order that the wall may be made to diminiſh in the ſame degree. It is added, that all the boards and ledges muſt be, after they are planed, ſomething more than one inch thick. And that the wedges, *fig.* 5, muſt be an inch thick, and from eight to twelve inches high ; and the gage, *fig.* 6, be cut in length equal to the thickneſs of the wall that is to be erected.

It is ſtill further ſtated, that the eight ledges which are neceſſary to ſecure the two large ſides of the mould, ſerve alſo to receive eight upright poſts, ſtanding on four joiſts. The poſts, *figs.* 7 and 8 in the plate, may be made either of wood ſawed ſquare, or of round wood of any kind ; ſo that one may uſe indifferently the ends of rafters, joiſts, ſmall trees, or their branches. Theſe poſts are to exceed the height of the mould by eighteen inches ; they muſt, therefore, be about five feet high, including their tenons (which ſhould be ſix inches long), and three by four inches wide. That part which is to bear againſt the ledges of the mould muſt be made flat and ſtraight, the other ſides need not be worked with ſo much truth. And the joiſts may be of the ſame ſort of ſtuff, three feet ſix inches long, three inches and a half broad, and three inches thick. On the broad part muſt be made the two mortiſes, as at *fig.* 9 in the plate, ten inches and a half long, and rather more than an inch wide, and at each end three inches and a half muſt be left beyond the mortiſes, ſo that the interval between them will be fourteen inches. Theſe dimenſions muſt be obſerved, in order that the two ſides of the mould may incline towards each other, and the thickneſs of the wall be gradually diminiſhed, till it is reduced to fourteen inches at the roof. Of courſe the dimenſions for the joiſts are theſe :

	ft.	in.
The two ends, remaining beyond the mortiſes, three inches and a half each -	0	7
The two mortiſes, ten inches and a half each -	1	9
The interval between the mortiſes -	1	2
Total length of the joiſt	3	6

It may be noticed, that the elevation of the whole machine is ſeen at *fig.* 11 in the plate ; and the following is a liſt of its ſeveral parts, enumerated in the ſame order that the workmen muſt follow, when they erect the mould on a wall. A, ſtone foundation, eighteen inches thick, on which the wall of earth is to be raiſed ; B, the joiſts placed acroſs the foundation wall; C, C, the two ſides of the mould, including between them three inches of the foundation wall ; D, D, the two upright poſts, the tenons of which fit into the mortiſes of the joiſt ; E, the wall-gage, which fixes the width of the mould at the top, and which is ſhorter than the width of the wall at the bottom, to regulate the diminution of the wall to be erected ; F, a ſmall cord, ſomething leſs than half an inch diameter, making ſeveral turns round the poſts ; G, a ſtick, which, by being wound round, faſtens the cord, and holds the poſts tight together ; H, H, wedges, which enter into the mortiſes in the joiſts, and keep the poſts and the mould firmly fixed againſt the wall. But though ſuch is the proceſs of erecting the mould, a contrary order muſt be obſerved in taking it to pieces. The rope muſt be looſened, the wedges taken out, and the poſts, the mould, and the joiſts removed, in order to refix the whole again. And the rammer with which the earth is rammed into the mould, is a tool of the greateſt conſequence, and on which the firmneſs and durability, in ſhort, the perfection of the work depends, and in making which more difficulty will be found than is at firſt apprehended. It ſhould be made of hard wood, either aſh, oak, beech, walnut, &c. or, what is preferable, the roots of either of theſe ſorts of wood.

And in regard to the nature of this ſort of work, it differs very eſſentially from that miſerable way of building with clay or mud mixed with hay or ſtraw, which is often ſeen in country villages ; it contains all the beſt principles of maſonry, together with ſome rules peculiar to itſelf. At *fig.* 15, in the plate, is repreſented the plan of a houſe, the building of which is regularly deſcribed according to this method. The foundation may be made of any kind of maſonry that is durable, and muſt be raiſed to the height of two feet above the ground ; which is neceſſary to ſecure the walls from the moiſture of the earth, and the ſplaſhing of the rain, which will drop from the eaves of the roof. When theſe foundation walls are made level, and eighteen inches thick, mark upon them the diſtances at which the joiſts are to be ſet for receiving the moulds ; thoſe diſtances ſhould be three feet each from centre to centre. Each ſide of the mould being ten feet long will divide into three lengths of three feet each, and leave ſix inches at each end, which ſerve to lengthen the mould at the angles of the houſe, and are uſeful for many other purpoſes. After having ſet the joiſts in their places, the maſonry muſt be raiſed between them ſix inches higher, that is, to a level with the joiſts ; here will, therefore, upon the whole, be a baſe of two feet and a half, which in moſt caſes will be found more than ſufficient to hinder the rain, froſt, ſnow, or damp, from injuring the walls. Raiſe the mould in the manner mentioned above, immediately on this new maſonry, placing it over one of the angles of the wall. The head of it, which is to be placed againſt the angle, ſhould have eighteen inches in breadth at the bottom, and only ſeventeen inches and a half at the top ; thus the ſides of the mould will incline towards each other, and produce that diminution in the thickneſs of the wall, which is uſual in buildings of this nature. The wedges muſt then be driven in, and the poſts well fixed by cords, and the head of the mould ſecured by iron pins, when the whole is ready for the workmen to begin their work.

In addition it is ſtated, that a workman ſhould be placed in each of the three diviſions of the mould, the beſt being placed at the angle. He is to direct the work of the other two, and by occaſionally applying a plumb-rule, to take care that the mould does not ſwerve from its upright poſition. The labourers who dig and prepare the earth muſt give it in ſmall quantities to the workmen in the mould, who, after having ſpread it with their feet, begin to preſs it with the rammer. They muſt only receive at a time ſo much as will cover the bottom of the mould to the thickneſs of three or four inches. The firſt ſtrokes of the rammer ſhould be given cloſe to the ſides of the mould, but they muſt be afterwards applied to every other part of the ſurface; the men ſhould then croſs their ſtrokes, ſo that the earth may be preſſed in every direction. Thoſe who ſtand next to one another in the mould ſhould regulate their ſtrokes ſo as to beat at the ſame time under the cord, becauſe that part cannot be got at without difficulty, and muſt be ſtruck obliquely; with this precaution the whole will be equally compreſſed. The man at the angle of the wall ſhould beat carefully againſt the head of the mould, and for the ſake of the appearance, or perhaps to increaſe the ſtrength of the building, it is uſual to ſpread every ſix inches high a layer of mortar near the head, in imitation of the joints of ſtone-work. Care muſt be taken, that no freſh earth is received into the mould till the firſt layer is well beaten, which may be aſcertained by ſtriking it with the rammer; the ſtroke ſhould leave hardly any print on the place. They muſt proceed in this manner to ram in layer after layer till the whole mould is full. When this is done, the machine may be taken to pieces, and the earth which it contained will remain firm and upright, about nine feet in length, and two feet and a half in height. The mould may then be replaced for another length, including one inch of that which has firſt been completed: the regular manner of joining the different lengths may be ſeen in the geometrical elevations in the plate at *fig.* 16, and more particularly at *fig.* 17, where it will be obſerved, by the letters A and B, that no joints are left in this work, as the different lengths are united, and made to preſs one on the other. In the ſecond length, and moſt of the following, the head of the mould is uſeleſs; it is only made uſe of at the angles. As ſoon as the workmen have gone round the whole building, taking the mould to pieces and putting it together again ſucceſſively, they ſhould begin upon the partition marked C in the ſame plate *fig.* 15, where the head of the mould muſt be uſed, as the door jambs are ſquared like the angles of the wall. The jamb next to the exterior wall, which is too narrow to be made of piſé, can eaſily be made of wood, brick, or ſtone. And the firſt courſe being thus completed proceed to the ſecond, and here it muſt be obſerved, that if in laying the firſt courſe the work begin with one angle, as the angle A, *fig.* 15, and proceed towards E, it muſt, for the ſecond courſe, begin with A, and proceed towards B, and ſo in each ſucceſſive courſe it muſt proceed in a direction contrary to that of the preceding. It may eaſily be conceived, that with this precaution the joints of the ſeveral lengths will be inclined in oppoſite directions, which will contribute very much to the firmneſs of the work. There is no reaſon to fear overcharging the firſt courſe with the ſecond, though but juſt laid; for three courſes may be laid without danger in one day; mark the grooves for receiving the joints in the firſt courſe, at the diſtance of three feet from one another, but not immediately over the former grooves, but over the middle points between them, as ſeen at *fig.* 17. in the plate. Theſe grooves muſt be cut with a pick-axe, and the ſecond courſe completed in the ſame manner as the former, except that it muſt proceed in a contrary direction, as was before obſerved, and that the head of the mould and wall-gage muſt be diminiſhed, in order that the ſame inclination of the ſides to one another that was given to the firſt courſe, may be preſerved in this ſecond. It muſt, however, be remarked, that this ſecond courſe is not to be continued without interruption like the firſt, as it is neceſſary that the partition-wall ſhould join or bond into the exterior wall; or rather, that all the walls in the building, whether outſide or partition-walls, which meet at an angle, ſhould croſs each other at every courſe. In purſuance, therefore, of this rule, when the work has been advanced from A to C, or perhaps not quite ſo far as C, leave the exterior wall, and turn the mould to the partition, applying the face of it to C. This will appear more clearly by the letter G, in the ſame plate *fig.* 17. When the work has been carried on along the partition-wall as far as the door, bring back the mould to the part which remained unfiniſhed in the exterior wall, marked C, at *fig.* 15. in the plate; and after having filled up that ſpace, carry the mould on beyond the partition-wall, and complete the courſe. The reaſon of the partition-wall on the ſide oppoſite to C, not being connected in the ſame manner with the interior wall, is that it ought to be made of wood or brick-work, and not of this material, but the third courſe muſt be carried over the door, and join into the wall, as above. It has been obſerved, that this deſcription of the two firſt courſes is equally applicable to all the others, and will enable any perſon to build a houſe, with no other materials than earth, of whatever height and extent he pleaſes to have it.

Beſides this, it may be remarked that the gables cannot be croſſed, as theſe are detached from one another; but as their height is ſo inconſiderable, and they are beſides connected together by the roof, this is not of any conſequence. They may be made without any difficulty, by merely making their inclination in the mould, and working the earth accordingly. It has been obſerved, that each courſe will be two feet and a half high, if the mould is two feet nine inches; for the mould muſt include three inches of the courſe beneath. For this reaſon the grooves are made ſix inches deep, though the joiſts are only three inches in thickneſs. If the directions which have been given for diminiſhing the thickneſs of the walls are obſerved, that thickneſs will be reduced to fifteen inches at the roof, in a houſe (like that of which a deſign is annexed) conſiſting of ſix courſes; for in each courſe there will be an inclination of half an inch. The gables might have been reduced to fourteen inches only in thickneſs, as an interval of fourteen inches only was left between the mortiſes of the joiſts: and by increaſing or diminiſhing that interval the thickneſs of the walls may be regulated at pleaſure.

It is noticed that in this mode of building, according to the account of the Rev. Mr. Jancour, as practiſed at Montbriſon, the capital of the Forêts in France, as tranſmitted to the Board of Agriculture, the earth is pounded as much as poſſible, in order to crumble any ſtones therein; clay is added thereto in a ſmall quantity, about one-eighth part. It is all beaten and mixed up together by repeated blows with a mallet about ten inches broad, ten or fifteen long, and two inches thick. The earth being thus prepared and ſlightly wetted, the foundation of the houſe is dug for; this is laid with ſtone, and when it is about one foot high above the ſurface of the ground, planks are arranged on each ſide, which are filled with the earth intended for the wall. It is ſtrongly beaten; and this method is continued ſucceſſively all round the building. The walls have more or leſs thickneſs, according to the fancy of the owner; he has ſeen them of ſix and of eighteen inches thick. Some builders interſperſe from ſpace to ſpace a thin layer of lime. If ſeveral ſtories are intended in ſuch erections, they do not fail to place beams to ſupport the floors before they build higher; the windows and doors are attended to in the ſame manner. Of ſuch buildings he never ſaw any conſiſting of more than two ſtories at moſt; generally they have but one beſides the ground-floor. When the building is thus finiſhed, it is left for ſome months to dry: then ſuch as wiſh to make the building more ſolid and durable, give it a rough-caſt coating on the outſide with lime and ſand.

And in regard to the manner of forming the openings for the doors and windows, they ſhould be left at the time of building the walls. This may be done by placing within the mould either two or one of the heads, (as repreſented *figs.* 3 and 4 in the plate,) as may be neceſſary, wherever the wall is to terminate and the opening commence. They ſhould be made ſloping a little, in order to leave room for the frames and ſaſhes. And the exterior decorations of the windows and doors are uſually made, by the rich, of ſtone or brick, and by the poor of wood, which latter have a bad effect on the appearance of the houſe, as wood will never unite well with piſé-work; and notwithſtanding the greateſt precautions, the exterior covering will break and fall off the wood; whereas ſtone or brick-work unite perfectly with the piſé, and retain their plaſter, and of courſe the paint, of which it forms the ground. The chimney-pieces of brick or ſtone are laid and united with the walls in the ſame manner as in common buildings; and the flues are alſo very firmly connected with them, being made of brick-work. But a very particular advantage is, that the apartments may be very handſomely finiſhed, without making any jambs to the inſide doors, either of ſtone, brick, or wood. The finiſhing of the earthen walls will make jambs unneceſſary, and it is not requiſite to be at the expence of any other finiſhing, as the doors may be hung on the grounds or wainſcot of the apartment, as may be found neceſſary.

The particular Nature of, and Manner of preparing the Earth.—It is further obſerved that beating, or compreſſion, is uſed in many different ſorts of work; the ancients employed it in making their rough walls; the Italians employ it for the terraces which cover their houſes; the Moors for all their walls; the Spaniards, the French, and others, for ſome of the floors of their apartments. The intent of the ancient architects, when they recommended the beating of cement, and other compoſitions uſed in building, was to prevent them from ſhrinking and cracking; and it is employed for the ſame purpoſe in the walls which are made of earth. The beater, by repeated ſtrokes, forces out from the earth the ſuperfluous water which is contained, and cloſely unites all the particles together, by which means the natural attraction of thoſe particles is made powerfully to operate, as it is by other natural cauſes, in the formation of ſtones. Hence ariſes the increaſing ſtrength and aſtoniſhing durability which houſes of this kind are found to poſſeſs. It is added that upon beating a ſmall portion of earth, and weighing it immediately afterwards, it was found to contain thirty-nine pounds and a half; fifteen days after it had loſt four pounds and a quarter; in the ſpace of another fifteen days it loſt but one pound; and in fifteen days after that its weight diminiſhed only half a pound. In the ſpace of about forty-five days the moiſture was completely evaporated, and its weight was diminiſhed about one-eighth; conſequently only one-eighth of the whole maſs was occupied by moiſture, and this ſmall proportion cannot at all affect the ſolidity and conſiſtency of the earth ſo treated. This experiment is alſo ſufficient to ſhew the difference between this kind of building, and that vulgar kind called in England "mud-walling;" the latter cannot be executed without adding a great deal of water, to ſoften the materials employed, which entirely deſtroys their conſiſtency; the water, which occupies a conſiderable ſpace in the mud, leaves, in evaporating, an infinite number of pores or little cavities, and thus the walls become weak and brittle, and incapable of ſupporting ſeveral ſtories, or ſuch ponderous weights as the beaten earth or piſé can ſuſtain.

And with regard to the quantity or height of walling of this ſort that may be done in one day, it is ſtated, that three courſes, of about three feet each, may be laid one over the other in the courſe of a day; ſo that a wall of earth, of about eight or nine feet, or one ſtory high, may be raiſed in the ſame time. Experience has proved, that as ſoon as the builders have raiſed their walls to a proper height for flooring, the heavieſt beams and rafters may, without danger, be placed on the walls thus newly made; and that the thickeſt timber of a roof may be laid on the gables of this ſort the very inſtant they are completed.

Further, on the proper ſorts of earth for this uſe, it is ſtated, that, 1ſt. All earths in general are fit for ſuch uſe, when they have not the lightneſs of poor lands, nor the ſtiffneſs of clay. 2dly. All earths fit for vegetation. 3dly. Brick-earths; but theſe, if they are uſed alone, are apt to crack, owing to the quantity of moiſture which they contain. This, however, does not hinder perſons who underſtand the buſineſs from uſing them to a good purpoſe. 4thly. Strong earths, with a mixture of ſmall gravel, which for that reaſon cannot ſerve for making either bricks, tiles, or pottery. Theſe gravelly earths are very uſeful; the beſt work of this ſort is made of them. And it is ſaid, that from the following marks may be known what earths are fitteſt to be employed by themſelves. When theſe have been deſcribed, it will remain to point out ſuch as muſt be mixed with others, in order that they may acquire the neceſſary quality. And the following appearances indicate that the earth in which they are found is fit for building: when a pick-axe, ſpade, or plough, brings up large lumps of earth at a time; when arable lands lie in clods or lumps; when field-mice have made themſelves ſubterraneous paſſages in the earth; all theſe are favourable ſigns. When the roads of a village, having been worn away by the water continually running through them, are lower than the other lands, and the ſides of thoſe roads ſupport themſelves upright, it is a ſure mark that the work may be executed in that village. One may alſo diſcover the fitneſs of the ſoil, by trying to break with one's fingers the little clods of earth in the roads, finding a difficulty in doing it, or by obſerving the ruts of the road in which the cart-wheels make a ſort of piſé by their preſſure: whenever there are deep ruts on the road, one may be ſure of finding abundance of proper earth. And proper earth is found at the bottom of the ſlopes, on low lands that are cultivated, becauſe every year the rain brings down the fat or good earth. It is frequently found on the banks of the rivers; but above all, it is found at the foot of hills where vines are planted, and of all cultivated lands which have much ſlope. In digging trenches and cellars for building, it generally happens that what comes out of them is fit for the purpoſe of this ſort of building. But as it may ſometimes happen that earth of a proper quality is not to be found on the ſpot where it is intended to build, it becomes of importance to attend to the method of mixing earths; for though the earth which is near at hand may not of itſelf be proper, it is very probable that it may be rendered ſo by the mixture of a ſmall quantity of another earth fetched from a diſtance. The principle on which a mixture muſt be made is very ſimple; ſtrong earths muſt be tempered with light; thoſe in which clay predominates, with others that are compoſed more of chalk and ſand; and thoſe of a rich, glutinous ſubſtance, with others of a poor and barren nature. The degrees in which theſe qualities of the earth prevail, muſt determine the proportions of the mixture ; which it is impoſſible here to point out for every particular caſe, but which may be learnt by a little practice. And it will not be amiſs to mix with the earth ſome ſmall pebbles, gravel, rubbiſh of mortar, or in ſhort any ſmall mineral ſubſtances ; but none of the animal or vegetable kind muſt be admitted. Such hard ſubſtances bind the earth firmly between them, and being preſſed and preſſing in all directions, contribute very much to the ſolidity of the whole ; ſo that well-worked earth, in which there is a mixture of gravel, becomes ſo hard at the end of two years, that a chiſſel muſt be uſed to break it, as if it was freeſtone, or other ſolid ſtone.

The following experiments are detailed in order to aſcertain the qualities of any earth.

Experiment 1.—Take a ſmall wooden tub or pail, without a bottom, dig a hole in the ground of a court or garden, and at the bottom of that hole fix a piece of ſtone, flat and level; place your tub upon the ſtone, fill around it the earth that has been dug out to make the hole, and ram it well, that the tub may be encloſed, to prevent its burſting. Then ram into the tub the earth you mean to try ; putting in, at each time, about the thickneſs of threee or four fingers' breadths ; when this is well rammed, add as much more, and ram it in the ſame manner, and ſo the third and fourth, &c. till the earth is raiſed above the brim. This ſuperfluous earth muſt be ſcraped off extremely ſmooth, and rendered as even as the under part will be, which lies on the ſtone. Looſen with a ſpade the earth round the tub, and you will then be able to take it out, and with it the compreſſed earth that it contains ; then turn the tub upſide down, and if it is wider at the top than at the bottom, as ſuch veſſels uſually are, the piſé will eaſily come out ; but if it ſhould happen to ſtick, let it dry in the air about twenty-four hours, and you will then find that the earth is looſe enough to fall out of itſelf. You muſt be careful to cover over this lump of piſé with a little board ; for though a ſhower of rain, falling in an oblique direction, will not injure it, yet it may be a little damaged, if the rain falls perpendicular, and eſpecially if it remains upon it. Leave the lump expoſed to the air, only covered with a board or flat ſtone, and if it continues without cracking or crumbling, and increaſes daily in denſity and compactneſs, as its natural moiſture decreaſes, you may be ſure that the earth is fit for building. But you muſt remember that it is neceſſary that the earth employed ſhould be taken from a little below the ſurface of the ground, in order that it may be neither too dry nor too wet : it muſt be obſerved alſo, that if the earth is not well preſſed around the outſide of the tube before it is filled, though the hoops were of iron, they would burſt, ſo great is the preſſure of the beaten earth againſt the mould, of whatever ſize it may be.

Experiment 2.—This trial may be made in the houſe. Having brought from a field the earth you want to try, preſs it in a ſtone mortar, with a peſtle of wood, braſs, or iron (the latter is beſt), or with a hammer ; fill the mortar above the edge, and then with a large knife, or ſome other inſtrument, take away the ſuperabundance of the earth even with the brim. If you find then that the earth will not quit the mortar, you muſt expoſe it to the ſun, or near a fire ; and when it is ſufficiently dry, it may be taken out without difficulty by turning the mortar upſide down on a flat ſtone, or the floor. It will have the ſhape of the mortar, and if expoſed as above directed, will ſhew the quality of the earth.

Experiment 3.—Preſs with the end of a ſtick, or cane, your earth in a little box, round which you had better firſt tie a piece of packthread, leſt it ſhould burſt in the operation ; when you have filled it above its brim, cut off the overplus with a knife ; you will undoubtedly be obliged to break the box to get it out, unleſs you had rather wait, and let it dry in the air, in the ſun, or before a fire. It will take the exact form of the box, be it round, ſquare, or oval ; if your earth be red, or any other colour, that which is encloſed in the box will ſtill remain the ſame. It is not improper to remark, that the colour of the earth neither adds to nor diminiſhes the goodneſs of the piſé, therefore every proprietor may be at eaſe on that head. Beſides, every perſon in walking on his ground, may make little balls of earth, and preſs them as tight as he can between his hands. If he brings them home and puts marks on them, he will by that means know the quality of every piece of land, and alſo be a judge of the mixture it will be neceſſary to make.

Further, in preparing the earth, all the operations are very ſimple and eaſy : there is nothing to be done but to dig up the earth with a pick-axe, break the clods with a ſhovel, ſo as to divide it well, and then lay it in a heap ; which is very neceſſary, becauſe as the labourers throw it on that heap, the lumps of earth and large ſtones roll to the bottom, where another man may break them, or draw them away with a rake. He muſt obſerve, that there ſhould be an interval of about an inch and a quarter between the teeth of the rake, that the ſtones and pebbles of the ſize of a walnut, or ſomething more, may eſcape, and that it may draw off only the largeſt. If the earth that has been dug has not the proper quality, which is ſeldom the caſe, and that it is neceſſary to fetch ſome better from a diſtance, then the mixture muſt be made in this manner : one man muſt throw one ſhovel full of the beſt ſort, while the others throw five or ſix of the inferior ſort on the heap, and ſo more or leſs, according to the proportion which has been previouſly aſcertained. No more earth ſhould be prepared than the men can work in one day, or a little more, that they may not be in want ; but if rain is expected, you muſt have at hand either planks, mats, or old cloths to lay over the heap of earth, ſo that the rain may not wet it ; and then as ſoon as the rain is over, the men may reſume their work, which, without this precaution, muſt be delayed : for it muſt be remembered, that the earth cannot be uſed when it is either too dry or too wet, and therefore if the rain ſhould wet it after it has been prepared, the men will be obliged to wait till it has recovered its proper conſiſtency ; a delay which would be equally diſadvantageous to them and their employer. When the earth has been ſoaked by rain, inſtead of ſuffering compreſſion, it becomes mud in the mould ; even though it be a little too moiſt, it cannot be worked : it ſwells under the blows of the rammer, and a ſtroke in one place makes it riſe in another. When this is the caſe, it is better to ſtop the work, for the men find ſo much difficulty, that it is not worth while to proceed. But there is not the ſame neceſſity of diſcontinuing the work when the earth is too dry, for it is eaſy to give it the neceſſary degree of moiſture ; in ſuch a caſe it ſhould be ſprinkled with a watering-pot, and afterwards well mixed together ; it will then be fit for uſe. It has already been obſerved, that no vegetable ſubſtances ſhould be left in the earth ; therefore in digging, as well as in laying the earth in a heap, great care muſt be taken to pick out every bit of root, great and ſmall, all ſprigs and herbs, all bits of hay and ſtraw, chips or ſhavings of wood, and in general every thing that can rot, or ſuffer a change in the earth after it has been prepared in this manner for uſe in building.

The Kind of Timber neceſſary.—It is ſtated that, in order to make good walls, it is not ſufficient that the earths be well beaten, but they muſt be well united together. In houſes of brick or ſtone, to conſolidate their parts, they make uſe of angles and binders of free-ſtone, and of iron braces, and cramp irons, which are very expenſive; but here the binders coſt very little; they conſiſt only of thin pieces of wood, a few cramps and nails, and theſe are ſufficient to give the greateſt ſtability to buildings of piſé. It is added, that the firſt courſe A, *figs.* 15 and 16 in the plate, being laid on the front and inner walls of a houſe, then begin the ſecond; and if, for the inferior courſe, the mould has been directed from A to E, it muſt, for this ſecond, be directed from A to F, as has been explained above. But before this ſecond courſe is begun, lay at the bottom of the mould a board about five or ſix feet long, reſting on the angle A, and extending lengthwiſe towards B. This board muſt be rough as the ſawyers have left it, ſomething leſs than an inch thick, and in breadth about eight, nine, or ten inches, ſo that there may remain on each ſide four or five inches of earth, if the wall is eighteen thick; by this means the board will be entirely concealed in the body of the wall. When thus placed, neither the air nor damp can reach it, and of courſe there is no danger of its rotting. This has often been proved by experience, as in taking down old houſes of piſé ſuch boards have always been found perfectly ſound, and many that had not even loſt the colour of new wood. It is eaſy to conceive how much this board, from the preſſure of the work raiſed above it, will contribute to bind together the two lengths A and B, and to ſtrengthen the angle A; but this is not all, it is uſeful (particularly when the earth is not of a very good quality) to put ends of planks into the piſé after it has been rammed about half the height of the mould. Theſe ends of planks ſhould be only ten or eleven inches long, to leave as before a few inches of earth on each ſide of the wall, if it is eighteen inches thick; they ſhould be laid croſswiſe (as the plank before-mentioned is laid lengthwiſe) over the whole courſe, at the diſtance of about two feet from one another, and will ſerve to equalize the preſſure of the upper parts of the works on the lower courſe of the piſé, or rammed earth. But theſe boards need only be placed at the angles of the exterior wall, and in thoſe parts where the courſes of the partition-walls join to thoſe of the exterior wall; the ſame directions that have here been given for the ſecond courſe, muſt be obſerved at each ſucceeding courſe, up to the roof. By theſe means, it is ſeen, an innumerable quantity of holders or bindings will be formed, which ſometimes draw to the right, ſometimes to the left of the angles, and which powerfully unite the front walls with thoſe of the partitions; the ſeveral parts deriving mutual ſupport from one another, and the whole being rendered compact and ſolid. Hence theſe houſes, made of earth alone, are able to reſiſt the violence of the higheſt winds, ſtorms, and tempeſts. The height that is intended to be given to each ſtory being known, boards of three or four feet in length ſhould be placed before-hand in the piſé, in thoſe places where the beams are to be fixed, and as ſoon as the mould no longer occupies that place, the beams may be laid on, though the piſé be freſh made; little ſlips of wood, or boards, may be introduced under them, in order to fix them level. The beams thus fixed for each ſtory, the piſé may be continued as high as the place on which you intend to erect the roof of the building.

And beſide the uſe of this ſort of material in the building of houſes, it may be applied to the raiſing of walls for different ſorts of incloſures, as parks, gardens, yards, &c. in which the mould muſt be fixed in an angle, or againſt a building, if the wall is to reach ſo far, and the workmen muſt proceed from thence to the other extremity of the wall; and when they have finiſhed the firſt courſe, they muſt raiſe the mould to make the ſecond, returning to the place where they began the firſt. But when a very great incloſure is to be made, as for inſtance a park wall, then, for the ſake of ſpeed, it is neceſſary to ſet ſeveral moulds and men at work. In ſuch a caſe, a mould ſhould be placed at each end, and the number of men be doubled; they will work at the ſame time, and meet in the middle of the wall, where they will cloſe the firſt courſe; after which each ſet of men raiſe their mould to make the ſecond; and both ſetting out from the middle continue working, in oppoſite directions, towards the ends where they firſt began.

In this way houſes may be built, which are ſtrong, healthy, and very cheap; and which will laſt a great length of time, as the author ſays, he had pulled down ſome of them, which, from the title deeds in the poſſeſſion of the proprietors, appeared to be 165 years old, though they had been ill kept in repair. The rich traders of Lyons have, he obſerves, no other way of building their country-houſes. An outſide covering of painting in freſco, which is attended with very little expence, conceals from the eye of the ſpectator the nature of the building, and is a handſome ornament to the houſe. That method of painting has more freſhneſs and brilliancy than any other, becauſe water does not impair the colours. No ſize, oil, or expence is required, manual labour is almoſt all it coſts, either to the rich or poor. Any perſon may make his houſe look as ſplendid as he pleaſes for a few pence laid out in red or yellow ochre, or in other mineral colours. And he adds that ſtrangers, who have ſailed upon the Rhone, probably never ſuſpected that thoſe beautiful houſes which they ſaw riſing on the hills around them, were built of nothing but earth; nay, many perſons have dwelt for a conſiderable time in ſuch houſes, without ever being aware of their ſingular conſtruction. Farmers in that country generally have them ſimply whitewaſhed, but others, who have a greater taſte for ornament, add pilaſters, window-caſes, pannels, and decorations of various kinds.

Beſides, it is ſuggeſted that there is every reaſon for introducing this method into all parts of the kingdom; whether we conſider the honour of the nation as concerned in the neatneſs of its villages, the great ſaving of wood which it will occaſion, and the conſequent ſecurity from fire, or the health of the inhabitants, to which it will greatly contribute, as ſuch houſes are never liable to the extremes of heat or cold. It is attended with many other circumſtances that are advantageous to the ſtate, as well as to individuals. It ſaves both time and labour in building, and the houſes may be inhabited almoſt immediately after they are finiſhed; for which latter purpoſe the holes made for the joiſts ſhould not be cloſed up directly, for the air, if ſuffered to circulate through them, will dry the walls more ſpeedily. And the durability of this ſort of building is fully ſhewn by the ſtatement of the Rev. Mr. Jancour, who reſided at Montbriſon in France, where, he ſays, the church was the moſt remarkable in this ſtyle of building; it is about eighty feet long, forty feet broad, and fifty feet high; the walls built in *piſé* eighteen inches thick, and *crépé*, or rough-caſt on the outſide with lime and ſand. Soon after his arrival, the church, by ſome accident, was deſtroyed by fire, and remained unroofed for about a twelvemonth, expoſed to rains and froſt. As it was ſuſpected that the walls had ſuſtained much damage, either by fire or the inclemency of the ſeaſon, and might fall down, it was determined to throw them down partially, and leave only the lower parts ſtanding;

but even this was not done, he adds, without much difficulty, ſuch was the firmneſs and hardneſs theſe walls had acquired, the church having ſtood above eighty years; and all the repairs required, were only to give it, on the outſide, every twelve or fifteen years, a new coating of rough-caſt. And it is further remarked, that beſides the advantages of ſtrength and cheapneſs, this method of building poſſeſſes that of ſpeed in the execution. It is found that a maſon uſed to work, can, with the help of his labourer, when the earth lies near, build, in one day, ſix feet ſquare of the piſé. If two men can build, in one day, ſix feet ſquare, it is evident that ſix men, which is the neceſſary number to work the mould, (*viz.* three in the mould, and three to dig and prepare the earth,) will build, in the courſe of ſixteen days, or three weeks at moſt, ſuch a houſe as is ſeen in the plate, at *figs.* 15 and 16, containing 228 ſquare feet of wall; a very ſhort time therefore is ſufficient for a man to build himſelf a ſolid and laſting habitation. Theſe facts, which have been proved by numberleſs inſtances, afford a proportion by which every one may determine the time that his houſe or wall will take in building, having firſt aſcertained the number of feet it will contain. Thus, if he wiſhes to have a wall 540 feet long, and ſix feet high, it will be finiſhed in one month, with one ſingle mould, and ſix men; but if he doubles both mould and men, it will be done in fifteen days. Theſe are ſimple but neceſſary inſtructions, for they will prevent the inconvenience to which many are expoſed from having the completion of their building protracted beyond the time that they originally expected. All perſons who wiſh to build, may now contract with the builder that the work ſhall be finiſhed on ſuch a day; or that he ſhall indemnify them for all the loſſes which they may incur from his failure to make good his engagement in that reſpect.

And in regard to the outſide covering of plaſter, which is proper for rammed earth or piſé walls, it is quite different from that which is made uſe of on any other walls: it is neceſſary, too, to take a proper time for laying it on. When a houſe of this ſort has been begun in February, and completed in April, the covering may be laid on in the autumn, that is to ſay, five or ſix months after it is finiſhed; or if it is finiſhed in the beginning of November (at which time the maſons generally give over working) it may be laid on in the ſpring. In this interval the walls will be ſufficiently dried; but it muſt not be imagined that it is the drought or cold that extracts the moiſture from an earthen wall; it is only the air, which is of itſelf ſufficient either in ſummer or winter, to dry a piſé or rammed-earth wall thoroughly. If the plaſter be laid over them before the dampneſs is entirely gone, it muſt be expected that the ſweat of the walls will caſt it off.

But in order to prepare the walls for plaſtering, they ſhould be indented with the point of a hammer, or hatchet, without being afraid of ſpoiling the ſurface left by the mould; all thoſe little dents muſt be made as cloſe as poſſible to each other, and cut in, from top to bottom, ſo that every hole may have a little reſt in the inferior part, which will ſerve to retain and ſupport the plaſter. And to do it the maſons muſt make a ſmall ſcaffold in the holes which the joiſts of the mould have left at *figs.* 2 and 3 in the plate. This ſcaffold may be made in a few minutes, and when, with the aſſiſtance of it, they have indented the upper parts of the houſe, they muſt run a ſtiff bruſh over the indented ſurface, to remove all duſt or looſe earth. The walls, when thus prepared, may receive the plaſtering; but it ſhould be obſerved that there are two kinds of plaſter that may be uſed in the piſé; rough-caſt, and ſtuccoing. Rough-caſt conſiſts of a ſmall quantity of mortar, diluted with water in a tub, to which a trowel of pure lime is added, ſo as to make it about the thickneſs of cream. Stucco is nothing more than poor mortar, which the labourers make up in a clean place near the lime-pit, and carry it to the maſons on the ſcaffold.

Beſides, for the purpoſe of rough-caſting one workman and his labourer are ſufficient; the workman only ſprinkles with a bruſh the wall he has indented, ſwept, and prepared; after that he dips another bruſh, made of bits of reed, box, &c. into the tub which contains the rough-caſt, and throws with this bruſh the rough-caſt againſt the wall; when he has covered, with as much equality as poſſible, ſo much of the wall as is within his reach, he lowers his ſcaffold, and ſtops up the holes of the joiſts with ſtones, or old plaſter, &c. does as before, and continues lowering his ſcaffold in the ſame manner till he comes to the bottom of the houſe. This rough-caſt, which is attended with ſo little trouble and expence, is notwithſtanding the beſt cover that can be made for piſé or rammed-earth walls, and for all other conſtructions; it contributes to preſerve the buildings, and though not beautiful, has the recommendation of being attainable by people in moderate circumſtances. It is the peculiar advantage of theſe buildings that all the materials they require are cheap, and all the workmanſhip ſimple and eaſy to be performed.

But in regard to the proceſs of ſtuccoing it is very different; two workmen and two labourers are requiſite, the two workmen being on the ſcaffold, and one of the labourers making up the mortar, while the other carries it with water, and ſerves the workmen. One of the workmen holds in his right hand a trowel, and in the other a bruſh, with which he ſprinkles the wall, having beforehand indented and ſwept it; after that, he lays on a few trowels full of ſtucco, which he ſpreads as much as poſſible with the ſame trowel, and then he lays on more, and thus continues his work. The ſecond workman has alſo in his left-hand a bruſh, and in his right-hand a ſmall wood float; he ſprinkles water over the mortar that his partner has ſpread, and rubs over that part he has wetted with his wood float. Thus the firſt workman lays on the plaſter, and advances gradually, the ſecond follows and poliſhes; one labourer makes up the ſtucco, the other carries it, and ſerves the workmen. By this proceſs the ſmootheſt, fineſt, and cheapeſt plaſtering is made. And at the ſame time that the plaſter is laid on, it may alſo be whitened by the uſe of lime alone, which is alſo an object of economy, ſince it ſaves white lead, &c. For this purpoſe dilute lime in a tub of very clear water, and let a labourer take ſome of it in a pot, and carry it to the workmen, who muſt lay it on with a bruſh; this, as well as all other colours, adheres to the plaſter, and never falls, although it is uſed with water only, without ſize or oil. This is to be attributed to the precaution of laying on the colour whilſt the plaſter is ſtill wet; as it grows dry, it incorporates the mineral colours with its own ſubſtance, and makes them laſt as long as itſelf. This is on the principles of freſco colouring or painting, which is very neat.

And it is added, that the lime is of very general utility; it is uſed in building, in plaſtering, and in white-waſhing; and it will appear that for painting alſo it may be employed with advantage. Thoſe who intend to build, therefore, ought always to have a ſtore of it by them, and it ſhould be ſlaked a long time before it is uſed, to prevent crevices and bliſters, which, without this precaution, will ariſe in the plaſter, and give it ſo diſagreeable an appearance, that it will be neceſſary to do the work over again. The reaſon of it is this, there will always remain in the lime ſome particles that have not been ſlaked in the pit; all the ſtones are not entirely reduced to lime in the kiln, and thoſe ſtones will reſiſt the action of the water for a time, and will burſt from the plaſter after it has been laid, leaving the crevices above-mentioned. This inconvenience will not happen if the lime, after being ſlaked, is left to ſtand ſome time before it is uſed. Indeed it will not be amiſs to let it lie by a whole year, or longer, when it can be done with convenience. Beſides this, it is obſerved on the painting in freſco of the outſide covering, that that kind of painting which is known by this name, is the moſt beautiful and cheapeſt of any, and it is that which the author recommends for the decoration of piſé or rammed-earth buildings. The moſt celebrated painters were very partial to it, and Rome furniſhes many excellent models, which ſhould engage us to reſtore it from that neglect and diſuſe into which it has, without reaſon, been ſuffered to fall. And that, whoever wiſhes to have his houſe painted in freſco, muſt have a painter ready, and place him on the ſcaffold with the workmen. The latter lay on the mortar, as before directed, and are attentive to ſpread it very even, to receive the paint. When they have finiſhed one part, they ſuſpend their work, to give the painter time to do his; for if they continued working on, the painter, who cannot go on ſo faſt as they, would find the mortar too dry, and the colours would not incorporate with it. It is abſolutely neceſſary that the plaſterer's work ſhould be ſubordinate to that of the painter; it is ſometimes ſo arranged, that the latter work while the former are gone to their meals; and when in his turn he retires from work, he traces out the part that the plaſterers are to cover during his abſence, foreſeeing how much he ſhall be able to paint in the courſe of the day. All theſe precautions are taken to prevent the too ſpeedy drying of the mortar, and to ſeize the proper time to lay on the colours while it is freſh.

And in order to make the colour meant to be given to a country-houſe, dilute in a large tub a ſufficient quantity of lime which has been ſlaked a long time; and alſo dilute in another tub or pot ſome ochre, either yellow, red, or any other mineral colour, but always in very clear water; after which, pour a little of the colour into the large tub, and ſtir it about with a ſtick, ſo as to mix it well with the lime; take ſome of the colour on a bruſh, and try it on a board or wall; if it is too deep or too light, add freſh lime or colour from the tub, and by repeated trials bring it to the tint that is wiſhed to be given to the houſe. The colour being made for the body of the houſe, the frames of the doors and the windows are next to be conſidered, and a new colour choſen, to diſtinguiſh them from the reſt of the front. If the body of the houſe is painted yellow, or of a pale red, the angles and frames may be white or blue; if it is grey, they may be yellow or deep red, and in all caſes it will be a very eaſy matter to find the moſt ſuitable colours. It is added, that the plaſterers are equal to painting the fronts of houſes in a common way; but when builders or proprietors wiſh to have them decorated in a ſuperior manner, they muſt call in a painter, whoſe buſineſs it is to do it. The writer aſſerts that theſe paintings in freſco are more lively and more brilliant than any other; becauſe the colours are not deadened by ſize or oil, which do not enter into their compoſition; their effect is ſurpriſing, and may be had at a little expence. And in concluding, it is remarked that the plaſter proper to ſerve as a ground for freſco painting or colouring, is made of one part lime and three parts clean, ſharp, waſhed ſand; alſo that this ſort of painting has lately been executed with great ſucceſs at Woburn Abbey, and ſome other places in this country. It is not very uſual, it is obſerved, to ſlake the lime in this country ſo long before it is wanted; but it is an excellent practice, eſpecially if it be wood-burnt.

In ſhort, this method of building ſeems, from its cheapneſs and durability, and the readineſs with which it is executed, to deſerve the attention of the proprietors of lands in this kingdom, as the means of raiſing comfortable houſes for their labourers and cottagers, which, from the increaſed prices of the uſual ſorts of building materials, are now become ſeriouſly expenſive in providing.

Some different kinds of buildings of theſe earthy materials may be ſeen at Woburn Abbey, the ſeat of the duke of Bedford, and in ſome other places.

There are other neat buildings of the cottage kind, formed and raiſed in this way, which may be ſeen in *Plate* XXII. in the ſecond volume of the Farmer's Dictionary, under the head *Piſé Cottages*, with different elevations, ground plans, &c.

Others likewiſe built with the common ſorts of materials, but which may be raiſed equally well and conveniently in piſé work, are repreſented at *figs.* 1, 4, and 7, in *Plate* VII. on *Agriculture*, under the title of *Ornamental Cottages*, in which *figs.* 2, 5, and 8, ſhew the ground plans, and *figs.* 3, 6, and 9, thoſe of the upper rooms. Theſe kinds of cottages would have an extremely neat and ornamental appearance when erected in the latter of theſe methods, about the entrances of parks and other kinds of pleaſure grounds, as well as near any large country reſidences, and at the ſame time be built at an eaſy expence.

PISEK, in *Geography*, a town of Bohemia, in the circle of Prachotitz, on the Watawa; 20 miles N. of Prachotitz. N. lat. 49° 22′. E. long. 14° 36′.

PISHAMIN PLUM, in *Botany*. See *Indian Date* PLUM.

PISIDIA, in *Ancient Geography*, a province of Aſia Minor, N. of Pamphylia, ſeparated by a chain of mount Taurus from Iſauria.

PISIFORME OS, in *Anatomy*, one of the bones of the carpus See EXTREMITIES.

PISIG, in *Geography*, a ſmall iſland in the Eaſt Indian ſea. N. lat. 2° 20′. E. long. 125° 1′.

PISIGNANO, a town of Naples, in the province of Otranto; four miles S.E. of Lecce.

PISILIS, in *Ancient Geography*, a town of Aſia Minor, in Caria, between the river Calbis and the town of Caunus, according to Strabo.

PISINDA, a town of Africa Propria, placed by Ptolemy among thoſe which lay between the two Syrtes.—Alſo, a town of Aſia, in Pamphylia, placed by Ptolemy in that part of this country which was called Carbalia.

PISINGARA, a town of Aſia, in the Leſſer Armenia, placed by Ptolemy at a diſtance from the Euphrates towards the mountains.

PISISTRATI INSULÆ, three iſlands on the coaſt of Ionia, near Epheſus, called by Pliny Anthinæ, Myonneſos, and Diarrheuſa.

PISISTRATUS, in *Biography*, an eminent Athenian citizen, was of noble deſcent, which he derived from Codrus, the laſt king of Athens, and inherited a large property from his father Hippocrates. He poſſeſſed the natural advantages of a commanding perſon, a ready elocution, and an uncommon capacity, which he improved with the utmoſt diligence. Entering into public life, he promoted, by his eloquence, the endeavours of Solon to rouſing the Athenians to the recovery of Salamis, and he accompanied that legiſlator in the ſucceſsful expedition for the purpoſe. Naturally ambitious, he ingratiated himſelf with the lower claſſes of citizens by the moſt winning affability, and boundleſs

leſs liberality. He relieved their neceſſities, ſet open his gardens, and in all his diſcourſes he was the advocate of political equality, and the democratic conſtitution. Solon and others ſaw through the artifice of his conduct. Piſiſtratus one day haſtily appeared in the market-place, bleeding from ſome ſlight wounds which he had inflicted on himſelf, and loudly implored the protection of his fellow-citizens from pretended enemies, who were, he ſaid, purſuing his life, on account of his attachment to the democracy. From this time he obtained a guard to attend his perſon for his ſecurity. This guard he ſoon employed to ſeize the citadel. He diſarmed the multitude, and was now the undoubted maſter of Athens, while Solon, who had reſiſted his tyranny in vain, departed from his enſlaved country. This event occurred B.C. 560. Though Piſiſtratus juſtly incurred the charge of tyranny by the mode which he adopted to acquire his power, he by no means uſed that power in an offenſive way. On the contrary, it is thought, that very few lawful ſovereigns ever conducted themſelves with greater moderation, or with more regard to the beſt intereſts of his countrymen. He did not in the leaſt attempt to abrogate the wiſe laws of Solon, but inveſted them with additional authority, and he always expreſſed great veneration for the legiſlator, whom he intreated, but in vain, to return to Athens. His ſupremacy, however, was not as yet well ſecured, and attempts were made by Megacles to overthrow his power. He ſucceeded, and Piſiſtratus was obliged, in his turn, to become an exile, while his property was put up to public ſale. Afterwards Megacles permitted him to return, on condition that he would marry his daughter, to which Piſiſtratus readily acceded, though he refuſed to live with her, which ſo far exaſperated the father-in-law, that to avoid his vengeance he retired to Eretria. He there occupied himſelf in preparations for the recovery of his authority by force, which he effected in the eleventh year of his ſecond exile. From this time he continued to govern with the ſame lenity; but in order to weaken the popular party, he obliged many of the idle inhabitants to leave the city and engage in the cultivation of the ſurrounding diſtrict: and by exacting the tenth of every man's income and produce, he augmented the public revenues, which he expended on magnificent buildings. He alſo ſtudied to ſoften the minds of the Athenians by the encouragement of literature. He founded a public library, and made a collection of the poems of Homer, which were at that time ſcattered in detached parts throughout Greece, and digeſted them into the order which they have ſince preſerved. Senſible of the odium attaching to a tyranny, he was careful to maſk his power under the demeanour of a citizen, and in this way he exerciſed the ſovereignty during the remainder of his life, regarded rather as the father than the oppreſſor of his country, which ſcarcely ever enjoyed a longer period of quiet and proſperity. He died in the year 527 B.C., leaving his ſons, Hippias and Hipparchus, the heirs of his power. Univer. Hiſt.

PISKOI, in *Geography*, a town of Ruſſia, in the government of Archangel, on the river Mezen; 188 miles E. of Archangel.

PISMIRE, in *Zoology*. See Ant.

PISO, L. Calpurnius, in *Biography*, ſurnamed *Frugi*, a Roman of a diſtinguiſhed patrician family, called the Calpurnian, according to Cicero; though in another paſſage he repreſents him as the ſon of a tribune. The epithet Frugi is ſaid to have been given him on the following occaſion. When conſul in the year 183 B.C., he went into Sicily in order to ſuppreſs a mutiny among the ſlaves, and after the buſineſs was effected, beſtowing commendations from the tribunal on thoſe who had chiefly contributed to the ſucceſs, he awarded to his own ſon the prize of a golden crown of three pounds weight, ſaying, at the ſame time, that he meant to leave him the gold as a legacy, ſo that he ſhould receive the honour from his generals, and the reward from his father. For this inſtance of frugality of the public money, the appellation of Frugi was beſtowed upon him. In proof of the exactneſs of the principles of juſtice by which he was governed, we have the following anecdote. He had always oppoſed the law for the gratuitous diſtribution of corn, but when it had been carried by C. Gracchus he came to demand his portion. Gracchus perceiving him ſtanding in the crowd, aſked him how he could be ſo inconſiſtent as to receive corn by virtue of the law which he had oppoſed. To this he replied, "It was againſt my will that you ſhould have the diſtribution of my property, but if it muſt be ſo, I will claim my ſhare of it." Piſo was afterwards cenſor with Metellus Balearicus. He pleaded cauſes, and was a promoter or oppoſer of ſeveral laws. He left behind him various orations, and was the author of "Hiſtorical Annals," which, though written in the meagre ſimplicity of the times, were reckoned of good authority.

Piso, in *Commerce*, a weight uſed on the coaſt of Guinea. A ſeron is $1\frac{1}{2}$ piſo, and a piſo is ſubdivided into $1\frac{1}{3}$ quintos, 2 agiragues, or 4 media-tablas.

PISOGNE, in *Geography*, a town of Italy, in the department of the Benaco; 20 miles N.N.W. of Breſcia.

PISOLITE, in *Mineralogy*, a ſlaty artificial calcareous ſtone of a grey colour, ariſing from calx of iron. See Lime-*Stone*.

PISONIA, in *Botany*, received that appellation from Father Plumier, in memory of William Piſo, a phyſician of Leyden, the companion of Marcgraf, but whether his maſter or ſervant remains in diſpute. (See Marcgravia.) Piſo ſurvived Marcgraf, but of the time of his death, or of his age, we find no account.—Plum. Gen. 7. t. 11. Linn. Gen. 551. Schreb. 739. Willd. Sp. Pl. v. 2. 283. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 2. 333. Brown Prodr. Nov. Holl. v. 1. 422. Juſſ. 91. Lamarck Illuſtr. t. 861. Gærtn. t. 76.—Claſs and order, *Polygamia Dioecia*, Linn. rather *Heptandria Monogynia*. Nat. Ord. *Aggregatæ*, Linn. *Nyctagines*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, bell-ſhaped; its limb in five acute, equal, ſpreading, folded ſegments, permanent. *Cor.* none. *Stam.* Filaments more numerous than the ſegments of the calyx, uſually from ſix to ten, prominent, awl-ſhaped; anthers roundiſh, two-lobed. *Piſt.* Germen ſuperior, oblong; ſtyle ſimple, cylindrical, longer than the calyx; ſtigma cloven. *Peric.* Capſule oval, of one cell, without valves, clothed with the permanent pentagonal tube of the calyx. *Seed* ſolitary, ſmooth, oblong.

Eſſ. Ch. Calyx bell-ſhaped, five-cleft, plaited. Corolla none. Capſule of one cell, without valves, clothed by the angular calyx. Seed ſolitary.

Obſ. The ſtamens on one plant, and the piſtils on another, are more or leſs imperfect, ſo that the genus is, in effect, dioecious, or at leaſt polygamous; but it is one of thoſe which, having no other difference of ſtructure in their flowers, but, on the contrary, the rudiments at leaſt of both organs preſent in every flower, are beſt claſſed by the number of their ſtamens. In this latter reſpect however *Piſonia* is uncertain, like its relations *Mirabilis*, *Valeriana*, and *Boerhavia*.

1. P. *aculeata*. Prickly Piſonia, or Fingrigo. Linn. Sp. Pl. 1511. Ait. n. 1. Plum. Ic. t. 227. f. 1. (Pa-

liuro affinis arbor ſpinoſa, &c.; Sloane Jam. v. 2. 25. t. 167.)—Spines axillary, horizontal. Leaves ovate, acute at each end, ſmooth. Calyx of the fruit prickly.—Native of the Weſt Indies. A tree whoſe *trunk* is as thick as a man's thigh, eight or nine feet high, with weak drooping ſpinous branches. *Leaves* nearly oppoſite, ſtalked, ſimple, entire, ſmooth, pointed, two or three inches long and one broad, deciduous. *Flowers* appearing before the leaves in denſe downy *panicles*, about the ends of the branches, yellowiſh-green, bracteated, ſmall, ſmelling like elder. *Fruit* club-ſhaped, its angles beſet with numerous, regular, obtuſe, prickles, the *panicle* being enlarged and divaricated.

2. P. *ſubcordata.* Heart-ſhaped Fingrigo, or Loblolly-tree. Swartz Ind. Occ. v. 2. 641. Willd. n. 2.—Spines none. Leaves roundiſh-heart-ſhaped. Calyx of the fruit dry, its angles prickly in the upper part.—Native of Antigua, St. Kitt's, &c. A tree, with unarmed, ſmooth, brittle *branches.* The wood is of little uſe, whence, according to Swartz, it is called *loblolly*, an appellation given in the Weſt Indies, to a number of trees whoſe wood is good for nothing. *Leaves* ſtalked, oppoſite, ſmooth, turning black in drying. *Cymes* axillary, ſtalked. *Flowers* minute, greeniſh, polygamous. *Stamens* ſeven.

3. P. *nigricans.* Black-berried Fingrigo. Swartz Ind. Occ. v. 2. 643. Willd. n. 3. Ait. n. 2. (P. inermis; Jacq. Amer. 275.)—Spines none. Leaves ovate, pointed, ſmooth. Flowers cymoſe, erect. Calyx of the fruit pulpy, ſmooth.—Native of mountainous woods in Jamaica and Hiſpaniola. *Swartz.* Jacquin ſays it is frequent about Carthagena. A ſmall *tree*, or *ſhrub*, ten or twelve feet high, with ſmooth *branches*, deſtitute of thorns. *Leaves* ſtalked, oppoſite, ſmooth on both ſides. *Cymes* ſtalked, terminal and axillary, of many ſmall yellowiſh-green upright *flowers*, with two or three minute acute *bracteas* at the baſe of each. *Fruit* oval, ſmooth, black, the tube of the *calyx* which clothes it becoming pulpy as the *ſeed* ripens, but there are no prickles upon it.

4. P. *coccinea.* Scarlet-berried Fingrigo. Swartz Ind. Occ. v. 2. 645. Willd. n. 4.—Spines none. Leaves elliptic-lanceolate, ſmooth. Panicles terminal, looſe. Flowers drooping. Calyx of the fruit pulpy, ſmooth.—Native of buſhy places in Hiſpaniola, flowering in May. *Sw.* A *ſhrub*, or ſmall *tree*, with ſmooth, round, unarmed *branches.* *Leaves* ſcattered or oppoſite, on longiſh ſlender ſtalks, and tapering at each end; paler beneath. *Flowers* whitiſh-brown, ſmall, drooping, with three linear *bracteas* at their baſe. *Stamens* ſeven, rarely eight or ten. *Fruit* oblong, ſmooth, pulpy, ſcarlet. We have an authentic ſpecimen of this from Dr. Swartz. If we are right in a ſpecimen in the herbarium of the younger Linnæus, which we preſume to be the *nigricans*, that ſpecies differs from *coccinea* in having much ſhorter and broader *footſtalks*, as well as far more numerous and ſtraight tranſverſe veins to the *leaves*, which latter are obovate, rather than ovate. The *fruit* is ſmooth, oblong, in a long-ſtalked ſpreading *panicle.* Probably the ſtalk is elongated after flowering, as Swartz deſcribes it ſhorter, in that ſtate, than the leaves.

5. P. *mitis.* Small-thorned Piſonia. Linn. Sp. Pl. 1511. Willd. n. 5. (P. inermis; Swartz Obſ. 393. Katukava walli; Rheede Hort. Mal. v. 7. 13. t. 17, on the authority of Linnæus.)—Spines axillary, curved. Leaves ovate, downy. Calyx of the fruit downy, without prickles. Native of the Eaſt Indies. *Koenig.* This has the habit of the firſt ſpecies, but the *ſpines* are fewer, ſmaller, and curved. *Leaves* oppoſite or aggregate, alternate on the young ſhoots, ovate, or elliptic-lanceolate, with a blunt point, obſcurely veined, clothed, more or leſs denſely, with ſhort ruſty down. *Footſtalks* downy, a quarter the length of the leaves. *Flower-ſtalks* axillary, often two together, longer than the leaves, downy, with oppoſite branches all towards their ends, bearing denſe tufts of ſmall downy *flowers*, with ovate downy *bracteas.* *Stamens* ſeven. *Panicle* of the fruit more lax and ſpreading. *Fruit* obovate, clothed with the downy tube of the *calyx*, deſtitute of prickles. As we unfortunately have not acceſs at preſent to the ſeven latter volumes of the Hortus Malabaricus, we cannot examine into Rheede's ſynonym, but our ſpecimens having *ſpines*, one part of the difficulty, which has ſo much embarraſſed authors, is removed. The Linnæan herbarium has no marked ſpecimen; but the ſpecies ſeems to us perfectly clear in its characters and hiſtory. Poiret, in Lamarck, has confounded it, under the faulty name of *inermis*, with the *nigricans* of Swartz.

6. P. *grandis.* Superb Piſonia. Brown Prodr. Nov. Holl. v. 1. 422. Ait. n. 3.—"Stem arboreous. Leaves oblong, pointed, ſmooth. Cymes compound. Flowers polygamous. Stamens from ſeven to nine. Calyx of the fruit prickly."—Found by Mr. Brown in the tropical part of New Holland, and brought in 1805 to Kew, where it is kept in the green-houſe, but has not yet bloſſomed. We have ſeen no ſpecimen.

7. P. *villoſa.* Broad-leaved Piſonia. Poiret in Lamarck Dict. v. 5. 347?—Leaves ovate, obtuſe, ſomewhat downy. Panicles denſe, repeatedly branched, downy. Calyx very ſlightly divided.—Native of the iſland of Mauritius. Our ſpecimen came from Thouin's herbarium. The bark of the *branch* is ſmooth, without thorns. *Leaves* two or three inches long, and half as broad, ſtalked, ovate, obtuſe, wavy, thinly covered with fine ſhort pubeſcence, which perhaps diſappears at a more advanced period. *Flowers* very numerous, in denſe, round, ſtalked, downy panicles, whoſe copious ſubdiviſions are alternate. *Calyx* abrupt, club-ſhaped, downy. *Anthers* large, reddiſh. We have ſeen no *fruit.* Our only doubt is whether Poiret's plant may not be our *mitis.* We have therefore deſcribed our own ſpecimen, without borrowing any thing from him, and to this, in either caſe, the name of *villoſa* may remain. Our's has all the appearance of being one of Sonnerat's ſpecimens. As it is the young extremity of a *branch*, the *ſpines* may well be wanting.

The P. *ſubovata*, Poiret n. 4, is an accidental error for *ſubcordata* of Swartz.

The beautiful BUGINVILLÆA of Commerſon, ſee that article, is very nearly allied to *Piſonia.* Its curiouſly twiſted limb of the *calyx*, in the ripening *fruit*, is not repreſented by Lamarck, though it may have ſome weight in the generic character.

PISONIA, in *Gardening*, contains plants of the exotic tree kind for the ſtove, of which the ſpecies cultivated is the prickly piſonia (P. aculeata.)

Method of Culture.—It is increaſed by ſeeds, which ſhould be ſown in pots filled with light rich earth, and plunged into a hot-bed of tanners' bark; and when the plants come up, they ſhould be tranſplanted into ſeparate pots, and plunged into the hot-bed again, where they may remain till autumn, when they ſhould be removed into the ſtove, and plunged into the bark-bed, and treated in the ſame manner as has been directed for ſeveral tender plants of the ſame country; in hot weather giving them plenty of water, but in winter more ſparingly.

They are too tender to thrive in the open air of this country at any ſeaſon of the year, they ſhould, therefore, be conſtantly kept in the ſtove. They retain their leaves moſt part of the year in this climate.

The plants afford variety in ſtove collections of exotic plants.

PISONOS, in *Ancient Geography*, a town of Aſia, in Leſſer Armenia, on the route from Sebaſte to Cocuſon, between Ad Prætorium and Melitene, according to the Itinerary of Antonine.

PISRAH, in *Geography*, a town of Hindooſtan, in Bahar; 58 miles S.S.W. of Patna.

PISSA, a town of Pruſſian Lithuania; four miles S. of Stalluponen.—Alſo, a river of Pruſſia, which runs into the Pregel, near Inſter.

PISSANIZENA, a town of Pruſſia, in Natangen; 10 miles S. of Marggrahowa.

PISSASPHALTUM, or Pissasphaltus, πισσασφαλτος, compounded of πισσα, *pitch*, and ασφαλτος, *bitumen*, in *Natural Hiſtory*, denotes a native, ſolid bitumen, found in the Ceraunian mountains of Apollonia: of an intermediate nature between pitch and aſphaltum. Its characters are theſe: the piſſaſphalta are fluid mineral bodies, of a ſomewhat thick conſiſtence, duſky, and opaque; of a ſtrong ſmell, and readily inflammable, but leaving a reſiduum of greyiſh aſhes after burning.

There are three known ſpecies of this genus. 1. A thinner blackiſh kind, called *oleum terræ*, and *petrol*. 2. A thicker black one, called *piſſelæum Indicum*, or *Barbadoes tar*. And, 3. A black and viſcous one, called ſimply *piſſaſphaltum* in the ſhops. See Bitumen.

Piſſaſphaltum is as tough and viſcous as bird-lime, and of the ſame conſiſtence when old. It very much reſembles the common black pitch, when ſoftened a little by heat; and has been generally thought to have ſomething of the ſmell of that ſubſtance; but this ſeems to have ariſen from its being too frequently adulterated by mixing pitch with it, and the true genuine ſubſtance has no other ſmell than the rank one of all the bitumens, which ſomewhat reſembles that of oil of amber. It is produced in ſeveral parts of the world, and there are large quantities of it in Germany, in Perſia, and in France. It yields a limpid oil by diſtillation, which very much reſembles the native petroleum, and is too often ſold with us under this name, being annually imported in large quantities from thoſe parts of Germany where it is manufactured, and having itſelf no particular name in the ſhops of our druggiſts.

Piſſaſphaltum was much recommended by the ancients for external uſe, as an emollient, maturant, and digeſtive: with this intention it was uſed in cataplaſms, for ripening all ſorts of tumours, and againſt the ſciatica and other pains of the limbs. They alſo had recourſe to it for ſtrengthening the limbs, after the reduction of diſlocations. It is little uſed at preſent, the petroleum being thought very proper to ſupply its place.

Pissasphaltum is alſo a name given to a factitious ſubſtance, compounded of pitch and aſphaltus, or the true bitumen Judaicum.

The coarſeneſs of this, the black colour, and the fetidneſs of the ſmell, diſtinguiſh it from the true aſphaltum.

Pissasphaltum is alſo uſed, by ſome writers, to denote the Jewiſh pitch, or ſimple aſphaltum.

PISSELÆUM, πισσελαιον, *oleum Picinum*, or oil of pitch, an obſolete medicament compounded of oil and pitch.

Pisselæum *Indicum*, among *Modern Writers*, denotes a bituminous ſubſtance brought from the Weſt Indies, popularly called *Barbadoes tar*.

It is a heavy, thick, and duſky-looking mineral fluid, of the colour and conſiſtence of common treacle, and of a very opaque hue; it is of a diſagreeable ſmell, faintly approaching to that of oil of amber, and is very inflammable. It is found trickling down the ſides of the mountains at the back of ſeveral of our plantations in America, and is in great eſteem there for coughs and diſorders of the lungs. We meet with very little in England that is genuine, ſeveral different ſophiſtications of it being in common uſe, even upon the ſpot. (See Bitumen.) It has a ſtrong ſmell not unlike the common tar, and is not very pleaſant to ſight or taſte. It is accounted a good balſamic, and where the ſtomach can diſpenſe with it, will do great ſervice in many diſorders of the breaſt, which has alſo been experienced of common tar.

PISSER, in *Geography*, a mountain of the county of Tyrol; four miles S.E. of Landeck.

PISSEROS, the name of an ointment greatly recommended by Hippocrates in many caſes, as in burns, freſh wounds, &c. It was made of oil of roſes, bees-wax, and pitch, proportioned ſo as to give the whole a ſoft conſiſtence. It was of the nature of our modern black baſilicon, and found a good ointment in many caſes.

PISSINUM. Pliny ſays it was cuſtomary for the ancients to hold fleeces of wool over the ſteam of boiling tar, and ſqueeze the moiſture from them, which watery ſubſtance was called *piſſinum*.

Ray will have this to be the ſame with the piſſelæum of the ancients; but Hardouin, in his notes on Pliny, thinks the piſſelæum to have been produced from the cones of cedars. What uſe they made of theſe liquors anciently, is not known; but it may be preſumed they were uſed in medicine, though at preſent it does not appear they are uſed at all.

PISSITES, a name given by the ancients to a wine impregnated with the virtues of liquid pitch or tar. To prepare it, the tar was ordered to be waſhed in ſea-water or brine, and afterwards in freſh water many times; and after a tedious preparation of this kind, two ounces of it were ordered to be put to eight gallons of muſt, which is to be ſuffered to work together, and the clear liquor to be bottled off.

This was accounted a warm wine, very aſſiſtant to concoction, and of an abſterſive faculty, and a good pectoral: on theſe accounts it was given in diſorders of the breaſt, and in obſtructions of the liver, ſpleen, and uterus, if not attended with a fever; and was a common medicine in coughs and aſthmas of all kinds.

PISSOCEROS, a name given by the old naturaliſts to a ſubſtance found very frequently in the hives of bees, and conſiſting of a mixture of propolis and wax. The ancients were well acquainted with the uſe of this ſubſtance, which was uſed for ſtopping up the cracks and chinks in the hives: they mention, indeed, three ſorts of matter uſed by the bees for this purpoſe; the metys, the piſſoceros, and the propolis; but later authors call them all by the general term propolis, the piſſoceros and metys being only the ſame ſubſtance, mixed with wax in different proportions. This propolis is a reſinous ſubſtance, of a ſoft and viſcous conſiſtence, collected from the beds of the poplar and other trees.

PISSOS, in *Geography*, a town of France, in the department of the Landes, and chief place of a canton, in the diſtrict of Mont-de-Marſan; 27 miles N.W. of Tartas. The place contains 1338, and the canton 4572 inhabitants, on a territory of 482½ kiliometres, in ſeven communes.

PISSOSIS, a word uſed by the old writers on medicine for the depraved appetite of young women about the firſt eruption of the menſes, and of ſome women with child.

PISS-POT Bay, in *Geography*, a bay in the ſtraits of Magellan. S. lat. 53° 14′. W. long. 75° 12′.

PISTACHIA-Nut, in *Botany*, *Gardening*, &c., a well known ſort of nut. See Pistacia.

Pistachia, or *Piſtach-nut*, a fruit brought from ſeveral parts

parts of Aſia, chiefly from Aleppo and Perſia. When wrapt in all its coats, it is of the ſize of a green almond; but when ſtript of all but its ſhell, it reſembles a ſmall nut. The kernel is red without, and green within; its taſte is very agreeable.

The word is formed from the Latin *piſtacium*, of the Greek ϖιττακιον, whence, according to Menage, the city Pſittacium took its name.

The tree that produces it is a kind of turpentine-tree. See Pistacia.

The nuts are to be choſen new, heavy, and full; as to thoſe that are broken, ſuch as have kept their colours beſt are to be preferred; for nothing depends upon the ſize.

Piſtachias have been reckoned aperitive, and proper to give vigour; and uſed in emulſions, &c. in phthiſical and nephritical caſes. They alſo enter ſeveral ragouts, and are comfited, made into conſerves, &c. There is likewiſe a kind of falſe piſtachia, brought from the Caribbee iſlands, which ſome confound with the real ones, though very different, both with regard to the plants that produce them, and their quality. The ſpurious piſtachia plant does not riſe above a foot high; nor does the fruit grow on the branches, but is found in pods. The pod ſometimes only contains a ſingle nut, which reſembles an olive; but uſually ſeveral; and in that caſe they are irregular. The ſubſtance is white, compact, and heavy.

This fruit is rarely eat raw, becauſe of the ill effects it produces; it is uſually roaſted or comfited; it is uſed in ragouts, and to make ratifias.

Pistachia-*Tree, Black Virginian*, a ſpecies of the *hamamelis*; which ſee.

PISTACIA, in *Botany*, πιστακια of Dioſcorides, a word of doubtful origin. Athenæus attributes it to the Syrians. Forſkall gives *foſtuk* as the Arabic name of the *Lentiſcus*, and Olaus Celſius of the *Piſtacia;* hence De Theis ſuppoſes πιστακια a corruption of that word; but ſurely it is hazarding enough to preſume them of one common origin. Rauwolf's *fiſtuc* indeed comes much nearer.—Linn. Gen. 518. Schreb. 683. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 5. 381. Lamarck Illuſtr. t. 811. (Terebinthus; Tourn. t. 345. Juſſ. 371.)—Claſs and order, *Dioecia Pentandria.* Nat. Ord. *Amentaceæ*, Linn. *Terebintaceæ*, Juſſ.

Gen. Ch. Male, *Cal.* Perianth of one leaf, in five deep equal ſegments. *Cor.* none. *Stam.* Filaments five, capillary, very ſhort, ſpreading; anthers large, oblong, quadrangular, obtuſe, of two cells burſting lengthwiſe, ſpreading.

Female, on a ſeparate plant, *Cal.* Perianth of one leaf, inferior, in three deep equal ſegments, deciduous. *Cor.* none. *Piſt.* Germen ſuperior, roundiſh, ſomewhat triangular; ſtyles three, erect; ſtigmas ſpreading, obovate, thickiſh, hiſpid, undivided. *Peric.* Drupa dry, coriaceous, ovate. *Seed.* Nut ovate, ſmooth.

Eſſ. Ch. Male, Calyx five-cleft. Corolla none. Female, Calyx three-cleft. Corolla none. Styles three. Drupa dry. Nut ſingle-ſeeded.

Obſ. Linnæus conſiders the male flowers as conſtituting a catkin. Juſſieu diſcretely terms it *racemus amentaceus*. The infloreſcence is actually a panicle, with a bractea under each of its ſubdiviſions, in both ſexes; which is proved by the preſence of a true perianth to each flower in each.

1. P. *officinarum*. Fiſtachia-nut Tree. Ait. n. 1. (Piſtacia; Matth. Valgr. v. 1. 248. Bauh. Hiſt. v. 1. par. 1. 275. Ger. em. 1436. Piſtachi, fiſtuc of the Arabians; Rauw. It. 72. t. 9. Terebinthus indica Theophraſti, Piſtacia Dioſcoridis; Tourn. Inſt. 580. Duham. Arb. v. 2. 306. t. 88.)—Leaves ſimple, ternate, or pinnate; leaflets oval. Fruit ovate, pointed.—Native of Syria, and other countries in the Levant. Matthiolus ſays the Venetians uſually imported the nuts from Syria. The tree has often been raiſed in this country, and as often loſt. It is marked as hardy in Hort. Kew. flowering in April and May. We have had no opportunity of ſeeing more than a dried ſpecimen, without flowers. The young *leaves* are ternate, the more advanced ones pinnate; the leaflets elliptical or ovate, pointed, ſlightly wavy, entire, ſmooth, except a fine, chiefly marginal, pubeſcence when young. Their midrib ſends off ſeveral parallel tranſverſe veins, connected by fine reticulations. *Fruit* panicled, about an inch long, ovate, with an oblique point, reddiſh, well known, for the ſake of its nut, at our tables. The green internal hue of the kernel is remarkable. Linnæus's hiſtory of this plant is ſo extremely confuſed, that we have judged it beſt to follow Mr. Aiton in its name, rejecting the ſynonym of Boccone, Muſ. v. 2. 139. t. 93, which is certainly a female, not a male, plant, though called ſo by the author, after the old Bauhinian faſhion; and it appears to us rather to belong to the next ſpecies. The figures we have cited moſtly repreſent three pair of leaflets, with an odd one; the Hort. Kew. deſcribes two pair at the utmoſt; yet theſe figures muſt be authentic. Our plant muſt be what Linnæus meant by his *P. vera*, but he was impoſed upon by a full-grown ſpecimen of *P. Terebinthus*, whence his ſpecific character of *vera* is taken. He was ſtill more deceived by Koehler, with a branch of *Fraxinus Ornus* for *P. narbonenſis*. The latter ſpecies therefore is beſt omitted, whatever its ſynonyms may belong to. We have not materials to arrange all theſe with any certainty.

2. P. *reticulata*. Net-leaved Piſtachia Tree. Willd. Sp. Pl. v. 4. 751. Ait. n. 2. (P. trifolia; Linn. Sp. Pl. 1454. Piſtacium mas ficulum, folio nigricante; Bocc. Muſ. v. 2. 139. t. 93? Terebinthus indica major, fructu rotundo; Bauh. Hiſt. v. 1. par. 1. 278.)—Leaves ternate and pinnate; leaflets roundiſh, abrupt, ſomewhat pointed; tapering at the baſe; ſtrongly reticulated with prominent veins. Fruit roundiſh-oval, obtuſe.—Native of the Levant. Cultivated by Miller, as well as in the French gardens. It is generally taken for the *trifolia* of Linnæus, and perhaps ought to retain that name, but as the *leaves* are often pinnate, which Linnæus himſelf remarks, and as they moſtly are ſo in our ſpecimen, we ſubmit to the above change. There ſeems never to be more than two pair of leaflets, and an odd one; they are all large, coriaceous, broad, rounded, and obtuſe; their veins remarkably and ſtrongly reticulated; their baſe more or leſs contracted, elongated, or wedge-ſhaped. When young they are downy at the margin, and elſewhere, like the foregoing. Bauhin repreſents the *fruit* as more rounded and obtuſe than the common Piſtachia, but equally good. His *leaves* however are much too pointed for our plant, and agree far better with the former; while, on the other hand, the *leaves* in Rauwolf's cut, cited for *P. officinarum*, to which his *fruit* belongs, come nearer to the *reticulata*. After all, theſe plants may poſſibly be but varieties, and we are much inclined to come to that concluſion. The following are more intelligible, and better defined by authors.

3. P. *Terebinthus*. Common Turpentine Tree. Linn. Sp. Pl. 1455. Ait. n. 3. Woodv. Med. Bot. t. 153. (Terebinthus; Matth. Valgr. v. 1. 101. Ger. Em. 1433. Bauh. Hiſt. v. 1. par. 1. 279. T. vulgaris; Tourn. Inſt. 579. Duham. Arb. v. 2. 306. t. 87.)—Leaves pinnate; leaflets numerous, ovato-lanceolate, acute, recurved. Flowers panicled. Segments of the calyx awl-ſhaped, longer than the ſtamens.—Native of the ſouth of Europe and north of Africa. Long known in our gardens. There is a fine female tree at Chelſea garden, near the gate, which,

for want of the male bloſſoms, can never perfect its fruit. The habit of this ſpecies is like the two foregoing, the *trunk* and *branches* rugged, and bent in all directions. *Leaves* of three to five pair of ovate-oblong entire ſmooth leaflets, with an odd one, all ſomewhat curved backwards. They are, in our climate at leaſt, deciduous, and appear by Dr. Sibthorp's drawings to be ſo in Greece. Their red hue, when young, is beautiful. *Flowers* in large, very compound, *panicles*. *Anthers* dull yellow. *Stigmas* crimſon. *Fruit* ſcarcely bigger than a large pea, globular, a little compreſſed, reticulated. Galls of the ſame ſhape are found on the leaves, and very large oblong ones, like legumes, are often produced from the young branches, as the old figures repreſent. The reſin of this tree is the Chian or Cyprus Turpentine, generally preferred, for medical uſe, to what is obtained from the Fir tribe; but it is ſcarcely to be had without adulteration.

4. P. *Lentiſcus*. Maſtick Tree. Linn. Sp. Pl. 1455. Ait. n. 4. Woodv. Med. Bot. t. 152. (Lentiſcus; Matth. Valgr. 1. 99. Ger. Em. 1432. Bauh. Hiſt. v. 1. par. 1. 283. L. vulgaris; Tourn. Inſt. 580. Duham. Arb. v. 1. 354. t. 136.)—Leaves abruptly pinnate; leaflets ovato-lanceolate. Flowers racemoſe. Segments of the calyx ovate, ſhorter than the ſtamens.—Native of the ſouth of Europe. Leſs hardy than the laſt, and requiring the ſhelter of a greenhouſe in our climate, being evergreen. In Italy it is very common, flowering about April; as well as in the Levant, where its reſin, called maſtick, is a well-known article of luxury, and different varieties of this ſhrub are conſequently cultivated with care. It differs from every other known *Piſtacia*, in having no odd leaflet, whence Tournefort made it a diſtinct genus; as well as in its ſimply racemoſe infloreſcence, and the ſhortneſs of the *calyx*; but there is nothing like a reaſonable generic diſtinction, either in fructification or habit. The wood, called *lignum lentiſchinum*, has been ſuppoſed to poſſeſs ſome medical virtues, but its chief fame at preſent is in Portugal, where it ſerves for toothpicks. Theſe are rather more neat than if made of deal.

P. *oleoſa*. Lour. Cochinch. 615, is enveloped in too much uncertainty to be received without examination of ſpecimens.

Pistacia, in *Gardening*, contains plants of the exotic, deciduous, tree and ſhrubby evergreen kinds, of which the ſpecies cultivated are the true piſtacia tree (P. vera); the common turpentine tree (P. terebinthus); and the maſtic tree (P. lentiſcus.)

With reſpect to the ſecond ſort, it may be remarked, that the Cyprus or Chian turpentine, which it furniſhes, is procured by wounding the bark of the trunk in ſeveral places, during the month of July, leaving a ſpace of about three inches between the wounds; from theſe the turpentine is received on ſtones, upon which it becomes ſo much condenſed by the coldneſs of the night, as to admit of being ſcraped off with a knife, which is always done before ſun-riſe; in order to free it from all extraneous admixture, it is again liquefied by the ſun's heat, and paſſed through a ſtrainer: it is then fit for uſe.

Of the third ſort, there is a variety which riſes to the ſame height as the preceding; but differs from it in having a pair or two of leaflets more to each leaf, much narrower, and of a paler colour. It is a native of the country about Marſeilles, &c.

Method of Culture.—The firſt is capable of being increaſed by the ſeeds or nuts procured from abroad, and planted in the ſpring, in pots filled with light kitchen-garden earth, plunging them in a moderate hot-bed; when the plants appear, a large ſhare of air ſhould be admitted to them, to prevent their drawing up weak; and by degrees they ſhould be hardened to bear the open air, to which they may be expoſed from the beginning of June till autumn, when they ſhould be placed under a hot-bed frame to ſcreen them from the froſt in winter; as while young, they are too tender to live through the winter in this climate without protection, but ſhould always be expoſed to the air in mild weather; they ſhed their leaves in autumn, and therefore ſhould not have much wet in winter. In the ſpring, before the plants begin to ſhoot, they muſt be removed each into a ſeparate ſmall pot; and be plunged into a very moderate hot-bed, to forward their putting out new roots. As ſoon as they begin to ſhoot, they muſt be gradually hardened, and placed abroad again.

Theſe plants may be kept in pots three or four years, till they have got ſtrength, during which time they ſhould be ſheltered in winter; and afterwards be turned out of the pots, and planted in the full ground, ſome againſt high walls to a warm aſpect, and others in a ſheltered ſituation, where they bear the cold of our ordinary winters very well, but in ſevere froſts are often liable to be deſtroyed. The trees flower and produce fruit, but the ſummers are ſeldom warm enough to ripen the nuts.

The third ſort is alſo capable of being increaſed by laying down the young branches, which, if properly managed, put out roots in one year, and may be cut off from the old plants, and be planted out into ſeparate ſmall pots. Theſe muſt be ſheltered in winter, and in ſummer placed abroad in a ſheltered ſituation, and treated in the ſame way as other hardy kinds of green-houſe plants.

When raiſed from ſeeds they ſhould be taken from trees growing in the neighbourhood of the male plants, as otherwiſe they will not grow. When theſe plants have obtained ſtrength, ſome of them may be turned out of the pots, and planted againſt warm walls; where, if their branches are trained againſt them, they endure ordinary winters very well, and with a little ſhelter in ſevere winters may be preſerved with ſafety.

They are curious and ornamental in different ſituations.

PISTAKETI, in *Geography*, a town of the principality of Georgia, in the province of Carduel; 40 miles S.S.W. of Teflis.

PISTANA, in *Botany*, a name by which ſome authors have called the *ſagittaria aquatica*, or water arrow-head.

PISTATIO, among *Pharmaceutic Writers*, a word uſed to expreſs that preparation of ſimples which conſiſts in covering them with, or including them in, a paſte, and ſending them to a baker's oven till tender throughout. Squills are ſometimes prepared thus.

PISTAZITE, in *Mineralogy*, named alſo by ſome writers Acanticone, Arandalite, and Thallite, is a ſpecies of the flint genus: of a piſtachio-green, which paſſes into olive-green and blackiſh-green. It is found in a maſſive and cryſtallized ſtate, under different forms: 1. In ſix-ſided priſms, in which the lateral edges are ſometimes truncated and ſometimes bevelled; and the terminal edges and angles are truncated. 2. In very oblique four-ſided priſms, which have a reed-like aſpect; ſometimes they are acuminated by four planes, and ſometimes bevelled on the extremities, and the bevelling planes are ſet on the obtuſe lateral edges. 3. In acicular cryſtals; internally it is ſhining; the fracture is foliated, ſometimes narrow and parallel. The fragments are ſometimes indeterminately angular, ſometimes wedge-ſhaped and ſplintery. It occurs in coarſe granular diſtinct concretions. It is tranſlucent, which, in the cryſtallized varieties, paſſes into tranſparent. It is hard, eaſily frangible, and not particularly heavy. It is found in beds in primitive mountains in Norway, Saxony, France, and Bavaria.

PISTE, in the *Manege*, the track or tread which a horſe makes upon the ground he goes over.

The word is French, and literally ſignifies a *track*.

The piſte of a horſe may be either *ſingle* or *double*.

If the rider make him go but an ordinary gallop, in a circle, or rather ſquare, he will make but a ſingle piſte: if he either make him gallop with his haunches in, or go terra a terra, he will make two piſtes, one with the fore-part, another with the hind. And the ſame if the rider make him paſſage, or go ſideways, either in a ſtraight line, or upon a circle.

PISTEREEN, or PIASTRINE, in *Commerce*, the name given in the Weſt Indies to the Spaniſh pecetas. Piſtereens are alſo called two-bit pieces; they paſs at Jamaica for 1*s*. 3*d*. currency, and are worth 10½*d*. ſterling. Engliſh ſhillings and ſixpences occaſionally paſs here as piſtereens and bits.

PISTIA, in *Botany*, ſo named by Linnæus, from πιϛης, *a channel* or *watering place*, becauſe it inhabits pools and rivers.—Linn. Gen. 467. Schreb. 455. Willd. Sp. Pl. v. 3. 690. Mart. Mill. Dict. v. 3. Juſſ. 69. Lamarck Illuſtr. t. 733. (Kodda-pail; Plum. Gen. 30. t. 39.)—Claſs and order, *Gynandria Hexandria*, Linn. *Monadelphia Octandria*, Schreb. Willd. Nat. Ord. *Inundatæ*, Linn. *Hydrocharides*, Juſſ.

Gen. Ch. corrected by Schreber, *Cal.* none. *Cor.* of one petal, unequal, erect, permanent; tube ſhort, cloſely embracing the germen; limb roundiſh, ſomewhat heart-ſhaped, dilated, pointed, undivided, contracted at each ſide, in the middle, by a lateral plait directed inwards. *Stam.* Filament round, thick, obtuſe, ſpringing almoſt perpendicularly from the centre of the limb of the corolla, and ſtanding over the piſtil, ſurrounded at the baſe by a membranous diſk, and augmented at each ſide below, with a dependent fringe, the breadth of the anthers; anthers ſix to eight, globoſe, ſtanding in a row round the margin of the filament at its ſummit. *Piſt.* Germen ſuperior, nearly ovate, twice as long as the tube of the corolla, attached to the back of the petal by a thickened longitudinal line, reaching to the origin of the filament; ſtyle thick, erect, ſhorter than the filament; ſtigma obtuſe, ſomewhat peltate. *Peric.* Capſule ovate, compreſſed, of one cell. *Seeds* numerous, oblong, depreſſed, and marked with an umbilicated point at the ſummit, horizontally inſerted into the back of the capſule, where it is attached to the corolla.

1. P. *Stratiotes.* Linn. Sp. Pl. 1365. Jacq. Amer. 234. t. 148. (Kodda-pail; Rheede Malab. v. 11. 63. t. 32. Plantago aquatica; Rumph. Amboin. v. 6. 177. t. 74. Stratiotes; Alp. Ægypt. 106. t. 108, 109. Veſling. Ægypt. 44. t. 45.)—Native of Aſia, Africa, and South America, in ſtagnant waters. Rumphius ſays it is found only in ſuch as have a muddy bottom, though the plant floats entirely like a *Lemna*, ſending down its long, ſtraight, ſimple, pubeſcent *roots* deep into the water, but not ſo far as the ground. The whole herb conſiſts of a number of broad wedge-ſhaped obtuſe *leaves*, ſpreading in the form of a large roſe, without any ſtem, of a coriaceous or rather ſpongy texture, ribbed, glaucous, with a velvet-like ſurface; the innermoſt more erect, convoluted, and downy. *Flowers* white, axillary. The plant is propagated by long lateral runners, each terminating in a bud.

PISTICCIO, in *Geography*, a town of Naples, in Baſilicata; 12 miles from Turſi.

PISTILLUM, in *Botany* and *Vegetable Phyſiology*, the piſtil of a flower, is one of thoſe eſſential parts of the fructification, neceſſary to the production of ſeeds. It is either one or ſeveral, ſituated in the centre of the flower, within the ſtamens, if the latter be, as uſual, in the ſame flower. When in a ſeparate one, the piſtils are not always central. The idea of Linnæus, of their originating from the pith, and the ſtamens from the wood, is refuted by anatomical obſervation, as well as by more correct phyſiological enquiries. Each piſtil conſiſts properly of three parts; the *germen*, or rudiment of the young fruit or ſeed, which of courſe is eſſential; the *ſtyle*, various in length and thickneſs, not always preſent, as it merely ſerves to elevate the third part, the *ſtigma*, which, though indiſpenſably neceſſary, is, in ſeveral caſes, ſeated immediately upon the germen. See FECUNDATION *of Plants*, GERMEN, and, hereafter, STIGMA and STYLUS, or STYLE.

Piſtils are ſometimes obliterated, though more generally transformed to petals, in double flowers, as well as the ſtamens. In the double-bloſſomed cherry the piſtil is actually changed to a leaf. The ſtyle in that caſe becomes dilated, ſerrated, and aſſumes a deep green colour, turning to a perfect leaf, and the ſtigma, without much viſible change, becomes the gland terminating the leaf, like what is found on the original and proper foliage. Some plants, which increaſe plentifully by root, are ſubject to have the piſtils weakened and abortive, as in Mint, and *Lilium bulbiferum;* but they do not, in ſuch caſes, undergo any transformation. Many whole genera have rudiments only of piſtils in ſome flowers, and of ſtamens in others, as the *Rhodiola;* ſuch plants being in effect either dioecious, or monoecious. Still more have, intermixed with perfect flowers, whoſe male as well as female organs are complete, a greater or leſs number whoſe ſtamens only are perfect and effective, their piſtils being imperfect, or entirely obliterated. Such is the nature of a great majority of tropical trees, which are therefore, in Linnæan language, polygamous, and ſtrictly belong to the claſs *Polygamia;* but ſo much difficulty attends a cloſe adherence in practice to this principle, in conſequence of accidental variations, that it is found beſt to conſider no plants as polygamous that have not a difference of ſtructure in their ſeveral flowers. See POLYGAMIA.

PISTILS FIORD, in *Geography*, a bay on the N. coaſt of Iceland.

PISTIS, in the *Materia Medica of the Ancients*, a name given to the gum bdellium, particularly to that kind of it which was brought from Arabia, and was of a fine yellowiſh-white, and in ſmall round drops, or lumps of a roundiſh ſhape, and firm conſiſtence.

PISTOCCHI, FRANCESE-ANTONIO, of Bologna, in *Biography*, one of the greateſt ſtage ſingers of the ſeventeenth century, began to flouriſh, both as a performer and compoſer, about the year 1679. He was retained ſome time at the court of the margrave of Brandenburg as maeſtro di capella; but late in life, after eſtabliſhing a ſchool of ſinging at Bologna, which was afterwards continued by his diſciple Bernacchi, he retired to a monaſtery, where he ended his days.

An oratorio of his compoſition, which we were ſo fortunate as to find in Italy, called "Maria Virgine Adolorata," has more merit of expreſſion, and elegance of melody, than any vocal muſic of the ſame century. There is no date to this compoſition; but by the ſimplicity of the ſtyle it ſeems to have been produced about the end of the 17th century, at which time recitative, freed from formal cloſes, and in poſſeſſion of all its true forms, was occaſionally extremely pathetic and dramatic; and Piſtocchi ſeems a more correct contrapuntiſt than the generality of opera ſingers whom the demon of compoſition ſeizes at a period of their lives, when it is too late to begin, and impoſſible to purſue ſuch ſtudies effectually, without injuring the cheſt, and neglecting the cultivation of the voice. This oratorio has neither overture nor chorus. The interlocutors are an angel, the Virgin

Mary, Mary Magdalen, and St. John. At the termination of this oratorio, which is truly pathetic and ſolemn, all the degrees of the diminution of ſound are uſed: as *piano*, *più piano*, *pianiſſimo*, equivalent to the *diminuendo*, *calando*, and *ſmorzando*, of the preſent times.

Piſtocchi publiſhed ſix cantatas, with two duets, and two airs, one to French, and one to Italian words, about the year 1699; but we have never been able to find them.

PISTOIA, anciently *Piſtoria*, in *Geography*, a city of Etruria, which is an epiſcopal ſee, remarkably well built, and from the unuſual wideneſs of the ſtreets and ſolidity of its edifices, appearing both airy and magnificent. Of theſe buildings, the principal are the cathedral, the church called "Del Umilla," and the ſeminary. The dome of the firſt, the front, or rather the veſtibule of the ſecond, and the general diſpoſition of the third, are much admired. Thoſe eſtabliſhments called ſeminaries in Italy and France, are not merely academies or ſchools, but colleges, where the young clergy are inſtructed in the peculiar duties of their profeſſion, under the inſpection of the biſhop, during three years previous to the time of their receiving holy orders. Hence each dioceſe has its ſeminary, which is always in the epiſcopal city, and generally contiguous to the biſhop's palace. In Piſtoia there are two public libraries. The river Ambrone flows cloſe to the town. The ſurrounding country is not only fertile and well cultivated, but unuſually picturеſque.

PISTOL, a little fire-arm, borne at the ſaddle-bow, at the girdle, or in the pocket.

The piſtol is ſaid to have taken its name from Piſtoia, a city in Italy; where, as Fauchet tells us, it was firſt made. Borel derives the word from *fiſtula, pipe;* the barrel of this piece bearing ſome reſemblance to a flute.

It is ſaid that from harquebuſſes (ſee HARQUEBUSS) came piſtole, or piſtolets, with wheel-locks, the barrels of which were only one foot long, being the harquebuſs in miniature. The Germans are ſaid to have uſed them in France before the French; and the horſemen who received them in the time of Henry II. were called "Piſtoliers." They are mentioned as early as the year 1544, under the reign of Francis I. Piſtols with a ſimple ſpring, inſtead of the wheel formerly uſed, fuſils and muſketoons, are of modern invention; but the inventors are not known. In the year 1658, the uſe of wheel-locked piſtols was not aboliſhed. The wheel-lock was a little ſolid wheel of ſteel, fixed againſt the plate of the lock of the harquebuſs or piſtol; it had an axis that pierced it in its centre; at the interior end of this axis which went into the lock, a chain was faſtened, which twiſted round it on the wheel being turned, and bent the ſpring by which it was held; to bend this ſpring, a key was made uſe of, into which the exterior end of the axis was inſerted. By turning this key from left to right, the wheel was made to revolve, and by this movement a little ſlider of copper, which covered the pan with the priming, retired from being over it; and by the ſame movement the cock, armed with a flint like the cock of a fuſil, was in a ſtate to be diſcharged, on pulling the trigger with the finger, as in ordinary piſtols; the cock then falling on the wheel, produced fire, and communicated it to the priming.

PISTOL *Bay*, in *Geography*, a bay on the northern extremity of Newfoundland. A late writer (1768) on the probability of a North-weſt paſſage, mentions this bay as the only remaining part of Hudſon's Bay where this weſtern communication may exiſt. But this has been examined; and upon the authority of captain Chriſtopher, who ſailed from fort Churchill in the year 1761, for the purpoſe of examining Cheſterfield's inlet, through which it was ſuppoſed there might be a paſſage to the Weſtern ocean, the reader may be aſſured that there is no inlet of any conſequence in all that part of the coaſt. Nay, he has, in an open boat, ſailed round the bottom of what is called Piſtol bay, and inſtead of a paſſage to a weſtern ſea, found it does not run above three or four miles inland. See NORTH-WEST *Paſſage*.

PISTOLE, DOUBLOON, or *Doblon*, in *Commerce*, a gold coin ſtruck in Spain.

The piſtole of exchange, as a money of account in foreign exchange (*i. e.* dobloon de plata), was valued at 32 reals of old plate, or 60 reals 8 maravedis vellon; but in commercial tranſactions within the country, it was reckoned only at 60 reals. After the year 1772, when a new coinage took place, the gold coins current in Spain have been as follow: the dobloon of 8 eſcudos, or quadruple piſtole, which paſſes for 320 reals vellon; the dobloon of 4 eſcudos, or double piſtole for 160; the dobloon de oro, or piſtole for 80; the eſcudo for 40; and the coronilla, or veinten de oro, for 20.

In 1786, the ſtandard of the gold was reduced to 21 carats for the different dobloons and their diviſions, and to 20$\frac{3}{8}$ carats for the coronilla, or veinten de oro. The quadruple piſtole, or dobloon of 8 eſcudos, coined ſince 1786, contains 366$\frac{1}{6}$ troy grains of fine gold, and is therefore worth 3*l.* 4*s.* 9$\frac{1}{2}$*d.* valued in Engliſh gold coin; and the ſubdiviſions of the quadruple are in proportion: the allowance for remedy may be valued at 6*d.* in the quadruple. By the aſſay of the London mint, the weight of the quadruple is 17 dwt. 8 gr., and its fineneſs 4$\frac{1}{2}$ gr. worſe than Engliſh ſtandard: hence its value in Engliſh gold coin is 3*l.* 4*s.* 0$\frac{1}{2}$*d.* The value of gold in the Spaniſh coins is to that of ſilver as 16 to 1.

The aſſay, weight, &c. of the different Spaniſh gold coins, are as follow.

	Aſſay.			Weight.			Contents in pure Gold.	Value in Sterling.		
		car.	gr.	oz.	dwt.	gr.	grs.	*L.*	*s.*	*d.*
Quadruple piſtole, or dobloon, coined before 1772	W.	0	1$\frac{1}{2}$	0	17	8$\frac{1}{2}$	375.4	3	6	5$\frac{1}{4}$
Double piſtole, before 1772, ſingle and half in proportion - - - -	W.	0	1$\frac{1}{2}$	0	8	16$\frac{1}{4}$	187.7	1	13	2$\frac{1}{2}$
Quarter piſtole, or gold dollar, before 1772	W.	0	2	0	1	3	24.2	0	4	3$\frac{1}{4}$
Quadruple piſtole, or dobloon of 1772, the double and ſingle in proportion -	W.	0	2$\frac{1}{4}$	0	17	8$\frac{1}{2}$	372.	3	5	10
Half piſtole, or eſcudo de oro of 1772 -	W.	0	2$\frac{1}{2}$	0	2	4	46.4	0	8	2$\frac{1}{2}$
Quarter piſtole, or golden dollar of 1772	W.	0	3	0	1	3	24.	0	4	3
Quadruple piſtole of 1801 - -	W.	1	1	0	17	9	360.6	3	3	10
Double piſtole of 1801 - - -	W.	1	1	0	8	16$\frac{1}{2}$	180.3	1	11	11
Piſtole, or doubloon of 1801 - -	W.	1	1	0	4	8$\frac{1}{4}$	90.1	0	15	11$\frac{1}{2}$
Coronilla, or golden dollar of 1801 -	W.	1	2$\frac{1}{2}$	0	1	3	23.	0	4	1

The impreſſions on the gold coins of Spain are as follow: on the doubloon or piſtole is the head of the reigning king, with name and title; thus, CAROL. III. D. G. HISP. ET IND. REX, that is, Charles III., by the grace of God, king of Spain and the Indies: reverſe, arms of Spain, with the collar of the golden fleece; legend, in 1740, INITIUM SAPIENTIÆ TIMOR DOMINI, the fear of the Lord is the beginning of wiſdom; in 1762, NOMINA MAGNA SEQUOR, I follow great names; in 1763, IN UTROQUE FELIX AUSPICE DEO, happy in both under the divine auſpices: there is alſo at the bottom a letter to mark the place where the piece was coined; thus M, with a crown over it, ſignifies "Madrid;" M with an O over it, "Mexico:" there are alſo one or two other letters, which vary, being the initials of the moneyer's name. The double, quadruple, and half piſtoles bear the ſame impreſſions: but in modern coins, the half piſtole is marked "1 S," 1 ſcudo, or gold crown; the ſingle piſtole "2 S," and the others in proportion. The pieces coined between 1700 and 1723 bear no head, but have the arms, and the king's name with DEI GRA.; on the reverſe, a croſs ſurrounded with different ornaments; legend, HISPANIARUM REX. Thoſe coined before that period are not round, but of an irregular ſhape, and their impreſſions are very imperfect.

The doubloon of 1809, coined by Joſeph Bonaparte, bears on the front his head, with the legend, JOSEPH NAP. D. GR. HISP. ET IND. R. *i. e.* Joſeph Napoleon, by the grace of God, king of Spain and the Indies: reverſe, arms of Spain with a crown; legend, IN UTROQUE FELIX DEO AUSPICE, as before. The diviſions of the doubloon bear the ſame impreſſions.

The coronilla, or golden dollar, bears the ſame impreſſions as the doubloon, except with regard to the legends. Thoſe of an ancient date have on one ſide the king's name, with D. G., and on the reverſe HISPANIARUM REX; whilſt thoſe coined in 1786, &c. bear the name and title on the ſame ſide; and there is no inſcription on the reverſe except initials, as in the doubloon.

In Germany, under the name of piſtoles are included the Saxon Auguſt. d'ors, Pruſſian Frederick d'ors, Brunſwick Carl d'ors, Hanoverian George d'ors, Daniſh Holſtein Chriſtian d'ors, and the piſtoles of Heſſe, the Palatinate, Hildeſheim, and Mecklenburg; all reckoned at five rix-dollars current; 35 pieces of each of theſe ſorts of money are to weigh a Cologne mark, and the gold to be $21\frac{3}{4}$ carats fine; ſo that $38\frac{18}{29}$ pieces contain a Cologne mark of fine ſilver. An allowance is, however, generally made for a deficiency in weight and fineneſs, and they are current, in moſt places, as long as $35\frac{3}{5}$ pieces weigh a Cologne mark of gold, $21\frac{2}{3}$ carats fine: they are then called "paſſier piſtoles." The aſſay of the George d'or of Hanover is W. 0 car. $1\frac{1}{4}$ gr.; weight, 0 oz. 4 dwt. $6\frac{1}{2}$ gr.; the contents in pure gold 92.6 gr.; and value in ſterling, 16*s*. $4\frac{1}{2}$*d*. The aſſay of Heſſe-Caſſel piſtole is W. 0 car. $2\frac{1}{2}$ gr.; weight, 0 oz. 4 dwt. $7\frac{1}{4}$ gr.; contents in pure gold, 92; value in ſterling, 16*s*. $3\frac{1}{2}$*d*. Aſſay of Manheim piſtole W. 0 car. $1\frac{1}{2}$ gr.; weight, 0 oz. 4 dwt. $6\frac{1}{2}$ gr.; contents in pure gold, 92.5; value in ſterling, 16*s* $4\frac{1}{2}$*d*.. The George d'or of Hanover bears on the front the king's arms; legend, GEORG. II. D. G. M. B. F. ET H. REX. F. D.; reverſe, V THALER (5 rix-dollars of account), and under this the date; legend, BRUNS. ET LUN. DUX S.R. I.A. T.H. ET ELECT. The piſtole of Heſſe-Caſſel bears the head of the reigning prince, with his name and titles, thus: WILHELMUS IX. D. G. HESS. LANDG. HAN. COM., William IX. by the grace of God, landgrave of Heſſe, count of Hanau; reverſe, a ſtar, and within it, the legend, VIRTUTE ET FIDELITATE, by courage and fidelity; in the centre, a lion. Other piſtoles, coined in 1794, &c. bear on the reverſe a lion at reſt with ſtandards and military trophies, and over this 5 THALER.

The piſtole of Manheim bears the head of the reigning prince, with name and title, thus: CAR. THE. C. P. S. R. I. A. T. ET EL. that is, Charles Theodore, count palatine, high ſteward and elector of the holy Roman empire; reverſe a crown, formed by four crowns, and four cyphers of the letters C. T.; legend, DOMINUS REGIT ME, God directs me.

In various parts of Italy, the piſtole is known under the name of doppia.

In Geneva the gold coins are the old piſtole of 11 livres 10 ſols; and the new piſtole coined ſince 1752, worth 10 livres current, or 35 florins, with double and triple piſtoles in proportion. The aſſay of the old piſtole of Geneva is W. 0 car. 2 gr.; weight, 0 oz. 4 dwt. $7\frac{3}{4}$ gr.; contents in pure gold, 92.5 gr.; value in ſterling, 16*s*. $4\frac{1}{2}$*d*. The aſſay of the new piſtole is W. 0 car. $0\frac{1}{2}$ gr.; weight, 0 oz. 3 dwt. $15\frac{3}{4}$ gr.; contents in pure gold, 80; value in ſterling, 14*s*. 2*d*.

The aſſay of the piſtole of the Helvetic republic of 1800 is W. 0 car. $1\frac{1}{2}$ gr.; weight, 0 oz. 4 dwt. $21\frac{1}{2}$ gr.; contents in pure gold, 106 gr.; value in ſterling, 18*s*. 9*d*. The aſſay of the piſtole of Lucerne is W. 0 car. $1\frac{1}{2}$ gr.; weight, 0 oz. 4 dwt. $21\frac{1}{2}$ gr.; contents in pure gold, 106 gr.; value in ſterling, 18*s*. 9*d*. The aſſay of the piſtole of Soleure is W. 0 car. $1\frac{3}{4}$ gr.; weight, 0 oz. 4 dwt. 22 gr.; contents in pure gold, 106.8 gr.; value in ſterling, 18*s*. $10\frac{3}{4}$*d*. The impreſſions on the piſtole of the Helvetic republic are a ſoldier carrying a ſtandard; legend, HELVETISCHE REPUBLICK, Helvetic republic; reverſe, a crown of oak, containing 16 FRANKEN: the double piſtole is marked 32 FRANKEN. The piſtole of Lucerne bears the arms of the city, with the legend, RESPUBLICA LUCERNENSIS; reverſe, a wreath of laurel, containing 12 M 2. GL., and under this the date. The double piſtole is marked 24. The piſtole of Soleure bears a warrior carrying a ſtandard; legend, S. URSUS MARTYR; reverſe, arms of the city; legend, RESPUBLICA SOLODORENSIS, republic of Soleure. The double and half piſtoles bear the ſame impreſſions.

The aſſay of the piſtole, or doppia, of Piedmont, of 1741 to 1785, is W. 0 car. $1\frac{3}{4}$ gr.; weight, 0 oz. 6 dwt. $4\frac{1}{2}$ gr.; contents in pure gold, 134.2 gr.; value in ſterling, 1*l*. 3*s*. 9*d*. The aſſay of the piſtole coined ſince 1785 (half, &c. in proportion) W. 0 car. $1\frac{3}{4}$ gr.; weight, 0 oz. 5 dwt. 20 gr.; contents in pure gold, 127.8gr.: value in ſterling, 1*l*. 2*s*. $7\frac{1}{2}$*d*.; The aſſay of the doppia or piſtole of Genoa, (the pieces of. of 2, 4, and 5 piſtoles in proportion) is W. 0 car. $1\frac{1}{2}$ gr.; weight, 0 oz. 4 dwt. $7\frac{1}{2}$ gr.; contents in pure gold, 93.4 gr.: value in ſterling, 16*s*. $6\frac{1}{4}$*d*. For other particulars relating to the piſtole, both as a money of account and as a coin, we refer to Kelly's Univerſal Cambiſt.

N.B. W. every where denotes worſe than the Engliſh ſtandard.

PISTOLOCHIA, in *Botany*, a name uſed by ſome authors for the plant of which the Virginian ſnake-root of the ſhops is the root.

PISTON, a part or member in ſeveral machines, particularly pumps, air-pumps, ſyringes, &c. called alſo the *embolus*, and popularly the *ſucker*.

The piſton of a pump is a ſhort cylinder of metal, fixed exactly to the cavity of the barrel, or body; and which, being worked up and down alternately therein, raiſes the water; and when raiſed, preſſes it again, ſo as to make it force up a valve with which it is furniſhed, and ſo eſcape through the noſe of the pump.

There are two ſorts of piſtons uſed in pumps; the one with a valve, which is called a bucket; and the other without a valve, which is called a forcer. See Pump.

The piſtons of air-pumps, ſyringes, &c. ſee deſcribed under Air-pump and Syringe.

PISTORIA, in *Ancient Geography*. See Pistoia.

PISTRINA, in *Geography*, a town of Servia; 48 miles S.W. of Niſſa, and 100 miles E. of Raguſa.

PISTRITZER, a river of Saxony, which runs into the Elbe, near Wittemberg.

PISTYRUS, or Pissirus, in *Ancient Geography*, a town in the weſtern part of Thrace, near Meſtras, in the territory of which, according to Herodotus, was a lake thirty ſtadia in circuit.

PISUERGA, in *Geography*, a river of Spain, which ſprings in the N. part of Old Caſtile, and runs into the Duero; 10 miles S.W. of Valladolid.

PISUM, in *Botany*, the Pea, an ancient name, whoſe origin is loſt in its antiquity. Some of the learned are content to deduce it from the Greek πισον, which means the ſame thing, and which others derive from πτισσω, *to ſtamp*, or *bruiſe*, becauſe it was cuſtomary to take off the ſkin by ſuch means. De Theis thinks the Celtic *pis*, which is *piſen* in the plural, (he by miſtake ſays ſingular,) is the common root of this word in all languages. Hence the Anglo-Saxon *piſa;* the Engliſh *pea*, *peaſe*, and ſtill in obſolete Norfolk *peaſen;* the French *pois*, and for a pea-field, in old language, *peſiere;* the Italian *piſo;* the Welſh *pus;* all ſynonimous. Linn. Gen. Pl. 374. Schreb. 496. Willd. Sp. Pl. v. 3. 1070. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 760. Ait. Hort. Kew. v. 4. 302. Juſſ. 360. Tourn. t. 215. Lamarck Illuſtr. t. 633. Gærtn. t. 152. (Ochrus; Tourn. t. 219, 220.)—Claſs and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, five-cleft, acute, permanent; the two upper ſegments broadeſt. *Cor.* papilionaceous. Standard very broad, inverſely heart-ſhaped, reflexed, emarginate with a little point. Wings two, roundiſh, converging, ſhorter than the ſtandard. Keel compreſſed, half creſcent-ſhaped, ſhorter than the wings. *Stam.* Filaments in two diſtinct ſets; one ſimple, uppermoſt; and nine awl-ſhaped, united more than half-way into a cylinder, ſplit along its upper ſide; anthers roundiſh. *Piſt.* Germen oblong, compreſſed; ſtyle aſcending, triangular, membranous, keeled, its ſides bent outwards; ſtigma united with the upper angle, oblong, villous. *Peric.* Legume large, long, roundiſh, or compreſſed towards the baſe, terminating in a point directed upwards, of one cell and two valves. *Seeds* ſeveral, globoſe.

Obſ. *Ochrus* of Tournefort has an oblong ſcar to the ſeed; *Piſum* of the ſame author has a roundiſh ſcar.

Eſſ. Ch. Style triangular, keeled and downy at the upper ſide. Two upper ſegments of the calyx broadeſt. Stamens in diſtinct ſets.

1. P. *ſativum*. Common Pea. Linn. Sp. Pl. 1026. Willd. n. 1. Ait. n. 1. (Piſum; Riv. Tetrap. Irr. t. 36. Camer. Epit. 213. P. majus; Matth. Valgr. v. 1. 389. Ger. Em. 1219.)—Footſtalks cylindrical. Stipulas rounded and crenate at the baſe. Stalks bearing ſeveral flowers.—Native of the ſouth of Europe. Dr. Sibthorp found it, apparently wild, in various parts of Greece. The *root* is annual. *Stem* branched, leafy, ſmooth, climbing by means of tendrils, and various in height. *Leaves* alternate, pinnate, of about ſix, elliptical, nearly oppoſite, moſtly entire leaflets, on a common *footſtalk*, ending in a compound *tendril*. *Stipulas* in pairs at the inſertion of the footſtalk, much larger than the leaflets; rounded, lying over each other, and copiouſly crenate, at the baſe. *Stalks* axillary, ſolitary, bearing two or more large, pearly-white, inodorous *flowers*. Upper ſegments of the *calyx* broader, hardly ſhorter, than the reſt; all of them ovate, acute. *Legume* about a finger's length, ſmooth.

Of this valuable plant botaniſts have diſtinguiſhed ſeveral varieties, and gardeners ſeveral more. Among the latter are the Marrowfat, the Rounceval, the Hotſpur, &c. Among the former are the Sickle Pea of Miller, Piſum ſiliqua curva; Rivin. Tetrap. Irr. t. 37; the Dwarf Pea, P. nanum of the ſame author, t. 38. f. 2; the Sugar Pea, P. cortice eduli; Tourn. Inſt. 394; and the Roſe, Crown, or Topknot Pea, P. umbellatum; Mill. Dict. ed. 8. n. 3. Ger. Em. 1220. P. comoſum; Riv. Tetrap. Irr. t. 38. f. 1. Theſe two laſt, (the Sugar and the Crown Peas,) agree in the remarkable property of having no hard rigid lining to the legume, ſo that their pods may be boiled and eaten entire, having moreover a very ſweet and agreeable flavour. The *flowers* of the Crown Pea, at leaſt, have elegant roſe-coloured wings, and their ſtalks grow many together about the top of the ſtem, rendering the plant very ornamental, and the crop abundant. We have often been tempted to conſider this as a diſtinct ſpecies. The notches of the *ſtipulas* are, as Miller remarks, about four, being much fewer than in the Common Pea; but we can find no ſufficiently clear and permanent ſpecific mark.

2. P. *arvenſe*. Field, or Grey Pea. Linn. Sp. Pl. 1027. Willd. n. 2. Ait. n. 2. Sm. Fl. Græc. Sibth. t. 687, unpubliſhed. (Piſi pulchra ſpecies, folio anguloſo; Bauh. Hiſt. v. 2. 297. Moriſ. v. 2. ſect. 2. t. 1. f. 4.)—Leaflets four on a ſtalk. Stipulas ſtrongly crenate. Stalks ſingle-flowered.—Native of fields in ſeveral parts of Europe. Dr. Sibthorp found it near Conſtantinople; and it is often in ſome degree naturalized with us. This ſeems ſcarcely more than a variety, or perhaps the true original ſtate, of the firſt ſpecies, differing in having rather fewer *leaflets*, which are more frequently ſerrated; ſolitary purpliſh *flowers*, whoſe wings are of a violet purple; and rather more ſtrongly crenate, often angular, *ſtipulas*.

3. P. *fulvum*. Tawny-flowered Pea. Sm. Prodr. Fl. Græc. Sibth. v. 2. 62. Fl. Græc. t. 688, unpubliſhed.—Footſtalks cylindrical. Stipulas rounded at the baſe, ſharply toothed. Stalks two-flowered. Legumes ſhortened.—Gathered by Dr. Sibthorp in Aſia minor, probably near Smyrna. This is ſmaller than the preceding. *Leaflets* two or four, ſerrated. Baſe of the *ſtipulas*, rounded, dilated, very ſharply and copiouſly toothed. *Flowers* elegant; their ſtandard ſalmon-coloured, veined with crimſon or ſcarlet; wings of an orange hue; keel of a tawny yellow. *Legume* ſcarcely more than an inch long, half-elliptical. *Seeds* from three to five.

4. P. *maritimum*. Sea Pea. Linn. Sp. Pl. 1027. Willd. n. 3. Ait. n. 3. Sm. Spicil. 8. t. 9. Engl. Bot. t. 1046. Fl. Dan. t. 338.—Footſtalks ſlightly flattened above. Stem angular. Stipulas arrow-ſhaped. Stalks many-flowered.—Native of the ſtony ſea beach in the north of Europe, and according to Linnæus and Purſh, of North America alſo. It was firſt noticed in England between Aldburgh and Orford, Suffolk, when a year of ſcarcity cauſed it to attract the obſervation of the diſtreſſed peaſantry, who derived great relief from theſe wild peas, as Caius, Gerarde, and others relate; ſee Ger. Em. 1250. The long deep perennial *roots* were alſo found to be ſweet and eatable. The *ſtems* are ſhort, procumbent, thickly clothed with greyiſh glaucous *leaves*, each compoſed of ſix or eight oval, entire, generally alternate leaflets, and ending in a divided *tendril*. *Flowers* handſome, variegated with purple and blue, many

together on longiſh axillary ſtalks. *Legumes* linear-oblong; their young *ſeeds* about as good as the Grey Pea.

5. P. *Ochrus*. Wing Pea. Linn. Sp. Pl. 1027. Willd. n. 4. Ait. n. 4. Sm. Fl. Græc. Sibth. t. 689. (Ochrus ſive Ervilia; Ger. Em. 1249. Aracus niger; Matth. Valgr. v. 1. 384.) – Leaflets two, on winged decurrent footſtalks. Flower-ſtalks ſingle-flowered.—Native of Italy, Spain and the Levant. It was cultivated in the Engliſh gardens in Gerarde's time, being a hardy annual, flowering in June and July. The very large broad wings of the *footſtalks* mark it ſufficiently. Each lobe of theſe bears, at the ſummit, an oval glaucous *leaflet*, ſometimes more, and the middle part ends in a many-branched tendril, winged at the baſe. *Flower-ſtalks* axillary, ſolitary, much ſhorter than the footſtalks, ſingle-flowered. *Corolla* pale buff. *Legume* an inch and an half long, channelled and winged at the back. Of the quality of the peas we have no information.

Pisum, in *Gardening*, compriſes plants of the hardy herbaceous kinds, of which the ſpecies cultivated are; the common pea (P. ſativum); the ſea pea (P. maritimum); and the yellow-flowered pea (P. ochrus).

Of the firſt ſort there are two principal varieties, the white and grey; and ſeveral ſub-varieties, the principal of which are:

Early Kinds.—The early golden hotſpur; early Charlton hotſpur; Nichols's early golden hotſpur; the early Charlton; the Reading hotſpur; Maſters's hotſpur; Ormrod's hotſpur; early dwarf hotſpur; Leadman's dwarf; fan Spaniſh dwarf; early dwarf frame pea; pearl pea; cluſter pea; royal green pea; Eſſex hotſpur; the dwarf pea; the ſugar pea.

Late Kinds.—Spaniſh morotto; nonpareil; ſugar dwarf; ſickle pea; marrowfat; dwarf marrowfat; roſe or crown pea; rounceval pea; grey pea; large grey pea; crooked grey pea; long-bearing pea; green field pea; white field pea; pig pea.

Many of the firſt ſub-varieties are very early, and being low growers, require ſticks of three or four feet only in height, and often not ſo much. New varieties of theſe are raiſed almoſt every year, which, becauſe they differ in ſome ſlight particular, are ſold at an advanced price, and have frequently the names of the perſons who raiſed them, or the place where they firſt grew. Theſe varieties are not permanent, and without the greateſt care will ſoon degenerate.

Method of Culture in the open Ground.—All the ſorts of the firſt kind are raiſed from ſeed ſown annually; and as thoſe of one ſowing continue but a ſhort time in bearing, ſeveral ſowings are requiſite each ſeaſon, to continue ſucceſſions for the table all ſummer; each ſowing to remain where ſown, chooſing a warm dry border, &c. for the earlieſt crops; and for the ſucceeding ones, any of the common quarters, in a free expoſure, diſtant from the ſhade of trees, &c., but open to the ſun.

For the late crops the more moiſt parts are the beſt.

The general ſeaſon for ſowing is any time in open weather, from the lattter end of October, or in November, until May or June.

But in order to have green peas as early as poſſible, recourſe muſt be had to the aſſiſtance of hot-beds, by the aid of which they are obtained in March and April, and continued till the coming in of the natural ground crops, in the latter end of May or beginning of the following month.

The early and firſt general Crops.—Towards the latter end of October, in November or December, as the weather may be convenient, the earlieſt crops ſhould be put into the ground. In warm ſoils and ſituations it is always adviſable to ſow a few in the two former months; but in general, and eſpecially in open expoſed grounds, November and December is time enough to begin the principal ſowings. For this purpoſe the earlieſt Charlton or golden hotſpurs are the moſt proper.

And in order for their reception a warm ſouth border, or ſome other dry, ſheltered, ſunny ſituation ſhould be dug over and prepared; when, in a dry day, drills ſhould be drawn by a line, ranging ſouth and north, to enjoy the greater advantage of the ſun's influence, making them an inch and a half deep, and two feet and a half at leaſt aſunder; but if deſigned for ſticks, three feet and a half will be a more proper diſtance. Then the ſeed ſhould be ſcattered in evenly along the middle of each drill, rather thickiſh, as they are liable to accidents from vermin and the ſeaſon, covering them in regularly with the earth either with a rake or hoe, being careful that they are all equally covered the depth of the drills; and then with a rake lightly trim the ſurface ſmooth; which finiſhes the work.

The peas begin to germinate in a fortnight, if mild weather, and come up in three weeks or a month, but ſeldom in leſs time at this ſeaſon; when the plants are to be managed as directed below.

Another ſowing ſhould be performed in three weeks or a month after this; or when the firſt was ſowed in October or early in the following month, it is better to repeat the ſowing in a fortnight or three weeks, for fear the firſt ſhould fail; and after this continue ſowing once in three weeks or a month all winter in mild weather. But towards ſpring a principal crop of the Reading and other large hotſpurs ſhould be ſown; and as the ſeaſon advances, the ſowings be made in more open expoſures, and more in quantity than the early ones; and as the ſpring draws on, the ſowings ſhould alſo be repeated oftener; as from the cloſe of the year till the beginning of April, they ſhould be once in three weeks; and from that time till May once a fortnight, eſpecially as the warm weather increaſes.

The winter and early ſpring ſowings differ materially in the time they require to germinate: thoſe ſown any time in winter are ſometimes three weeks or near a month before they appear, while thoſe ſown towards ſpring come up much ſooner, in the later ſpring ſowings, often in a very ſhort time.

In the later of the above ſowings, ſome of the dwarf ſorts may be introduced; as Leadman's dwarf, both for middle and late crops.

As the plants of each ſowing come up, and are advanced two or three inches in height, it is proper to begin the firſt culture by drawing a little earth with a hoe, or ſmall rake, lightly up to their ſtems on each ſide of the different rows to ſtrengthen and forward their growth, repeating the earthing once or twice at proper intervals, as occaſion may require, and at the ſame time cutting up and clearing away all weeds; and when the crops are ſix or eight inches in height, thoſe deſigned for ſupport ſhould be ſticked.

As the earlieſt crops are often in danger from the ſeverity of froſts, it is proper, when they are about an inch and a half high, to draw a little fine earth lightly up to their ſtems in a dry day; it will alſo be of much advantage to give occaſional protection to ſuch crops in ſevere weather, by covering them lightly with long, light, dry litter, of the ſtrawy kind, or by mats; which, where there is but a moderate quantity in warm borders, may be more eaſily effected; but this need only be practiſed in very ſevere froſts. They muſt however be carefully uncovered every fine day in temperate weather; and the moment the froſt diſappears the covering be entirely removed; as they muſt by no means be kept too cloſe, which would draw them up weak and tender.

When in bloſſom, if the weather ſhould prove dry and warm, a few good waterings in the mornings will be beneficial; and when the bloſſoming plants are advanced a conſiderable height, if they are then topped, it will promote their podding and coming to perfection.

As to the ſucceeding crops of the different kinds, all they require is hoeing up the earth to their ſtems occaſionally, and cutting up all weeds when they appear; thoſe deſigned for ſupport being always ſticked as ſoon as they are half a foot high, or a little more, before they begin to fall down on their ſides, providing ſticks about four or five feet long, and placing one range to each row principally on the ſouth or moſt ſunny ſide of the rows, as the plants naturally incline towards the ſun, and of courſe more readily attach themſelves to the ſticks.

In the culture of the larger kinds, for ſucceſſional general crops, ſuch as the marrowfats, Spaniſh morottos, &c. they may be begun ſowing in January, the dwarf marrowfats firſt; but the three following months are the moſt proper for the general crops of all the large kinds; a free expoſure in the moſt open quarters being made uſe of, drawing drills by line, about an inch and a half or two inches deep, and not leſs than a yard aſunder, and when ſticked, four feet, and for the largeſt ſorts four feet and a half or five feet, in ſingle or double rows.

In theſe caſes the ſeed ſhould be ſown thinly along the middle of each drill, drawing the earth evenly over them with the rake, hoe, or feet, covering them equally the depth of the drills, and raking the ſurface ſmooth; theſe ſowings being repeated once a fortnight or three weeks; and as the ſpring advances once a fortnight, eſpecially from the beginning of April until the end of the following month. Afterwards a few may be ſown every ten or twelve days. Late ſowings are, however, ſeldom very fruitful, being often attacked with the mildew; but it is proper to endeavour to have ſome as long in the ſeaſon as poſſible.

When theſe different crops are come up about three inches high, they ſhould have earth laid up to them on each ſide of the rows, cutting down all weeds, and repeating the hoeings occaſionally according as the growth of weeds may require; and when they are half a foot, or eight or ten inches high, they ſhould have the ſticks placed to them; which for theſe large ſorts require ſticks ſix or ſeven feet high at leaſt, placing them on the ſunny ſide of the rows, as directed above.

For late crops, any of the ſorts, either hotſpurs or larger kinds, may be continued ſowing all May and until the middle or latter end of June; likewiſe ſome of the dwarf ſorts at a later period for late production. It may be proper to ſow larger portions of Rouncivals for the lateſt crops, on account of their being rather the hardieſt to ſtruggle with the ſummer's heat and drought, and thereby moſt to be depended on for a late production.

For theſe crops ſome of the moiſteſt ground ſhould be choſen; and if the weather ſhould prove very dry and hot, it will be of importance to ſoak the ſeed in ſoft water ſix or eight hours previous to ſowing; or the drills may be well watered after it has been done; either of which will promote their riſing expeditiouſly and more regularly.

It may be obſerved, in reſpect to the times of ſowing, that it is a good rule, in the different ſorts, as ſoon as one crop appears fairly above ground, to ſow another to ſucceed it of the ſame kind, ſo as to have a regular ſucceſſion of crops following one another in bearing; and if a crop of marrowfats, &c., and another of hotſpurs, be ſown on the ſame day, the hotſpurs will come into bearing a fortnight the ſooneſt, and the marrowfats will arrive to a bearing ſtate about the time the others are going out, juſt in due time to ſucceed them; which ſhould be attended to in order to have theſe ſorts form a regular ſucceſſion to each other.

In gathering the crops, both hands ought always to be employed; one to hold the peduncle or footſtalk of the fruit, while the other pulls the pods; otherwiſe the ſtem or main ſtalk of the plant, being ſlender, fragile, and weak, is liable to be broken and deſtroyed; and the gatherings ſhould always be regularly performed according as the pods fill, never letting them ſtand to grow old, as they are in the greateſt perfection for eating while green, and the plants continue longer in bearing. Crops of peas continue only about a fortnight in full bearing, during which time they furniſh a plentiful gathering of pods in their perfection; though in moiſt ſhowery weather they ſometimes continue ſhooting and flowering three or four weeks; but the produce after the firſt fortnight is generally inferior both in quantity and quality.

As ſoon as the crops are paſt bearing, all the ſticks ſhould be taken up and tied in bundles, being ſet upright in any dry corner for future uſe.

Method of Culture in Hot-Beds.—In order to have green peaſe as early in the year as poſſible, recourſe muſt be had to the aſſiſtance of hot-beds; and the proper ſorts for this purpoſe are the early dwarf kinds, which by this means may be brought into bearing in March, or the following month.

In this intention, it is rather the beſt mode to raiſe the plants firſt in the natural ground, by ſowing in October, or the following month, giving occaſional protection from froſt; and when one or two inches high, to tranſplant them into the hot-bed, in January, or the beginning of the following month: as by this practice the luxuriant growth of the plants is ſo checked by the removal, that they ſhoot more moderately, and thereby bloſſom and bear ſooner, and more abundantly.

The ſowings ſhould be performed in a warm, dry, ſouth border, or in ſome ſimilar dry ſheltered part of light good earth, in a bed of proper dimenſions, to have the protection of a frame, &c. in ſevere weather; ſowing them in drills about a foot aſunder, in the manner as for the common crops. When they are come up, and advanced a little in growth, in a dry day, ſome fine earth ſhould be drawn up to their ſtems, giving ſuitable protection in bad weather.

But they may be ſown on a moderate hot-bed in December, or January, under frames, &c.; and when the plants are up, plenty of free air ſhould be admitted every temperate day, and be defended in the nights from froſt, ſnow, and cutting cold; or, ſome may be ſown in large pots, and be placed in a hot-houſe, &c. to bring up the plants quickly, for tranſplanting into the intended hot-bed in January. And they may be ſown at once in a hot-bed, at the above periods, to remain for bearing; but it is generally more eligible to have the plants previouſly raiſed an inch or two in height, either by early ſowing in the full ground, or forwarded under frames, or in a hot-bed, &c. as above, for tranſplanting into a freſh-made hot-bed for bearing.

In either of the above methods of raiſing the plants for tranſplanting, when advanced from one to two inches in growth, or little more, they are proper for planting out into the hot-bed to remain for fruiting.

In mild weather, towards the middle or latter end of January, or the beginning of the following month at furtheſt, a hot-bed for one or more of the largeſt three-light frames and glaſſes ſhould be prepared, which may be either of dung or tan: the latter, where it can be obtained eaſily at a moderate expence, is conſiderably the beſt for this purpoſe. It ſhould be made two feet and a half, or a yard thick, and covered with frames and lights; and when in a moderate temperature, the earth be put on for the reception of the plants. Any light, good, dry earth may be employed, which ſhould be laid eight or ten inches thick all over the bed; then in a dry mild day, the plants may be taken up, raiſing them with their roots as entire as poſſible, with what earth will readily hang about the fibres; and after drawing ſmall drills in the earth of the hot-bed, from the back to the front of the frame, a foot and a half aſunder, and about an inch deep, the plants ſhould be put in the drills, not more than an inch apart, covering in the earth cloſe to their roots and ſtems, and giving a very light watering, juſt to ſettle the earth; after which the lights ſhould be put on, being careful to raiſe them occaſionally at the upper end, to give vent to the ſteam, &c. And at firſt planting out, when in ſunny weather, if the plants ſhould flag, a moderate ſhade ſhould be given in the middle of the day, till the plants have taken root, and eſtabliſhed themſelves.

After this, freſh air muſt be admitted to the plants daily, in fine weather, to ſtrengthen them, by tilting the upper end of the lights, according to the temperature of the bed and outward air; keeping them cloſe in cold nights, and covering alſo with mats. Occaſional moderate waterings ſhould likewiſe be given in fine days; and, as the plants advance in growth, a little earth be drawn up to their ſtems once or twice; repeating the moderate refreſhments of water frequently, as the warm ſeaſon advances; which may be given more freely when the plants are in bloom. And according to the advanced growth of the plants, and increaſed warmth of the weather, a larger ſhare of freſh air in proportion ſhould be given; and when they are in bloſſom, if the ſun at any time appears too violent for them through the glaſſes, it is adviſable to give a very ſlight ſhade an hour or two in the heat of ſunny days: likewiſe, when in full bloſſom, and fruiting, to admit plenty of free air; even ſometimes, in fine days, ſhoving the glaſſes entirely off; alſo ſtill continuing the waterings more abundantly during the time of ſetting and growth of the pods, and indulging them with the benefit of warm ſhowers of rain. In this way, the plants may be brought to bearing in March or April; and by a ſucceſſion of two crops, in hot-beds made at three or four weeks' interval, and managed as above, a ſupply be continued till the natural ground crops come into bearing in May.

Where there is the convenience of fruit forcing-houſes, hot-walls, &c. a few of the earlieſt kinds, either previouſly raiſed in young plants an inch or two in growth, as in the hot-bed culture, or, in default of it, the ſeed ſown; and which being in pots, are placed in theſe departments: or, where there are internal borders of earth, ſome young plants may be placed therein. The internal moderate heat of the above departments, effected either by bark-beds, &c. or fire, or both occaſionally, in a requiſite degree for forcing the fruit-trees to early production, forwards them alſo, ſo as to have ſome for gathering in the moſt early ſeaſon, in a ſmall proportion.

Method of Culture in the Field.—Where deſigned to raiſe crops, in order to gather the produce green and young, for the ſupply of markets, November, or rather December, is ſoon enough to begin the firſt ſowings, eſpecially in open expoſed grounds; a dry light ſoil being choſen for the more forward ſowings. As to the ſorts, any of the hotſpurs may be uſed for the forward crops; and for a general crop, the Reading hotſpur is excellent; and after that ſort, the Maſters's and Ormrod's, &c.; but of the large kinds, the marrowfats and Spaniſh morattoes ſhould be choſen for the main crops.

The ground for their reception muſt be prepared by proper ploughing and harrowing; drills are then to be drawn with a hoe croſsways the lands, or with a drill-plough lengthways, two feet at leaſt, or two and a half aſunder for the early, and three for the larger ſorts. As no ſticks are intended for theſe large field crops, having ſown the ſeed, it ſhould be covered in either with the hoe, rake, or harrow; but the hoe or rake will cover them more evenly, and almoſt as expeditiouſly. When they come up, they muſt be kept clean from weeds, by broad-hoeing; but this is ſometimes performed in fields by horſe-hoeing, for the ſake of expedition; which, having hoes fixed in a ſort of plough horizontally, is drawn by a horſe between the rows, a man holding the plough-ſhafts to guide it. But as this can only cut down the weeds, a common drawing hand-hoe muſt be uſed to earth up the plants: though this is often diſregarded in the field-culture, it, however, proves very beneficial to the crops.

In theſe caſes, the rows ſhould be laid down ſo as to face the ſun as much as poſſible.

Method of ſaving Seed.—In order to ſave ſeed, ſome of each ſort ſhould be ſuffered to ſtand entirely for that purpoſe, or ſome ſown of each purpoſely in different parts; and the whole produce ſuffered to remain and ripen for ſeed.

In the latter mode, they ſhould be ſown in February, in ſome open ground, in rows two or three feet aſunder, no ſticks being required; and, when the plants come up, be kept clean from weeds by hoeing, the earth being laid up to their ſtems once or twice. When they are in bloom, they ſhould be examined row by row, to ſee if there be any degenerate ſort, which, when preſent, muſt be pulled out; or if any improved variety be diſcovered, to mark it; which is the only method to preſerve both the purity of the known ſorts, and to procure new varieties. For example: if amongſt the hotſpurs any large ſorts appear, they ſhould be removed directly; alſo any hotſpurs, &c. from amongſt the large kinds; and different ſorts of any of theſe from each other. And if any new ſort diſcovers itſelf, either by flowering earlier than all the reſt, or poſſeſſing ſome other ſingularity, or noticeable merit for culture, it ſhould be carefully marked; the ſeed being ſaved ſeparate, to ſow ſeparately for furniſhing a proper increaſe.

According as the ſeeds of the different ſorts ripen in July and Auguſt, which is diſcoverable by the pods changing brown, and the ſeed becoming a little hard, the haum ſhould be cut or pulled up in dry weather, and expoſed in heaps to the ſun, turning them every day; and when the ſeed is become perfectly dry and hard, it may either be threſhed out directly, or ſtacked up in a dry ſituation, till another opportunity: but when threſhed, each ſort muſt be kept ſeparate, and, when properly cleaned, be put up in ſacks, with the name of each upon them.

PIT *and Gallows*, in our *Ancient Cuſtoms*. See FURGA and FOSSA.

PITS, *Brine*, the name given by the people of Worceſterſhire and Cheſhire, to the wells or pits affording the ſalt water, out of which they extract the ſalt.

Theſe waters, though they all contain ſalt, yet have other things alſo in them, and theſe not in ſmall quantity. They all contain a very large proportion of ſtony matter: this is common to the whole ſet, but particular ſubſtances beſide this are found in the particular pits. At Northwich, in Cheſhire, there are four pits, the water of which ſtinks very ſtrongly of ſulphur, and contains ſo much vitriol, that it will turn black like ink, with a decoction of galls: yet this is boiled into a very fine and pure kind of ſalt, common at our tables under the name of baſket-ſalt, and having no ſuch properties.

There is a vaſt quantity of ſtony matter precipitated from theſe pans of brine, in the boiling of them to ſalt: this is partly ſaved in ſmall pans ſet at the ſide of the boiler, and partly precipitates to the bottom of the pan, where it forms a cruſt like that at the bottom and ſides of our tea-kettles, which the workmen find it neceſſary to remove every week; but there is no vitriol or ſulphur ſeparated. Phil. Tranſ. N° 150.

In the country near where theſe brine-pits are, the inſtruments uſed in boring often bring up fine and hard ſalt; ſo that they give proofs of there being rocks of ſalt in many places.

All along the river Weever, on each ſide, the earth affords brine wherever it is opened; but all theſe are not fit for boiling, many of the pits affording a brine too weak to be worked to any advantage. The very ſtrongeſt pits ſometimes alſo become at once too weak: this is owing to the irruption of freſh ſprings into them, and ſometimes the river itſelf makes its way into them, and overflows them with ſuch a quantity of freſh water, that they are utterly ſpoiled. The brine-pits at Weſton, near Stafford, afford a brine that ſtinks like rotten eggs: this turns inſtantly to ink with galls, and purges and vomits violently, if taken even in a ſmall quantity. This, in boiling, depoſits a white flaky ſand, or ſtony matter, without ſmell or taſte, and the ſalt is pure and fine.

The pit at Droitwich, in Worceſterſhire, affords no ſand in the boiling, nor any the leaſt ſediment of the ſtony matter at the bottom of the pan, and the ſalt is the pureſt of all the others; and by the people of the country it is eſteemed the moſt wholeſome, becauſe of its being without the ſand.

This and the other pits hereabout, all have the ſmell of rotten eggs, eſpecially after a little reſt, as on the Monday morning after the Sunday's reſt. If meat be put to pickle in the brine of theſe pits, inſtead of being preſerved, it will ſtink in twenty-four hours, ſometimes in twelve, yet they yield the beſt ſalt of any inland pits in the world.

The ſulphur ſpaws of Yorkſhire, which are very numerous in different parts of the county, all ſtink violently of rotten eggs; but if well drawn and worked, they would prove as inoffenſive as the reſt, and only ſo many weaker or ſtronger brine pits; and the ſmell is no other than that of the Cheſhire and Staffordſhire brine, when it has been left ſome time at reſt. It is remarkable, that though the ſtony matter is depoſited in ſuch vaſt plenty by the waters of all our ſalt ſprings, it is not found in any abundance in thoſe places where ſalt is made out of ſea-ſand, as in Lancaſhire, and ſome other places; ſo that it is much more than the natural quantity of ſpar contained in water that is thus depoſited; and indeed it appears from trial, that the brine of our ſalt ſprings, in general, contains more than twenty times the quantity of ſpar that common water does.

This ſtony matter ſeparates itſelf from the water before the ſalt does, and thus it appears in many other waters impregnated with mineral particles. The vitriolic waters all contain ochre and ſalt, and in all theſe the ochre ſeparates itſelf firſt in the boiling, and then the vitriol; and the ſtony matter precipitated from common ſalt ſprings affords, on an analyſis, the ſalt called *nitrum calcareum*, in conſiderable abundance. Phil. Tranſ. N° 156. See SALT.

PITS, *Forcing*, in *Gardening*, ſuch as are formed and conſtructed on ſomewhat ſimilar principles to thoſe in hot-houſes, ſtoves, &c., and which are found of very great uſe and advantage in raiſing crops of culinary exotics, as cucumbers, and many other ſorts;—in forcing common vegetables, as aſparagus;—in raiſing young exotics, as pines and other plants;—or in producing grapes. For theſe general purpoſes, pits have been conſtructed with one ſingle fire, which are capable of producing four different temperatures of heat at the ſame time. They are, conſequently, able to force all kinds of common vegetables, and capable of growing vines, pines, and melons, each in their proper climate, with one fire, and little trouble or expence. See HOT-HOUSE and STOVE.

PIT-*Coal*. See COAL.

Vegetables have been conſidered as the materials for the formation of pit-coal; but M. Chaptal obſerves, that a few foreſts, being buried in the earth, are not ſufficient to form the mountains of coal which exiſt in its bowels. He thinks ſome proviſion, greater and more proportioned to the effect, is requiſite, and this he finds only in the prodigious quantity of vegetables which grows in the ſeas, and which is ſtill increaſed by the immenſe maſs of thoſe that are carried down by rivers. Thoſe vegetables carried away by the currents, are agitated, heaped together, and broken by the waves; and afterwards become covered with ſtrata of argillaceous or calcareous earth, and are decompoſed. It is eaſier to conceive how theſe maſſes of vegetables may form ſtrata of coal, than that the remains of ſhells ſhould form the greater part of the globe. In confirmation of this theory, Chaptal alleges, the preſence of vegetables in coal mines; the impreſſions of ſhells and of fiſh that are found in the ſtrata of coal, and not unfrequently ſhells themſelves; and alſo the evidence afforded by the nature of the mountains which furniſh coal, from which it appears that their formation is ſub-marine; for they all conſiſt either of ſchiſtus, or grit, or limeſtone. The ſecondary ſchiſtus is a kind of coal, in which the earthy principle predominates over the bituminous. As the origin of the ſchiſtus, on which the texture of the vegetable, and the impreſſion of fiſh are well preſerved, is ſub-marine, the ſame muſt likewiſe be the origin of the coal diſtributed in ſtrata through its thickneſs. The grit-ſtone conſiſts of ſand heaped together, carried into the ſea by rivers, and thrown up againſt the ſhores by the waves. The ſtrata of bitumen which are found in theſe cannot but come from the ſea. Calcareous earth rarely contains ſtrata of coal, but is merely impregnated with it; the bitumen forming a cement with the calcareous earth.

Pit-coal is uſually found in ſtrata in the earth, almoſt always in mountains of ſchiſtus or grit. The ſecondary ſchiſtus is the baſis of all pit-coal, and the quality of the coal moſtly depends upon the properties of this baſis. When the ſchiſtus predominates, the coal is heavy, and leaves a very abundant earthy reſidence after its combuſtion. As the formation of the pyrites, as well as that of coal, ariſes from the decompoſition of vegetable and animal ſubſtances, all pit-coal is more or leſs pyritous; ſo that we may conſider pit-coal as a mixture of pyrites, ſchiſtus, and bitumen. The different qualities of coal, therefore, ariſe from the difference in the proportion of theſe principles. When the pyrites is very abundant, the coal exhibits yellow veins of the mineral, which are decompoſed as ſoon as they come in contact with the air; and form an effloreſcence of ſulphat of magneſia, of iron, of alumine, &c. When pyritous coal is ſet on fire, it emits an inſupportable ſmell of ſulphur; but when the combuſtion is inſenſible, inflammation is frequently produced by the decompoſition of the pyrites; and it is this which occaſions the inflammation of ſeveral veins of coal. When the ſchiſtus, or ſlaty principle, predominates in coals, they are then of a bad quality, becauſe their earthy reſidue is more conſiderable. The beſt coal is that in which the bituminous principle is the moſt abundant, and exempt from all impurity. This coal ſwells up when it burns, and the fragments adhere together; it is more particularly upon this quality that the operation called deſulphurating or purifying of coal depends. This operation is analogous to that in which wood is converted into charcoal. In the deſulphuration, pyramids are made, which are ſet on fire at the centre: when the heat has ſtrongly penetrated the maſs, and the flame iſſues out of the ſides, it is then covered with moiſt earth; the combuſtion is ſuffocated, the bitumen is diſſipated in ſmoke, and there remains only a light ſpongy coal, which attracts the air and humidity, and exhibits the ſame phenomena in its combuſtion as the coal of wood. When it is well made, it gives neither flame nor ſmoke; but it produces a ſtronger heat than that of an equal maſs of native coal.

It was long ſuppoſed that the ſmell of pit-coal is unwholeſome; but the contrary is now proved. M. Venel has made many experiments on this ſubject, and is convinced that neither men nor animals are incommoded by this vapour. Mr. Hoffman relates, that diſorders of the lungs are unknown in the villages of Germany, where this material of combuſtion is only uſed. Coal of a good quality, it is ſuppoſed, does not emit any dangerous vapour: but when it is pyritous its ſmell muſt be hurtful. The uſe of coal is generally applicable to the arts in a variety of ways. In Scotland lord Dundonald has erected furnaces in which the bitumen is diſengaged from coal, and the vapours are received and condenſed in chambers, by means of water, and theſe condenſed vapours afford an ample ſupply of tar. M. Faujas has carried into execution a ſimilar proceſs at Paris, by ſetting fire to coal, and extinguiſhing it at the proper time, ſo that the vapour may paſs into chambers containing water for the purpoſe of condenſing them. This tar is ſaid to be ſuperior to that of wood. (See Tar.) Pit-coal likewiſe affords ammoniac by diſtillation, which is diſſolved in water, while the oil floats above. When coal is deprived by combuſtion of all its oil and other volatile principles, the earthy reſidue contains the ſulphats of alumine, iron, magneſia, lime, &c. Theſe ſalts are all formed when the combuſtion is ſlow; but when it is rapid, the ſulphur is diſſipated, and there remain only the aluminous, magneſian, calcareous, and other earths. The alumine moſt commonly predominates. Chaptal's Elem. of Chemiſtry, vol. iii.

Pit, *Cock.* See Cock-*Pit.*

Pit, *Saw.* See Saw.

Pit *of a Theatre,* all that ſpace between the amphitheatre or galleries, and the theatre or ſtage; called by the ancients *orcheſtra;* and by the French, *parterre.*

This being the moſt commodious part, it was here the Roman ſenate was placed. It has its name *pit,* in Latin *cavea,* from its being ſunk below the level of the ſtage.

Pit-*Fiſh,* or Pit-*Viſch,* in *Ichthyology,* the Dutch name of an Eaſt Indian fiſh, approaching very much to the nature of the European turdus, but that it has no ſcales; its body is not flat but rounded, and is variegated with blue and yellow ſpots; its eyes ſtand very prominent, and the fiſh is able, at pleaſure, to thruſt them out or draw them in; its back fin is prickly: it loves muddy and foul places, yet it is a very well taſted fiſh. See Gobius *Boddaerti.*

PITAMA, or Pitamaha, in *Mythology,* the name of the god Brahma among the Hindoos; the creative power in their divine triad. See Trimurti.

PITAMBER, a name among Hindoo mythologiſts, given to their paſtoral god Kriſhna, and ſometimes alſo to Viſhnu, and Narayana; who are probably the ſame deity under different names, varied according to the ſectarial bias of the devotee.

PITANCIARIUS, Pietanciarius, or *Pietantiarius,* an office in the ancient monaſteries, whoſe buſineſs it was to provide and diſtribute the pittances of herbs and meat amongſt the monks. See Pittance.

PITANE, in *Ancient Geography,* a town of Aſia Minor, in Myſia, watered by the river Evenus, and diſtant 30 ſtadia from the mouth of the Caycus.

PITANGUA Guacu, in *Ornithology,* the name of a Braſilian bird of the ſtarling kind, called by the Portugueſe there the *bemetre.* It is of the ſize of the common ſtarling; its beak is long, thick, and of a pyramidal figure; its head broad and flattened; its neck ſhort, which, as it ſits, it contracts alſo, ſo as to make it appear much ſhorter; its legs and feet are of a duſky brown; it has a very loud and ſhrill voice; its head, neck, back, wings, and tail, are all of a browniſh-black, with a faint admixture of green; the lower part of the throat, the breaſt, and the belly, are yellow, the upper part of the throat white; its beak is very ſharp-pointed. See Lanius *Pitangua.*

PITCAIRN, Archibald, in *Biography,* an eminent phyſician of the mechanical ſchool, was born at Edinburgh on the 25th of December, 1652. Having received the early part of his education at a private ſchool at Dalkeith, he was removed to the univerſity of Edinburgh; where, having gone through a courſe of philoſophy, he firſt ſtudied divinity, and then civil law. In conſequence of his intenſe application his health began to ſuffer, and ſymptoms of pulmonary conſumption appeared, for the removal of which he was adviſed to travel to Montpellier in France. His health was ſpeedily re-eſtabliſhed, and he determined to purſue the ſtudy of the law in that univerſity. He found, however, that there was no able profeſſor of that ſubject in Montpellier; and as he aſſociated with ſeveral of his countrymen, who were ſtudying phyſic, he was induced to change his purpoſe again, and adopted their purſuit. On returning to Edinburgh, thus prepared with the firſt elements of all the three learned profeſſions, but undetermined which to follow, he applied himſelf zealouſly to the mathematics, in which he made great progreſs without a maſter, and was thus led, by diſcovering, as he ſuppoſed, the applicability of mathematical reaſoning to medicine, to adopt the latter as his profeſſion.

After ſtudying diligently for ſome time the collateral branches of medicine, botany, pharmacy, and the materia medica, at Edinburgh, he went again to Paris, where he completed his medical ſtudies, and then ſettled in Edinburgh, a little before the revolution, where he quickly obtained a great ſhare of practice and an extenſive reputation. In 1688, he publiſhed a little tract, entitled "Solutio Problematis de Inventoribus," the object of which was to aſcertain Harvey's right to the diſcovery of the circulation of the blood. His extending reputation obtained for him, in 1692, an invitation from the curators of the univerſity of Leyden to the profeſſorſhip of phyſic in their ſchool. He accepted this honourable appointment, and made his inaugural ſpeech from the chair, on the 26th of April in that year: the afterwards celebrated Boerhaave was one of his pupils. His new method of teaching the principles of phyſiology and pathology on mathematical principles, was, however, not very intelligible by the ſtudents, and met with conſiderable oppoſition from the members of the faculty; inſomuch that, after reſiding about a year, during which ſhort ſpace he publiſhed ſeveral diſſertations illuſtrative of the advantages of applying mathematical principles to medicine, he quitted Leyden rather unceremoniouſly, deſerting a chair, in which he had found himſelf ſomewhat neglected.

On his return to Scotland in 1693, he married the daughter of ſir Archibald Stephenſon, an eminent phyſician in Edinburgh, and was induced again to ſettle there, when he wrote a valedictory letter to the univerſity of Leyden. His lady did not ſurvive her marriage many years; but ſhe brought him a daughter, who was afterwards married to the earl of Kelly. Dr. Pitcairn died at Edinburgh on the 13th of October, 1713.

In 1701, Dr. Pitcairn republiſhed the Diſſertations which he had formerly printed, together with ſome additional ones; they were dedicated to profeſſor Bellini of Piſo, who had adopted the mathematical doctrines of phyſiology, and had paid a ſimilar compliment to him in his Opuſcula. This edition was publiſhed in 4to. at Rotterdam, under the title of "Diſputationes Medicæ," and contains eight eſſays. The laſt edition, which appeared during his life, was publiſhed at Edinburgh, a few months before his death, under the ſame title; but they were reprinted in 1714 at Rotterdam, and in 1715 at Venice, under the title of "Opuſcula Medica." After his death, his lectures to his pupils were publiſhed, under the title of "Elementæ Medicinæ Phyſico-Mathematica," Lond. 1717; and in an Engliſh tranſlation in 1727. All his works have been collected and printed together at Venice, 1733, and Leyden, 1737, in 4to. Pitcairn uſed to amuſe himſelf occaſionally with writing Latin poetry, for which he had no mean talent; and a few of his compoſitions in this way were printed, with the title of "Poemata Selecta," which are chiefly of the epigrammatic kind. Eloy Dict. Hiſt. de la Medecine. Hutchinſon, Biographia Medica.

PITCAIRN's *Iſland*, in *Geography*, an iſland in the South Pacific ocean, ſo called by captain Carteret in 1767, after a young gentleman, ſon to major Pitcairn of the marines, who was loſt in the Aurora, and who had diſcovered it. Upon approaching it, it appeared like a great rock riſing out of the ſea, not more than five miles in circumference, and ſeeming to be uninhabited. It was nevertheleſs covered with trees, and a ſtream of freſh water was obſerved to run down one ſide of it. A number of ſea birds hovered round it, and the adjoining ſea ſeemed to have fiſh. It is ſeen at the diſtance of more than fifteen leagues, and lies about a thouſand leagues W. of the continent of America, in S. lat. 25° 2′. W. long. 133° 21′.

PITCAIRNIA, in *Botany*, received that name from M. l'Heritier, in honour of the late William Pitcairn, M. D. F. R. S. Preſident of the College of Phyſicians, and a truſtee of the Britiſh Muſeum; one of the moſt amiable and benevolent of men, who employed the leiſure of the extenſive medical practice, to which his long life was devoted, to the cultivation of a botanic garden at Iſlington. There he entertained his friends, and communicated his ſcientific riches, with the ſame liberality with which he beſtowed the moſt valuable charity of his medical advice, on thoſe who ſtood in need of it. In conjunction with the no leſs diſtinguiſhed Fothergill, Dr. Pitcairn ſent a perſon to collect on the Alps of Switzerland, many curious plants, previouſly unknown to Engliſh cultivators, the great number of which acquiſitions may be ſeen in the Hortus Kewenſis of the late Mr. Aiton and his ſon. The name of *Hepetis*, appropriated by Swartz, from Solander's manuſcripts, to this ſame genus, has by common conſent been given up, in favour of the claims of ſo eminent a benefactor to botany as Dr. Pitcairn.—L'Herit. Sert. 7. Ait. Hort. Kew. ed. 1. v. 1. 401. ed. 2. v. 2. 201. Mart. Mill. Dict. v. 3. Swartz Ind. Occ. 578. Willd. Sp. Pl. v. 2. 10. Lamarck Illuſtr. t. 224. (Hepetis; Swartz Prodr. 56. Schreb. 798.)—Claſs and order, *Hexandria Monogynia*. Nat. Ord. *Coronariæ*, Linn. *Bromeliæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, in three deep, lanceolate, equal ſegments, converging into a tube, permanent, its baſe adhering to the lower half of the capſule. *Cor.* Petals three, oblong, twice the length of the calyx, cohering in the form of a tube, withering. Nectary a ſcale at the baſe of each petal. *Stam.* Filaments ſix, thread-ſhaped, ſhorter than the corolla, inſerted into the baſe of the calyx; anthers erect, linear-arrow-ſhaped. *Piſt.* Germen ſuperior, ovate, with three furrows; ſtyle thread-ſhaped, the length of the ſtamens; ſtigmas three, twiſted together. *Peric.* Capſule ovate, pointed, three-lobed, with three longitudinal furrows, three cells, and three valves; the partitions from the inflexed valves, ſoon ſeparating at the upper part. *Seeds* numerous, minute, oblong, winged.

Eſſ. Ch. Calyx in three deep ſegments, inferior, permanent. Petals three, with a ſcale at the baſe of each. Stigmas three, twiſted together. Capſule of three lobes, burſting at their inner edge. Seeds winged.

1. P. *bromeliæfolia*. Scarlet Pitcairnia. L'Herit. Sert. t. 11. Ait. n. 1. Willd. n. 1. Curt. Mag. t. 824. Schneevoght Ic. t. 11. Redout. Liliac. t. 75.—Leaves fringed with ſpinous teeth. Flower-ſtalks ſmooth, equal to the calyx, longer than the bracteas.—Native of Jamaica, on the ſides of ſhady rocky precipices, where it flowers in the middle of ſummer. *Swartz.* It was brought to England before 1781, and is readily increaſed in the ſtove by offsets. *Root* perennial, of numerous long ſtout fibres. *Stem* none. *Leaves* numerous, radical, ſheathing, ſpreading, very long, linear, taper-pointed, channelled, keeled, ſmooth, moſt glaucous, beneath an inch wide; their edges a little recurved, fringed with numerous ſpinous teeth, eſpecially the outermoſt; the inner ones are often deſtitute of teeth, particularly upwards. *Stalk* central, radical, erect, two or three feet high, round, bearing a few toothed *bracteas*, or ſmall leaves, occaſionally at the bottom, the upper part racemoſe, ſomewhat pyramidal, ſometimes branched, many-flowered. Partial *ſtalks* alternate, horizontal, ſimple, ſingle-flowered, ſmooth, an inch long. *Bracteas* ſolitary at the baſe of each partial ſtalk, lanceolate, taper-pointed, coloured, ſhorter than the ſtalk, permanent. *Flowers*, as well as their common and partial *ſtalks*, and *bracteas*, of a beautiful roſe-colour approaching to ſcarlet. *Calyx* an inch long, quite ſmooth. *Petals* more than twice as long, withering and fading quite in a different manner from the calyx. *Capſule* the length of the calyx, with long-pointed valves.

2. P. *anguſtifolia*, Narrow-leaved Pitcairnia. Ait. n. 2. Willd. n. 2. Redout. Liliac. t. 76. Curt. Mag. t. 1547.—Leaves fringed with ſpinous teeth. Flower-ſtalks downy, longer than the downy bracteas. Calyx downy at the baſe, twice the length of the flower-ſtalks.—Native of the iſland of Santa Cruz, where it was diſcovered by Mr. Ryan, and ſent by him to Kew in 1777. It flowers in the ſtove in winter. This has narrower and more ſpinous *leaves* than the former; much ſhorter downy partial *ſtalks* and *bracteas*. *Flowers* variable in colour, at leaſt in our gardens, according to the greater or leſs por-

tion of ſunſhine, from roſe-colour or ſcarlet to pale yellow. See the Botanical Magazine.

3. P. *latifolia.* Broadiſh ſmooth-leaved Pitcairnia. Ait. n. 3. Willd. n. 3. Andr. Repoſ. t. 322. Curt. Mag. t. 856, excluding the ſynonym of Redouté.—Leaves entire; ſlightly ſpinous at the baſe. Flower-ſtalks ſmooth, half the length of the ſmooth calyx.—Native of the Weſt Indies. The *leaves* are really not broader than thoſe of the *bromeliæfolia*, but are diſtinguiſhed from that, as well as from *anguſtifolia*, by being quite ſmooth and entire at the edges, except a few ſhort crowded teeth at the very bottom. The *flowers* are either ſcarlet, or pale roſe-coloured. *Bracteas* ſmooth, variable in length, ſometimes equal to the partial *ſtalks*, ſometimes much ſhorter. *Calyx* twice or thrice as long as its partial *ſtalk*, and, like that, quite ſmooth. Mr. Anderſon, the very ingenious and ſcientific gardener of James Vere, eſq. of Kenſington Gore, has remarked, that this plant may be made to bloſſom beſt, by leaving it on the ſhelf of the dry ſtove, till the bud appears; after which the pot ſhould be plunged into the bark bed. The *flowers* are uſually produced in July or Auguſt.—We have a ſpecimen of this ſpecies with a few ſpinous teeth on one leaf, towards the top. Its *bracteas* are woolly on their inner, or upper, ſurface; quite ſmooth beneath.

4. P. *bracteata.* Great Spiked Pitcairnia. Ait. n. 4. (P. latifolia; Redout. Liliac. t. 73, 74. P. ſulphurea; Andr. Repoſ. t. 249.)—Leaves entire; ſlightly ſpinous at the baſe. Flowers nearly ſeſſile, crowded. Bracteas as long as the calyx.—Native of the Weſt Indies. It ſeems to have flowered firſt in the choice collection of Mr. Evans, of Stepney. Mr. Woodford, late of Vauxhall, ſent it to the French gardens. This is a very ſtriking ſpecies, whoſe *leaves* moſt agree with the laſt, with which it has been confounded. It differs from that, and every other ſpecies, in its denſe *ſpike* of very numerous, crowded, nearly ſeſſile *flowers*, accompanied by large *bracteas*, reaching as far as the points of the *calyx*. The *corolla* is either ſcarlet, or pale yellow; the latter ſeems to be occaſioned by its coming out in ſpring, rather than in ſummer or autumn.

PITCH, in the *Arts*, a reſinous ſubſtance, which is the reſiduum of the diſtillation of tar. Reſin differs from pitch in being the reſiduum of turpentine, which is obtained from the different ſpecies of pine without heat. Tar is obtained by cutting the wood into pieces, and expoſing it to the heat by a furnace for the purpoſe. This accounts for the blackneſs of the latter, ariſing from the decompoſition of the eſſential oil by heat. Hence the ſpirit of tar differs from the ſpirit of turpentine merely in colour, from the preſence of carbonaceous matter. See TAR and TURPENTINE.

Pitch is properly a juice of the wild pine, or pitch-tree; and is conceived to be no other than the oil thereof inſpiſſated, and turned black, farther than in the balſam. For the method of procuring it from the wood of this tree, ſee PINE. See alſo TURPENTINE.

The beſt is that brought from Sweden and Norway. Its goodneſs conſiſts in its being of a gloſſy black colour, dry, and brittle.

This is leſs pungent and leſs bitter than the liquid tar, (ſee TAR,) and uſed only in ſome external application, as a warm, adheſive, reſinous ſubſtance. Neumann obſerves, that when melted with oils, reſins, and fats, into ointments and plaſter, the pitch is very apt to ſeparate and precipitate. The ancients had a peculiar kind of pitch called *brutia*, which was inſpiſſated to a higher than ordinary degree for certain uſes; ſuch as the receiving a proper quantity of bees' wax, to render it the zopiſſa uſed in coating the bottoms of ſhips; which the common pitch could not do, being of too ſoft a conſiſtence for this uſe. Pliny tells us that it was made in this manner: the wood was cleaved and formed into a pile, with proper trenches cut in the earth to receive what run from it in burning. When the pile was lighted, the firſt thing that flowed into theſe trenches was a thin fluid liquor like water. Lamp black is the ſoot of burned pitch: and it is likewiſe prepared by collecting the ſoot of pit-coal. See *Lamp* BLACK.

PITCH, *Burgundy*, is brought to us from Saxony, and is ſuppoſed to be a preparation of the ſame kind with the common reſin of the ſhops, only leſs diveſted of the oil, made by boiling the common turpentine till it acquires a due conſiſtence. Upon making an inciſion into the bark of the "Pinus abies," or Norway ſpruce fir-tree, a clear tenacious fluid iſſues, which concretes into a reſinous ſubſtance, known by the name of "reſina abietis." This, after being boiled in water, and ſtrained through a linen cloth, is called in the Pharmacopeias "Pix Burgundica," or Burgundy pitch. But if the boiling of the native reſin is continued till the water is wholly evaporated, and wine vinegar is at this time added, a ſubſtance of the name of "Colophonium" is formed. The greateſt quantity of Burgundy pitch is collected in the neighbourhood of Neufchatel, whence it is brought into this country packed in caſks. A fictitious ſort is made in England, and found in the ſhops under the title of *common* Burgundy pitch. It may be diſtinguiſhed by its friability, want of viſcidity and unctuoſity, and the odour which characteriſes the genuine ſort. Burgundy pitch is of a ſolid conſiſtence, yet ſomewhat ſoft, of a rediſh-brown colour, and not diſagreeable in ſmell. It is entirely confined to external uſe, and was formerly an ingredient in ſeveral ointments and plaſters. In inveterate coughs, affections of the lungs, and other internal complaints, plaſters of the reſin, by acting as a topical ſtimulus, are frequently found of conſiderable ſervice. See PLASTER.

PITCH, *Jews'*. (See BITUMEN.) Jews' pitch, or aſphaltes, is black, brilliant, ponderous, and very brittle. It emits a ſmell by friction; and is found floating on the water of the lake Aſphaltites, or the Dead ſea. The aſphaltes of commerce is extracted from the mine of Annemora, and more particularly in the principality of Neufchatel. M. Pallas found ſprings of aſphaltes on the banks of the Sock, in Perſia. Moſt naturaliſts, ſays Chaptal, conſider it as amber, decompoſed by fire. It liquefies on the fire, ſwells up and affords flame, with an acrid diſagreeable ſmoke. By diſtillation it affords an oil reſembling petroleum. The Indians and Arabs uſe it inſtead of tar; and it is a component part of the varniſh of the Chineſe.

PITCH, *Mineral.* (See BITUMEN.) This is a modification of pretroleum. It is found in France, in Auvergne, at a place called Puits de Lapege, near Allais, over an extent of ſeveral leagues. The calcareous ſtone is impregnated with a bitumen, which is ſoftened by the heat of ſummer, when it flows from the rocks, and forms a very beautiful ſtalactites. It forms maſſes in the fields; and impedes the paſſage of carriages: the peaſants uſe it to mark their ſheep. This ſtone, when rubbed, emits a filthy ſmell. Some have aſſerted that mineral pitch was uſed to cement the walls of Babylon.

PITCH, *Naval, pix navalis*, is that drawn from old pines, ranged and burnt like charcoal. This, with a mixture of tow, or beaten cables, ſerves for paying over the ſeams of a ſhip's ſides and decks, after they are caulked, to preſerve the oakum from any wet; and likewiſe over all the ſurface of the bottom and wales: to pay the two latter it is ſoftened with oil.

PITCH, *Naval*, is alſo a denomination given to that ſcraped from off the ſides of old veſſels; and which is ſuppoſed to have acquired an aſtringent virtue, by means of the ſalt water. It ſerves to make plaſters; though it is certain the apothecaries uſually ſubſtitute the common black pitch in its ſtead.

Pitch, *Greek*, or *Spaniſh pitch*, is that boiled in water till it has loſt its natural ſmell; upon which it becomes dry and friable.

The ancients called it *colophony;* from Colophon, a city in Greece, whence great quantities were brought. See Colophon, and *Burgundy* Pitch, ſupra.

Pitch, *Oil of*, *oleum picinum*, is an oil procured from pitch, by ſeparating the aqueous matter that ſwims a-top of the melted pitch. This, from the great virtues formerly attributed to it, was alſo called *balſam of pitch*.

Pitch, *Ointment of*, is made by melting tar with an equal weight of mutton ſuet, and ſtraining the mixture whilſt hot: this is uſed ſometimes as a digeſtive, and ſaid to be particularly ſerviceable againſt ſcorbutic and other cutaneous eruptions. See Tar.

Pitch, *Pills of*, are made of tar mixed with ſo much powdered liquorice, or other ſuch powdered matter as is ſufficient to render it of due conſiſtence for being formed into pills. See Tar.

Pitch *of Caſtro*, in the *Materia Medica*, the name given by Boccone and ſome other writers to a thick kind of bitumen, found iſſuing out of the cracks of ſome rocks near the village of Caſtro: from whence it has its name: it is famous in the eccleſiaſtical ſtate for its medicinal virtues.

Pitch, in *Building*, denotes the angle or gable end.

If the length of each rafter be three-fourths of the breadth of the building, the roof is ſaid to be *true* pitch. This is uſed when the covering is of plain tiles.

If the rafters be longer, it is ſaid to be a *high* or *ſharp-pitched* roof; if ſhorter, which ſeldom happens, it is ſaid to be a *low* or *flat-pitched* roof.

If the length of the principal rafters be equal to the breadth of the building, it is called *Gothic* pitch. This is uſed when the covering is of pantiles.

If to rule as a pediment, it is ſaid to be *pediment* pitch. The perpendicular height of this pitch, is equal to $\frac{2}{9}$ths of the breadth of the building. This pitch is uſed when the covering is lead.

Pitch, in *Muſic*, implies the elevation or depreſſion of the general ſcale. There is no term more common among muſicians,—who have the Roman pitch, the opera pitch, the organ pitch, the concert pitch. By the firſt is underſtood a *low* pitch; by the ſecond, the *true* and moſt general pitch; by the third, a *high* pitch; as almoſt all church organs are pitched very high by the builders, we believe, to ſave metal; of which more is neceſſary for a long than a ſhort pipe of the ſame diameter: and by the fourth, a varied pitch, according to the ſtate an inſtrument is found in by perſons who had never met before.

To Pitch *a Camp*, in *Military Language*, ſignifies to take a poſition, and encamp troops upon it according to the principles of *caſtrametation;* which ſee. See alſo Camp.

To Pitch *a Tent*, is to place a certain preſcribed quantity of canvas upon poles, ſo as to afford a temporary cover againſt the inclemency of the weather, for one or more officers or private ſoldiers. In order that the men may be expert in pitching or ſtriking tents, they ſhould be practiſed whilſt in camp in both operations.

Pitch, in *Rural Economy*, a fork full of hay, corn, or ſtraw, or as much as is raiſed to the load, ſtack, or mow, at one time.

Pitch-*Fork*, a ſort of fork with two prongs, which is in uſe for pitching different ſubſtances, as hay, corn, ſtraw, &c., to the cart, mow, ſtack, or other places; and which is uſually made larger and longer in the handle than the common hay fork.

Pitch-*Ore*, in *Mineralogy*, a ſpecies of the genus Uran, is of a velvet-black colour, or dark greyiſh-black, which inclines to iron-black. It occurs generally maſſive, and diſſeminated: internally it is ſhining, inclining to gliſtening, and its luſtre is reſinous. The fracture is imperfect and flat: the fragments indeterminately angular, and ſharp-edged. It occurs ſometimes in thick and curved lamellæ; ſometimes in coarſe and diſtinct concretions, reſembling red hematite. In the ſtreak, neither colour nor luſtre is changed. It is ſoft, brittle, and heavy. The ſpecific gravity is variouſly given: by Guyton it is ſaid to be 6.38; by Haüy, 6.53; and by Klaproth it is ſaid to be 7.5. It is infuſible, without addition, before the blowpipe. With ſoda or borax it forms a grey, muddy, ſlaggy-like globule; with phoſphoric ſalts it makes a tranſparent green bead. It diſſolves imperfectly in the ſulphuric or muriatic acids, and from this ſolution, which has a pale orange-yellow colour, the uran is precipitated browniſh-red by pruſſiat of potaſh, and yellow by the alkalies. According to Klaproth its conſtituent parts are,

Uran	86.5
Black oxyd of iron	2.5
Sulphurated lead	6.0
Silica	5.0
	100.0

By the analyſis of other chemiſts it is ſaid to contain only uran and iron, but neither ſulphurated lead nor ſilica; and in another ſpecimen were found ſulphur and a ſmall portion of copper. It is found in veins in primitive mountains with lead and ſilver ores. It is uſually accompanied with lead-glance, copper-pyrites, iron-ochre, calc-ſpar; ſometimes with cobalt-glance, red cobalt-ochre, ſilver-glance, uran-mica and uran-ochre. It is found in ſeveral parts of Saxony, Bohemia, and Norway, and is diſtinguiſhed from brown-blende by colour, ſpecific-gravity, fracture and ſtreak; from wolfram, by its ſtreak and fracture.

Pitch-*Tree*, in *Botany*. See Pine-*Tree* and Pinus.

PITCHED, in *Sea Language*. They ſay the maſt is pitched, when it is put or let down into the ſtep; alſo the maſt is pitched too far aft, when placed too near the ſtern. When a ſhip falls with her head too much into the ſea, or beats againſt it ſo as to endanger her top-maſts, they ſay, ſhe will *pitch her maſts by the board*.

This motion may proceed from two cauſes; the waves which agitate the veſſel, and the winds upon the ſails, which make her ſtoop to every blaſt thereof.

PITCHER, in *Agriculture*, the labourer or perſon who is employed in pitching.

PITCHET, in *Geography*, a town of Upper Siam; 40 miles S. of Porſeloue.

PITCHIN, a town of Perſia, in the province of Mekran; 100 miles W. of Kidge.

PITCHING. See Pavement.

Pitching, in *Seamanſhip*, the inclination or vibration of the ſhip lengthwiſe about her centre of gravity; or the motion by which ſhe plunges her head and after-part alternately into the hollow of the ſea. This is a very dangerous motion, and when conſiderable, not only retards the ſhip's way, but endangers the maſts and ſtrains the veſſel. This motion proceeds from two cauſes; *viz.* from the veſſel's improper conſtruction, or the ill arrangement of her cargo. See Shipbuilding.

PITCHING-*Pence*, a duty, commonly of one penny, paid for pitching or ſetting down every ſack of corn, or pack of merchandize, in a fair or market.

PITCHSTONE, in *Mineralogy*, a ſpecies of the clay genus, of which the colours are black, green, brown, red, and ſometimes, but rarely, grey. Of the black, there are the greeniſh, greyiſh, and browniſh-black. From greeniſh-black it paſſes through blackiſh-green into mountain-green, aſparagus-green, leek-green, olive-green, and oil-green. From olive-green it paſſes into liver-brown, yellowiſh and reddiſh-brown, and again into light-blood and brick-red. The varieties of the grey are ſmoke and dark aſh-grey, and ſometimes a kind of grey which paſſes into brown. It has ſometimes a blueiſh colour. Its colours are not lively, but always ſomewhat deep and muddy, or rather mixed with grey and brown. It is generally uniform, and it ſeldom happens that ſeveral colours occur together. It is found almoſt always maſſive, in great beds and rocks. Internally its luſtre is ſhining, ſometimes ſplendent, ſometimes gliſtening, and intermediate between reſinous and vitreous, yet more inclining to the firſt. The fracture paſſes from the large conchoidal into the coarſe ſplintery and coarſe grained uneven. The fragments are indeterminately angular, more or leſs ſharp-edged. It occurs ſometimes in coarſe diſtinct concretions, and the ſurface of the concretions is ſomewhat bent; alſo in priſmatic generally wedge-ſhaped diſtinct concretions, of which the ſurface is ſmooth. It is commonly tranſlucent in a ſmall degree; the black variety is only tranſlucent on the edges. It is brittle; eaſily frangible, and not very heavy. The ſpecific gravity of the Saxon pitchſtone is about 2.3. Before the blowpipe it is fuſible without addition. The black variety, heated to 21° of Wedgewood's pyrometer, ſwelled a little, its colour was ſlightly altered, the ſurface glazed, and internally it was porous; at 31° it was ſoftened; at 65°, the intumeſcence was more conſiderable; and at 100° it was ſtill veſicular, but more compact. The blackiſh-green variety found at Arran becomes black, is much rent, and internally porous at 23°; at 55° it formed a porous enamel; at 70° it became perfectly white and ſtill porous. The pitchſtone of Meiſſen, by analyſis, gave of

Silica	73.00
Alumine	14.50
Lime	1.00
Oxyd of iron	1.00
Oxyd of manganeſe	0.10
Natron	1.75
Water	8.50
	99.85
Loſs	15
	100.00

It occurs in beds in the newer porphyry formations, and in beds and veins that belong to the neweſt flotz trap formation. It is found in great quantity in the electorate of Saxony, particularly in the neighbourhood of Meiſſen, alſo in Hungary, as at Tokay and Schemnitz; in ſome of the iſlands of the Archipelago, where it was firſt obſerved by Mr. Hawkins; and at Glamoſcard in the iſland of Skye. It was firſt diſcovered about ſixty years ago in the neighbourhood of Meiſſen in the electorate of Saxony, and was named pitchſtone from the ſtriking reſemblance which ſeveral of its varieties bear to pitch.

PITCHT, SHOULDER. See SHOULDER *Pitcht*.

PITCHY *Iron-Ore*, in *Mineralogy*, a metallic foſſil, of a very deep reddiſh-brown, which ſometimes paſſes into black. It occurs maſſive with a rough ſurface, owing to a covering of iron-ochre. Internally it is gliſtening, and its luſtre is ſemi-metallic, paſſing into reſinous. The fracture is compact, and ſometimes foliated. It is opaque, not eaſily frangible, and brittle. Its ſpecific gravity is nearly 4. It melts very eaſily into a black enamel before the blowpipe; and its conſtituent parts are, phoſphoric acid, oxyd of iron, and oxyd of manganeſe. It is found at Limoges in France.

PITEA, or PITHEA, in *Geography*, a ſea-port town of Sweden, in Eaſt Bothnia, ſituated on a ſmall iſland at the mouth of a river of the ſame name: joined to the continent by a wooden bridge. The ſtreets are parallel, and the church is at a conſiderable diſtance from the town. It has a commodious harbour and a good ſchool. It was firſt built in 1621 by Guſtavus Adolphus, three miles from its preſent ſcite higher in the country; but in 1666 this town was deſtroyed by fire, and the preſent town was built in its preſent ſituation. N. lat. 65° 23′. E. long. 21° 22′.

PI-TEOU, a ſmall iſland near the coaſt of China. N. lat. 25° 20′. E. long. 119° 14′.

PITESZTI, a town of Walachia; 50 miles N.W. of Bucharest. N. lat. 44° 57′. E. long. 24° 49′.

PITH, in *Vegetable Phyſiology*. See MEDULLA.

PITHECALOPEX, the *Semivulpa*, or *Ape-fox*, in *Zoology*, a name given by Aldrovandus and ſome others to that ſtrange American animal which we call the opoſſum.

The name is compounded of that of the fox and the ape; of the natures of both which animals it is ſuppoſed by ſome to participate.

PITHECON PORTUS, in *Ancient Geography*, a port of Africa, in Libya, near Carthage.

PITHECUSSÆ, iſlands of the Tyrrhenian ſea, near the coaſts of Campania.

PITHIAS, or PITHITES, with ſome writers, a ſort of comet, or rather meteor, in form of a tub. Of theſe it is ſaid there are divers kinds, *viz.* ſome of an oval figure, others like a tun or barrel ſet perpendicular, and ſome like one inclined or cut ſhort off; others having a hairy train or buſh, &c.

PITHING, the name of an operation performed for killing animals ſuddenly and without pain. This is effected with a narrow doubled-edged poniard paſſed in between the ſkull and firſt vertebra of the neck: in this way the medulla oblongata is divided, and the animal inſtantaneouſly deprived of ſenſibility. This operation was performed by Mr. Cline junior, aſſiſted by Mr. Brodie and Mr. Clift, on a camel that had been the ſubject of Mr. Home's experiments. (See Phil. Tranſ. vol. xcvi. p. 359.) In the common mode of pithing cattle, the medulla ſpinalis only is cut through, and the head remains alive, which renders it the moſt cruel mode of killing animals that could be invented. See Dr. Dugard's Experiments, publiſhed in the Board of Agriculture's Report for Shropſhire, by Joſeph Plumley, M. A. p. 246.

PITHIVIERS, in *Geography*, a town of France, and principal place of a diſtrict, in the department of the Loiret; 21 miles E.N.E. of Orleans. The place contains 3071, and the canton 15,275 inhabitants, on a territory of 302½ kiliometres, in 22 communes. N. lat. 48° 11′. E. long. 2° 24′.

PITHOU, PETER, in *Biography*, a magiſtrate diſtinguiſhed for his integrity and erudition, was born in 1539 at Troyes, in Champagne. He received a good education, after which he ſtudied the law as a profeſſion. When called to the bar his natural diffidence ſo completely embarraſſed him, that he found it neceſſary to renounce that branch of his profeſſion. Being of the reformed religion he had nearly been ſacrificed at the horrid maſſacre of St. Bartholomew's day, which probably had ſuch an effect upon his mind, naturally timid, that in the following year he conformed to the Catholic church, and ſoon after obtained the office of attorney-general in the chamber of juſtice in Guienne. When Gregory XIII. had iſſued a brief againſt the ordinance of Henry III., concerning the council of Trent, Pithou publiſhed a memoir, in which he developed the ſecret purpoſes of the brief, and vigorouſly defended the cauſe of his king and country. After Henry IVth's converſion, as it has been called, he uſed his beſt endeavours to reduce the city of Paris to allegiance. He was one of the writers of the "Catholicon d'Eſpagne," a ſatire which proved very effectual in throwing ridicule upon the Spaniſh party. He alſo publiſhed a little work, which he pretended was a tranſlation from the Italian, entitled "Raiſons pour leſquelles les Evêques de France ont pu de droit donner l'Abſolution à Henry de Bourbon," which was ſeveral times printed, and which made many converts to the royal cauſe. He died in the year 1596, at the age of 57. He is repreſented by De Thou as one of the firſt men of the age, as well for probity, candour, and real piety, as for the extent of his learning, the ſoundneſs of his judgment, and his political wiſdom. He had a moſt intimate acquaintance with every thing relative to French hiſtory and antiquities, and his profound knowledge of the civil law, in which he was ſcarcely inferior to Cujas himſelf, under whom, in his youth, he had ſtudied. The works of this gentleman are, "Traité des Libertès de l'Egliſe Gallicane," in four vols. folio, and which is thought to be the baſis of all that has been written on the ſame ſubject: "A commentary on the Cuſtoms of Troyes," and other tracts on civil and canonical juriſprudence. He publiſhed, in 1609, a large collection of "Opuſcules," alſo editions of ſeveral monuments of antiquity, chiefly relating to the hiſtory of France. He had collected a curious and very valuable library, rich in MSS., which by his will he directed to be ſold only to a ſingle purchaſer acquainted with its value; this precaution, however, did not prevent its diſperſion. By his deep and extenſive erudition he acquired the title of the French Varro, and his name was not leſs celebrated abroad than in his own country. Gen. Biog.

Pithou, Francis, brother of the preceding, born in 1544, was likewiſe brought up to the law, and exerciſed the office of attorney-general to the chamber of juſtice, eſtabliſhed by Henry IV. to check the frauds of the financiers. He aſſiſted at the conferences of Fontainebleau, and was one of the commiſſioners for regulating the boundaries between France and the Low Countries. After this he retired, paſſing his life in ſtudy, emulating his brother in the variety and depth of his learned reſearches. He died in 1621. He took a part in moſt of his brother's publications, and eſpecially contributed to the elucidation of the "Body of Canon Law," printed at Paris, in two vols. fol. He was author likewiſe of ſeveral works, of which the chief are, "La Conference des Lois Romaines avec celles de Moyſe;" an edition of the "Salic Law," with notes; "Traité de la Grandeur et Droits du Roi et du Royaume de France." He publiſhed an edition of the "Antiqui Rhetores Latini," 1599. He diſcovered "Phædrus' Fables," which he publiſhed in conjunction with his brother. The names of the two brothers are very celebrated among men of letters. A full and exact catalogue of their ſeveral publications is prefixed to their works in Latin, printed in 1715. Moreri.

PITHYUSA, in *Botany*, a name uſed by many authors for a ſmall ſpecies of ſpurge.

PITI, in *Geography*, a town of Thibet; 204 miles S. of Latac.

PITIES, in *Commerce*, the only money of the natives of the iſle of Java, which is a ſmall coin containing four parts of lead and one of tin; 25 of theſe paſs for two duyts, each duyt being a fourth part of the copper coin, called the ſtiver.

PITIGLIANO, in *Geography*, a town and fortreſs of Etruria; 23 miles E.N.E. of Orbitello.

PITIHEMPO, a mountain of Aſia, which bounds Thibet to the north-weſt.

PITINUM, in *Ancient Geography*, a town of Italy, in the territory called by Pliny "Pitinas Ager," on the other ſide of the Apennines, and watered by the river Novanus. Ptolemy aſſigns this town to the Umbrians who inhabited the territory N. of the Tuſcans.

PITISCUS, Samuel, in *Biography*, a learned philologiſt, was born at Zutphen in 1637. He ſtudied under J. Fr. Gronovius at Deventer, and afterwards went through a courſe of theology at Groningen. When he had completed his education, he was made maſter of the ſchool at Zutphen, and, in 1685, he was promoted to be rector of the college of St. Jerom at Utrecht. He died at a very advanced age at Utrecht, in the year 1717. He was author of "A Latin and Dutch Dictionary;" but his principal work was "Lexicon Antiquitatum Romanarum," in two vols. fol. the labour of ten years of his life; a performance well known to the learned world. He alſo gave a new and improved edition of the "Roman Antiquities" of Roſin, and of Pomey's "Pantheon Myſticum."

PITIVILCO *la Baranca*, in *Geography*, a town of Peru, in the dioceſe of Lima; 28 miles N.N.W. of Guaura.

PITKEATHLY or **Pitcaithly**, a village in the pariſh of Dumbarny, and county of Perth, Scotland, is ſeated in a ſequeſtered corner of the rich vale of Stratherne, at the diſtance of four or five miles from Perth. It has been long celebrated for its mineral ſprings, and of late years has become a place of very faſhionable reſort. In the efficacy of the waters for the cure of ſcrofula, ſcurvy, gravel, and complaints in the ſtomach and bowels, Pitkethly wells are generally conſidered equal, if not ſuperior, to any in North Britain; and the village yields to none in beauty and agreeableneſs of ſituation. There are here five diſtinct ſprings of different degrees of ſtrength, but all partaking of the ſame qualities. The chief mineralizers are muriate of ſoda (common ſalt) and muriate of lime, with a portion of chalk and Paris plaſter held in ſolution. An account of theſe waters, and of their medicinal uſes, was publiſhed in the 62d volume of the Philoſophical Tranſactions. The period of their diſcovery cannot be aſcertained; as even tradition is ſilent upon the ſubject.

The pariſh of Dumbarny is about four miles in length and three in breadth. The ſoil is extremely fertile, and the ſurface finely diverſified with level and riſing grounds, wood, and water. The river Earn runs through the middle of the pariſh; and on one ſide it is bounded by the hill of Mordun or Moncrieff, the view from which is characteriſed by Pennant as "the glory of Scotland." The bridge over the Earn here is of great antiquity, and is kept in repair by the magiſtrates of Perth. Carliſle's Topographical Dictionary of Scotland, vol. i. 4to. Beauties of Scotland, vol. iv.

PITLAND, a town of Hindooſtan, in Guzerat; 18 miles N.E. of Cambay.

PITLAR, a town of Ruſſia, in the government of Tobolſk; 48 miles S. of Obdorſkoi.

PITLAWAD, a town of Hindooſtan, in the circar of Banſwalch; 12 miles S. of Tandla.

PITOE, a town Thibet; 24 miles W.N.W. of Latac.

PITON Point, the S.W. point of the iſland of St. Lucia.

PITOT, Henry, in *Biography*, a mathematician and engineer in the 18th century, was deſcended of a noble family of Languedoc, and born in the year 1695. His genius inclining him to the mathematical ſciences, he made himſelf a proficient in them without the aid of a tutor. At the age of twenty-three he went to Paris, and became intimately acquainted with Reaumur. In 1724 he was received into the Academy of Sciences, of which he was elected a penſioner not many years afterwards. He was author of a highly eſteemed work, entitled "The Theory of working Ships," 1731, which was ſo highly eſteemed, that on account of it, he was elected a member of the Royal Society of London. In 1740, the ſtates-general of Languedoc gave him the appointment of principal engineer to the province, and alſo that of inſpector-general of the famous canal, which forms a navigable junction between the Mediterranean ſea and the bay of Biſcay. "Many monuments of his genius," ſays his biographer, "which will tranſmit his name with honour to poſterity, may be ſeen in different parts of Languedoc; and, in particular, a noble plan deſigned and executed by him for ſupplying Montpelier with water from ſources at the diſtance of three leagues, which has deſervedly excited the admiration of travellers. Out of reſpect to his merits, the Royal Academy of Sciences at Montpelier inſcribed his name in the liſt of their members, and the king honoured him with the order of St. Michael." He died in 1771, at the age of 76, eſteemed for his probity and diſintereſtedneſs, and highly reſpected for his ſcience and ingenuity.

PITQUIN, in *Geography*, a town of New Mexico, and capital of the province of Sonora; 900 miles N.W. of Mexico. N. lat. 29° 56′. W. long. 112° 12′.

PITRIOWIN, a town of Auſtrian Poland, in Galicia; 32 miles S.W. of Lublin.

PITRIPETI, in *Mythology*, a name of the Hindoo deity Yama, who correſponds with the Pluto of weſtern mythologiſts. See Yama.

PITRIS, a claſs of beings with the Hindoos, to whom reverence is paid in their ſacrificial ceremonies. They ſometimes ſeem to bear the character of patriarchs, or ſages of former days, and at others the moon is aſſigned for their habitation. The word often occurs in Hindoo books, but apparently without any preciſe ſignification attached to it. In the inſtitutes of Menu, they are thus deſcribed. "The Pitris, or great progenitors, are free from wrath; intent on purity; ever exempt from ſexual paſſions; endued with exalted qualities: they are primeval deities, who have laid arms aſide." "From the Riſhis come the Pitris, or patriarchs," &c. ch. iii. v. 192. 200. See Rishis.

PITSCHEN, or Bitschen, in *Geography*, a town of Sileſia, in the principality of Brieg; ſurrounded with walls, and containing two churches and a college; 30 miles N.E. of Brieg. N. lat. 51° 8′. E. long. 18 15′.

PITSHAN, a town of Little Bucharia; 30 miles E.N.E. of Tourfan.

PITSYLVANIA. See Pittsylvania.

PITT, Christopher, in *Biography* an Engliſh poet, ſon of a phyſician, was born at Blandford, in Dorſetſhire, in the year 1699. He was educated in Wincheſter ſchool, where he was diſtinguiſhed for his aſſiduity in ſtudy, for his taſte as a general ſcholar, and as a writer of Engliſh verſe. On leaving Wincheſter, he was elected to New college, Oxford, and as an acknowledgement of the kindneſs of the electors, he preſented them with two manuſcript volumes of poems, of which one was miſcellaneous, and the other contained a complete verſion of Lucan's Pharſalia. He was intended for the church, and after three years reſidence at college, he was preſented, in 1722, to the rectory of Pimpern, in Dorſetſhire, to which place he retired after a further continuance of two years at Oxford, when he had taken his degree of M.A. Here he paſſed the remainder of his life in an eaſy ſituation, maintaining a ſocial and very friendly intercourſe with many perſons of rank and literary eminence. He died in 1748, in the 49th year of his age, generally reſpected and beloved. In 1727, he publiſhed a volume of Miſcellaneous Poems; after which he produced a tranſlation of Vida's Art of Poetry, which poſſeſſes much of the elegance and high poliſh of the original. His ſucceſs in this department of literature encouraged him to undertake the taſk of tranſlating Virgil's Eneid, which he completed in 1738, and publiſhed in two vols. 4to. in 1740. "This tranſlation," ſays his biographer, "if Dryden's had not exiſted, would have been conſidered as a very valuable addition to the maſs of Engliſh poetry; and even in competition with that work, it may ſuſtain itſelf by its different merits." It is certainly much more exact to the original, not only in meaning, but in that poliſh and refinement, which is ſo often violated by the coarſeneſs of Dryden. It is alſo by no means deficient in ſtrength and vigour; but it cannot boaſt of thoſe happineſſes of expreſſion, that glow and elevation, which in the beſt paſſages of Dryden give the ſtamp of original genius. Pitt's tranſlation, however, has taken a firm hold on the public, and has been repeatedly reprinted in a complete edition of Virgil in Engliſh verſe, of which the Eclogues and Georgics were contributed by Dr. Warton, with various critical diſſertations by himſelf and others. Johnſon's Engliſh Poets.

Pitt, William, earl of Chatham, one of the moſt illuſtrious ſtateſmen that ever lived, was ſecond ſon of Robert Pitt, and Harriet Villiers, ſiſter to the earl of Grandiſon. He was born, by his own account, entered on the books of Oxford, in St. James' pariſh, on the 15th of November 1708. He received the early part of his education at Eton, as a ſcholar on the foundation, and at the age of eighteen he was entered of Trinity college, Oxford, as a gentleman-commoner. Of his academical reputation little is known, but a copy of Latin verſes on the death of George I., publiſhed in the univerſity tribute on that occaſion, may be found in the Anecdotes of his Life, &c. in three vols. 8vo. to which we ſhall have frequent recourſe in the preſent article. Before he left Eton, he was occaſionally afflicted with an hereditary gout, which increaſed during his reſidence at Oxford, and which at length obliged him to quit the univerſity without taking a degree. He afterwards made the tour of part of France and part of Italy, but his diſorder was too deeply rooted in his conſtitution to be removed by foreign travel. He, however, conſtantly employed the leiſure, which this painful and tedious malady afforded, in the cultivation and improvement of his mind.

He firſt came into parliament in the month of February 1735, for the borough of Old Sarum, and being a younger brother of a large family, his fortune was inconſiderable, and his friends obtained for him a cornet's commiſſion in the Blues. The firſt time Mr. Pitt ſpoke in the houſe of commons, was to ſecond the motion of his friend Mr. (afterwards lord) Lyttelton, for a congratulatory addreſs to his majeſty, on the marriage of Frederic, prince of Wales. His exertions on this occaſion obtained for him the marked attention of the prince, who was then at the head of the oppoſition party. With this party Mr. Pitt uniformly voted, by which he incurred the diſpleaſure of ſir Robert Walpole, who revenged himſelf by taking away his commiſſion: which fact was celebrated by the following lines of his friend Lyttelton, ironically complimenting the miniſter for ſnatching the ſervile ſtandard from his hand, and raiſing him to patriotic eminence.

> "Long had thy virtues marked thee out for fame
> Far, far ſuperior to a Cornet's name;
> This *gen'rous Walpole* ſaw, and griev'd to find
> So mean a poſt diſgrace that noble mind:
> The ſervile ſtandard from the free-born hand
> He took, and bad thee lead the patriot band."

Mr. Pitt very ſoon attained the firſt place, for eloquence, in the ranks of oppoſition, and the miniſter ſoon repented his raſhneſs in making him his enemy. This illuſtrious young man was diſtinguiſhed for a fine figure, an expreſſive countenance, and a melodious voice. A keen eye, a graceful manner, and pleaſing addreſs, gave luſtre and effect to a copious elocution, not, at firſt, highly correct, but animated with the fire of genius, and frequently marked with paſſages of ſingular force and energy that impreſſed themſelves upon the memory, and were almoſt irreſiſtible in their effect. "The records of the Britiſh ſenate," it is ſaid, "ſcarcely preſent another name ſo diſtinguiſhed by that eloquence which bears away with it the paſſions and convictions of the hearer, and ſtrikes an antagoniſt with awe. To theſe powers he added true elevation of mind, honour, integrity, and pure conſtitutional principles." Without attempting to trace all the ſteps of this ſtateſman's progreſs from an oppoſitioniſt to a member of adminiſtration; we may briefly obſerve, that he continually roſe in the eſteem of the nation, as an able and vigilant oppoſer of all meaſures that appeared to him to be unconſtitutional. Seven of his ſpeeches preſerved in Chandler's Debates, and which were delivered during the remainder of ſir Robert Walpole's adminiſtration, exhibit the ardour of his mind, and the comprehenſiveneſs of his views as a young but truly enlightened ſtateſman; but his moſt important ſpeech in this period of his life, was in ſupport of a motion for inquiry into ſir Robert Walpole's (then earl of Orford) conduct. The motion was at firſt loſt, but when introduced a ſecond time, limiting the retroſpect to the laſt ten years, it was carried; but by a miniſterial manœuvre the inquiry was defeated. To popular applauſe was added a more ſubſtantial teſtimony of approbation of his conduct, by Sarah, ducheſs of Marlborough, who, in a codicil to her will, dated in 1744, bequeathed him the ſum of ten thouſand pounds on the grounds of his public ſervices. In 1745 Mr. Pitt was mentioned to the king, George II., by the duke of Newcaſtle, as a proper perſon to fill the office of ſecretary at war; but ſo obnoxious was his name to his majeſty, probably on account of his conſtant oppoſition to Hanoverian politics, that he was decidedly, and at once, rejected, and a general reſignation of the Pelham party followed. In the following year they were reinſtated, and Mr. Pitt was appointed to the office of vice-treaſurer of Ireland. He ſoon after ſucceeded to the lucrative place of pay-maſter of the forces, which gave him an opportunity of ſhewing how diſintereſted he was with regard to pecuniary concerns. His predeceſſors had always held very large ſums of the public money in their hands, of which they made advantage by means of the funds, but Mr. Pitt never once availed himſelf of his ſituation for his own private emolument. He even refuſed the uſual perquiſite upon a ſubſidy voted to the king of Sardinia, nor would he accept of any preſent in lieu of it. In 1754 Mr. Pitt married Heſter, daughter of Richard Grenville, a lady of great merit, of a highly cultivated mind, and of general and very extenſive knowledge, with whom he paſſed the remainder of his life in uninterrupted harmony.

In 1755, when the king returned from Hanover, bringing ſubſidiary treaties with Heſſe-Caſſel, and Ruſſia for its defence, he did not ſcruple to join Mr. Legge in oppoſing their ratification by parliament. On this account they were both diſmiſſed, together with Meſſrs. George and Richard Grenville. It ſhould be noticed, as exhibiting a prominent feature in Mr. Pitt's character, that when turned out of his ſituation, the balances belonging to his office were all lodged in the bank. Thoſe who encouraged the many attempts to throw a ſhade upon his moral character, were the diſcoverers of the fact, to their own utter mortification and confuſion. Mr. Pitt was now an eager oppoſitioniſt, and ſpoke with honeſt indignation againſt the favourite meaſures of introducing foreign troops for the defence of the kingdom, and protecting Hanover by ſubſidies; the natural force of the nation, he ſaid, was ſufficient to repel any attack of the enemy. That ſtate alone is worthy of being denominated a ſovereign ſtate, *qui ſuis ſtat viribus, non alieno pendet arbitrio*: which depends on its own ſtrength, and not on foreign aſſiſtance. The diſaſters with which the new war began, occaſioned great diſſatisfaction with the conduct of public affairs, and the nation eagerly expected a change of men and meaſures; and in the autumn of 1756 a new adminiſtration was formed, in which Mr. Pitt took the place of ſecretary of ſtate. The aſpect of affairs was inſtantly changed; and the vigour infuſed into the public councils became immediately apparent by the formation of a national militia, to which the internal defence of the country was entruſted, while the foreign mercenaries were ſent away:—by the levying of a body of Highlanders to ſerve in North America:—by the diſpatching of ſquadrons of men of war to the Eaſt and Weſt Indies, and by a ſucceſsful expedition to Goree on the African coaſt. Mr. Pitt was ſtill inimical to the war in Germany, at leaſt under the conduct of the duke of Cumberland; on which account he and his friends were diſmiſſed from office. The public diſcontent at this meaſure was manifeſted in the moſt marked and deciſive manner, and his majeſty invited him very ſoon after to take the efficient poſt in the miniſtry on any terms that were agreeable to him. He reſumed his poſt of ſecretary, and arranged a miniſtry according to his own views of the neceſſity of the caſe, and it was that adminiſtration which raiſed the Britiſh nation from a ſtate of depreſſion and diſgrace to the higheſt pitch of glory and ſucceſs. Of this miniſtry he was the ſoul, and he infuſed his own ſpirit through every department of the ſtate. The principle upon which he acted was, to diſregard all party diſtinctions; all family intereſts; and to employ men of real talents wherever he found them. Inſtead of inactive and incapable commanders, whom he found in the ſervice, he filled the army and navy with men raiſed to notice by their abilities and exertions. By a perpetual ſeries of enterprizes he kept all the national powers on the alert, and aſſaulted the enemy in every quarter of the globe. He gave all his own time to buſineſs and none to parade, not holding a ſingle levee during his ſecretaryſhip. He firſt accurately informed himſelf of the practicability of his plans, and then was moſt peremptory in his orders; and he provided, with the moſt wonderful foreſight, againſt every emergency. The hiſtory of Mr. Pitt's adminiſtration is ſo interwoven with the annals of the country, and the public events that occurred in it are ſo well known, that it will be ſufficient if we give a mere ſummary of the moſt important; and previouſly to this we may ſhew the extent of his miniſterial influence on his ſecond promotion to the adminiſtration in 1757, of which we are now ſpeaking. Mr. Pitt's firſt propoſition, ſays the author of the Anecdotes, was the excluſion of lord Anſon from the cabinet. The duke of Newcaſtle pleaded earneſtly to have lord Hardwicke in the cabinet: he ſaid it was the king's requeſt. Mr. Pitt conſented, on condition that ſir Robert Henley had the great ſeal; this ſtipulation was deſired by Leiceſter-houſe. Lord Temple was to be privy ſeal: himſelf ſecretary of ſtate. The duke of Newcaſtle offered lord Temple the treaſury: Mr. Pitt interpoſed, and ſaid it could not be, his grace muſt go there himſelf; but if, at any time hereafter, he ſhould think proper to retire, lord Temple ſhould ſucceed him. Lord Anſon was propoſed for the admiralty; Mr. Pitt declared that lord Anſon ſhould never have the correſpondence. The duke replied that ſuch an alteration could not be made without his majeſty's conſent. Here the conference broke off. Mr. Pitt ſoon after had an audience with the king, when he laid before him the difference that had occurred between the duke of Newcaſtle and himſelf, concerning the admiralty. The king immediately conſented that the correſpondence with the naval officers, uſually in the board of admiralty, ſhould be given to Mr. Pitt, and that the board ſhould ſign the diſpatches without being privy to their contents. It was at this audience Mr. Pitt ſaid, "Sire, give me your confidence, and I will deſerve it;" to which the king inſtantly replied "Deſerve my confidence, and you ſhall have it;" and it is underſtood to have been a fact that Mr. Pitt at length ſo won upon the king, that he was able to turn his partialities in favour of Germany to the benefit of his country.

At the period we are ſpeaking of, the duke of Cumberland had utterly failed in the attempt to reſcue Hanover from the French, and had been obliged to make a diſgraceful convention: this, for the moment, ſeemed to be a termination of the Engliſh interference in German affairs, but the king's predilections were not to be ſo defeated. He refuſed to ratify the convention, and was intent upon ſome opportunity for renewing military operations in that country, and to this, upon the victory of the king of Pruſſia over the French, the miniſter acceded, though on account of it he incurred much obloquy, and his popularity underwent a ſevere trial. The allied army was now to be commanded by Ferdinand, duke of Brunſwick, a general of the higheſt reputation; the king of Pruſſia was to be enabled by a large ſubſidy to co-operate with all the effect to be expected from his extraordinary talents; and thus a diverſion might be given to the French force, which would render the Britiſh arms ſuperior in all other quarters. The event proved the juſtice of ſuch expectations, and the miniſter ſeemed warranted in his emphatic ſentence that America was conquered in Germany. The years 1758, 9, 60, and 61, were marked by a ſeries of ſucceſſes, interrupted almoſt ſolely by the failure of ſome expeditions to the coaſt of France; but theſe ſerved to keep that country in a ſtate of alarm, and retaliate upon it the fear of invaſion which had ſo diſgracefully depreſſed England at the beginning of the war. At the end of that period the navy of France was nearly annihilated, and it had ſcarcely a colony or ſettlement left in any part of the world. In the mean time, however, a change in the crown had taken place, the old king had died, and his preſent majeſty, George III., had ſucceeded to the throne. The confidential, but ſecret adviſers of the new ſovereign, looked to new meaſures; they regarded with jealouſy the vaſt aſcendancy of the miniſter, then emphatically ſtyled the *great commoner*, and his warlike ſpirit was conſidered as adverſe to the re-eſtabliſhment of peace, which now began to be a national wiſh. A negociation with France was commenced, which was rendered abortive by the intermixture of the concerns of Spain with thoſe of this country. This intermixture was reſented in ſtrong language by Mr. Pitt, who being, at that time, furniſhed with intelligence of the treaty of alliance between all the branches of the houſe of Bourbon, called the *family compact*, warmly urged in the cabinet an immediate commencement of hoſtilities againſt Spain. He was over-ruled, and he determined that he would be no longer reſponſible for meaſures which he could not guide. He reſigned his poſt in October 1761, and was accompanied in his retreat by lord Temple. His paſt ſervices were rewarded with a peerage conferred on his wife by the ſtyle and title of baroneſs of Chatham, and an annuity of 3000*l.* for his own life and her's. Mr. Pitt now returned to the condition of a private member of parliament with his fortune ſo little improved by the poſts which he had held, that his principal ſupport was his annuity. He took no leading part in the ſubſequent debates, but when the preliminaries of peace, in 1762, came to be diſcuſſed in parliament, he ſpoke in ſtrong terms againſt many of the proviſions of them. When the queſtion of general warrants was moved, in 1764, Mr. Pitt ſpoke againſt their legality; and during all the conteſts between the prerogative of the crown and liberty of the ſubject, which agitated the early part of the preſent reign, he uniformly ſupported the popular cauſe. On account of his high character for patriotiſm, a conſiderable acceſſion to his fortune was produced in 1765, on the death of ſir William Pynſent, who bequeathed him an eſtate of 3000*l.* a-year. In 1766 the formation of a new miniſtry was committed to him, and on this occaſion he took the office of privy-ſeal, and was himſelf raiſed to the peerage, with the title of the earl of Chatham. He was, in this inſtance, deſerted by his early and intimate aſſociate lord Temple, and the marquis of Rockingham; while other men of rank and talents refuſed to join him; diſguſted, it was believed, by the tone of ſuperiority and haughtineſs which he was too much in the habit of aſſuming. His adminiſtration was therefore fluctuating and unſteady; his own influence gradually declined, and upon his reſignation in 1768, he was ſo far fallen in public eſtimation, that he was ſcarcely miſſed by the public. The fire of his genius was not, however, extinct, and he was rouſed to exertions worthy of his former reputation. He took a leading part in all the great popular queſtions at that time diſcuſſed in and out of parliament. He began with a ſpirited attack in the houſe of lords upon the proceedings of the houſe of commons in the caſe of the Middleſex election. The doctrine of libels, as laid down by lord Mansfield, was another ſubject on which the earl of Chatham vigorouſly maintained the principles of liberty. But it was the quarrel with the American colonies, commencing 1773 or 4, that called forth the remaining powers of this venerable patriot. He oppoſed with all the powers of eloquence of which he was the maſter, though unfortunately in vain, every harſh and coercive meaſure which haſtened the fatal cataſtrophe; he made motion after motion for cloſing the breach after it had been effected, and he foretold, with almoſt prophetic accuracy, the final reſult. Such was his anxiety on this ſubject, that it drove him from his bed in the midſt of pain and great debility of body, and urged him to a vehemence beyond that of his beſt years, and at length was the immediate cauſe of his death. On the 7th of April 1778, the duke of Richmond having moved an addreſs to his majeſty, on the ſubject of the ſtate of the nation, in which the *neceſſity of admitting the independence of America was inſinuated*, lord Chatham deprecated in the warmeſt terms ſuch a termination as the ruin of Britiſh greatneſs. "I rejoice," ſaid his lordſhip, "that the grave has not cloſed upon me; that I am ſtill alive to lift my voice againſt the diſmemberment of this ancient and moſt noble monarchy. Preſſed down, as I am, by the hand of infirmity, I am little able to aſſiſt my country in this moſt perilous conjuncture; but, my lords, while I have ſenſe and memory I will never conſent to deprive the royal offspring of the houſe of Brunſwick of their faireſt inheritance.—Shall this kingdom, that has ſurvived, whole and entire, the Daniſh depredations, the Scottiſh inroads, and the Norman conqueſt; that has ſtood the threatened invaſion of the Spaniſh armada, now fall proſtrate before the houſe of Bourbon? Surely, my lords, this nation is no longer what it was! Shall a people that ſeventeen years ago was the terror of the world, now ſtoop ſo low as to tell its ancient and inveterate enemy, take all we have, only give us peace? It is impoſſible." Lord Chatham's plan, at this moment, for conciliation with America was, no doubt, inefficient; the coloniſts had paſſed the Rubicon, and in 1778 nothing ſhort of independence would have ſatisfied them; but the dying earl thought otherwiſe, and he propoſed to make a great impreſſion upon France, to prevent her ſending that aſſiſtance to the Americans, which he knew the French court had promiſed; he recommended alſo a treaty of union with the Americans; and that America ſhould make peace and declare war in concert with Great Britain; that ſhe ſhould hoiſt the Britiſh flag, and uſe the king's name in her courts of juſtice; and he imagined that when America ſaw the impoſſibility of deriving any aſſiſtance from France, the congreſs would accept of theſe terms. He hoped thus at once to conquer and conciliate America by making a vigorous impreſſion upon France. He ſaw that a war with France was unavoidable, and therefore with his uſual penetration and ardour he wiſhed inſtantly to ſtrike the firſt blow; deteſting that procraſtination which gave the enemy power, not only of chooſing the period of his conveniency, but the firſt ſcenes of operation. The duke of Richmond having replied to his ſpeech, lord Chatham attempted to riſe to anſwer his grace, but after two or three unſucceſsful efforts to ſtand, he fainted, and fell back in his ſeat. He was caught in the arms of ſome of the lords who ſtood cloſe to him, and was conveyed to an adjoining room, and the houſe immediately adjourned. From this ſtate of exhauſtion he never recovered; he was indeed conveyed to his ſeat at Hayes in Kent, where he languiſhed till the 11th of May 1778, when he died, in the 70th year of his age, to the ſincere regret of every Britiſh ſubject, who had a juſt ſenſe of human dignity and virtue. His death, rendered peculiarly impreſſive by the circumſtances juſt referred to, excited general ſympathy. Intelligence of his deceaſe being ſent to London, colonel Barré, the moment he heard of the fact, haſtened to the houſe of commons, who were then ſitting, and communicated the melancholy information. Although the event had been, in ſome meaſure, expected for ſeveral days, yet the houſe were affected with the deepeſt ſenſibility. Even the adherents of the court joined in the general ſorrow, which was apparent in every countenance. The old members indulged a fond remembrance of the energy and melody of his voice; his commanding eye, his graceful action. The new members lamented that they ſhould no more hear the precepts of his experience, nor feel the powers of his eloquence. A deep grief prevailed. The public loſs was acknowledged on all ſides. Every one bore teſtimony to the abilities and virtues of the deceaſed, and on this occaſion all appearance of party was extinguiſhed. His remains were honoured with a public funeral; his debts were paid by the nation, and an annuity of 4000*l.* out of the civil liſt was annexed to the earldom of Chatham. The ſenſe of the extraordinary merits of this great man was not confined to his own country; it pervaded the whole of Europe, and was atteſted by ſome of the higheſt characters in it. But of all the numerous portraits which have been drawn of him, and of which many are preſerved in the "Anecdotes" already referred to, that of lord Cheſterfield is the moſt ſtriking, and probably, upon the whole, the moſt accurate. "His private life," ſays the noble writer, "was ſtained by no vice, nor ſullied by any meanneſs. All his ſentiments were liberal and elevated. His ruling paſſion was an unbounded ambition, which, when ſupported by great abilities, and crowned with great ſucceſs, make, what the world calls, a great man. He was haughty, imperious, impatient of contradiction, and overbearing—qualities which too often accompany, but always clog, great ones. He had manners and addreſs; but one might diſcern through them too great a conſciouſneſs of his own ſuperior talents. He was a moſt agreeable and lively companion in ſocial life, and had ſuch a verſatility of wit, that he would adapt it to all ſorts of converſation. He had a moſt happy turn to poetry, but ſeldom indulged, and ſeldom avowed it. His eloquence was of every kind, and he excelled in the argumentative as well as in the declamatory way. But his invectives were terrible, and uttered with ſuch energy of diction, and ſuch dignity of action and countenance, that he intimidated thoſe who were the moſt willing, and the beſt able to encounter him. Their arms fell out of their hands, and they ſtruck under the aſcendant which his genius gained over theirs." Demoſthenes was his great model in ſpeaking, and it has been ſaid he tranſlated ſome of his orations ſeveral times over. But though he was delighted with the manner of this orator, who united a wonderful power of expreſſion to the moſt forcible method of reaſoning, yet he was equally maſter of the pleaſing, diffuſe and paſſionate ſtyle of the Roman orator.

Of lord Chatham's literary productions, the chief is a volume of "Letters," written to his nephew, afterwards lord Camelford, father of the lord Camelford who was ſhot a few years ſince in a duel.

His lordſhip had five children, *viz.* three ſons and two daughters: 1. John, the preſent earl of Chatham, born in 1756. 2. William, born in 1759, who will be the ſubject of the following article. 3. James Charles, born in 1761, and who is now dead. 4. Lady Heſter, born in 1755, who married the preſent earl Stanhope, and died in the year 1780: this lady left three daughters, of whom the youngeſt, lady Lucy Rachel, married Thomas Taylor, eſq. and who, to the great grief of all that knew her, died March 1, 1814, having exhibited through, alas! much too ſhort a life, in almoſt the higheſt degree, every virtue that could adorn the child, the wife, the mother, and the friend. 5. Lady Harriet, born in 1758, who married the eldeſt ſon of lord Eliot, and died in 1786.

Pitt, William, ſecond ſon of the preceding, and his ſucceſſor in political talent and celebrity, was born May 28th, 1759. He was educated at home, under the eye of his father, who at a very early period diſcovered that in his ſon were talents that would repay all the attention that could be beſtowed on them, and which were likely to raiſe him to diſtinction in the country. For the claſſical education of his ſon he had a domeſtic tutor, but he relied entirely upon his own inſtructions, communicated in converſation, for opening his mind, and giving him a turn to large and accurate enquiry. For the purpoſe of accuſtoming him to that facility of ſpeaking, which he felt had been of great importance to his own riſe in the world, he frequently made him declaim on given topics. At an age when, with the generality of young people, much remains to be learnt at ſchool, Mr.

Pitt was found fully qualified for the univerſity : and accordingly, as ſoon as he had completed his fourteenth year, he was entered at Pembroke-hall, Cambridge, and placed under the private tuition of Dr. Prettyman, the preſent biſhop of Lincoln. At college he was diſtinguiſhed alike for the cloſeneſs of his application, and for the ſucceſs of his efforts, in attaining thoſe branches of knowledge to which his ſtudies were particularly directed. Although no proofs are recorded of extraordinary brilliancy in his academical career, yet few young men of any rank have paſſed through the probation of an univerſity with a more reſpectable character for morals, abilities, induſtry, and regularity. He was intended by his father for the bar and the ſenate, and his education was regulated ſo as to embrace both theſe objects. Soon after he quitted the univerſity, he went to the continent, and paſſed a ſhort time at Rheims, the capital of Champagne. The death of his illuſtrious father, while he was in his 19th year, could not fail to caſt a cloud over his proſpects, but the foundation was laid of thoſe qualities which would enable him to clear the path to eminence by his own exertions. He had already entered himſelf a ſtudent of Lincoln's Inn, and as ſoon as he was of age, in the year 1780, he was called to the bar, went the weſtern circuit once, and appeared in a few cauſes as a junior counſel. His ſucceſs during this ſhort experiment was thought to be ſuch as was amply ſufficient to encourage him to purſue his legal career, and to render him almoſt certain of obtaining all the wealth and honours which await the able and induſtrious labourers in the vineyard of the law. He was, however, deſtined to purſue a very different path, to ſignalize himſelf as a ſtateſman rather than as a barriſter, and to take, for a long ſeries of years, an active part in the regulation of the deſtinies of his country and the civilized world. At the general election in 1780, he was perſuaded to offer himſelf as a candidate to repreſent the univerſity of Cambridge, but, upon enquiry, he found his intereſt would not be equal to carry the election ; he therefore wiſely declined the conteſt. Before, however, he had completed his twenty-ſecond year, he was, through the influence of ſir James Lowther, returned member of parliament for the borough of Appleby. This was in the month of January 1781, a period in which an oppoſition, compoſed of ſome of the greateſt characters in the nation, was in warm contention againſt the miniſtry, which, under the guidance of lord North, was carrying on a diſaſtrous war with the American colonies. By this party the power of the crown was regarded as too great for the balance of the conſtitution, and its reduction by means of certain reforms was the favourite topic of the times. For this purpoſe Mr. Burke, at the commencement of the ſeſſion, brought forward his well-known bill for an economical reform in the civil liſt. It was on this occaſion that Mr. Pitt, on the 26th of February, 1781, made his firſt ſpeech in the Britiſh ſenate. The attention of the houſe was naturally fixed on the ſon of the illuſtrious Chatham, whoſe memory was ſtill dear to the nation, but in a few moments the regards of the whole audience were directed to the youthful orator on his own account. Unembarraſſed by the novelty of the ſituation in which he had been ſo lately placed, he delivered himſelf with an eaſe, a grace, a richneſs of expreſſion, a ſoundneſs of judgment, a cloſeneſs of argument, and a claſſical accuracy of language, which not only anſwered, but exceeded, all the expectations which had been formed of him. During the ſame and the ſubſequent ſeſſion, he occaſionally roſe to give his ſentiments on the mal-adminiſtration of public affairs, and to prove that he inherited his father's abhorrence of the American war, as well as his liberal ideas on other public topics. What ſeemed particularly to intereſt his patriotic feeling, which he unqueſtionably poſſeſſed, at this time, was a reform of parliament. The neceſſity of ſome improvement of this kind had ſtrongly impreſſed a large proportion of the nation, and meetings of numerous bodies of men had been held in different parts, who had appointed delegates to conſider of the beſt plans for bringing it to effect. In one of theſe conventions, holden at the Thatched-Houſe tavern, Weſtminſter, Mr. Pitt himſelf ſat as a delegate. It is true that when examined on his oath, in the year 1794, on the trial of Mr. Tooke, he did not ſeem to remember that he ſat as a delegate, though he admitted he had been engaged in attempts to obtain a parliamentary reform, for which, and which only, the priſoner, at the inſtance chiefly of Mr. Pitt, was then under trial for high treaſon ; but Mr. Sheridan, who was engaged with Mr. Pitt on the ſame buſineſs, expreſsly declared that the meeting at which they attended was a convention to which delegates were appointed from counties, towns, and different parts, to promote the object of parliamentary reform, and to act, not for themſelves individually, but for thoſe who deputed them.

As a public ſpeaker, we have already obſerved Mr. Pitt had opened his courſe with great ſplendour, and it was ſoon evident to all who acted with him, or who were witneſſes to the exerciſe of his talents, that he was apparently deſtined to act a high part on the political ſtage. When, however, lord North's adminiſtration broke up, and a new one was formed under the auſpices of the marquis of Rockingham, Mr. Pitt was not invited to take a ſhare in it. He ſtill purſued the great object of parliamentary reform, and in May 1782, moved for a committee, "to enquire into the ſtate of the repreſentation in parliament, and to report to the houſe their obſervations thereon" The motion was loſt by a majority of twenty. Mr. Pitt did not on this occaſion endeavour to diſcuſs the queſtion as to the beſt ſpecies of reform ; he only aſked for an enquiry, in order that a report might be made to the houſe as to the beſt means of carrying into execution a moderate and ſubſtantial reform in the repreſentation of the people. On this and two other occaſions, *viz.* in May 1783, and April 1785, he ſupported the neceſſity of a parliamentary reform with great eloquence, and the moſt powerful reaſoning, after which he abandoned the cauſe for ever. It has ſince been ably advocated by alderman Sawbridge, Mr. Flood, Mr. Grey, ſir Francis Burdett, and the Hon. Thomas Brand. (See a ſketch of various propoſals for a conſtitutional reform in the repreſentation of the people from 1770 to 1812, ſuppoſed to be drawn up by Mr. Meadley, author of the lives of Dr. Paley and Algernon Sydney.) The death of the marquis of Rockingham ſoon put a period to the adminiſtration of which that nobleman was the bond of union, and in July 1782, lord Shelburne having, with a part of the former members, placed himſelf at the head of a new arrrangement as firſt lord of the treaſury, aſſociated Mr. Pitt, who had juſt completed his 23d year, as chancellor of the exchequer : he refuſed, it was ſaid, to occupy an inferior poſt. A general peace ſoon followed, which was made a ground of cenſure by a very powerful oppoſition ; and in April 1783, the famous coalition miniſtry took the places of thoſe whom they had expelled. Mr. Pitt, during his continuance in office, had found little opportunity to diſtinguiſh himſelf, otherwiſe than as an able defender of the meaſures of adminiſtration, and a keen animadverter upon the principles and conduct of his antagoniſts. He retired with a character unimpeached, and immediately, as we have ſeen, reſumed his efforts for promoting the reform of the repreſentation.

A circumſtance ſoon after occurred, which was the eventual cauſe not only of Mr. Pitt's return to office, but of his poſſeſſion of a degree of authority with the king, and of popularity with the nation, which has rarely been the lot of a miniſter, and which he preſerved, with ſhort interruptions, to the end of his life. A bill for the regulation of the territorial government in India was brought into parliament, in November 1783: the leading proviſion of which was to veſt the whole management of the affairs of the Eaſt India Company in ſeven commiſſioners named in the act, and of courſe to be appointed by the exiſting miniſtry. It was moſt violently oppoſed by Mr. Pitt, on account of its being a violation of the chartered rights of the Company. It nevertheleſs paſſed the houſe of commons by a large majority, and was of courſe carried from thence to the upper houſe. In the mean time, an alarm was raiſed reſpecting the inordinate power which ſuch a regulation would confer upon the miniſtry, and which would render them almoſt, or perhaps altogether, independent of the crown. It was afterwards aſcertained, that, in a private audience granted to lord Temple by his majeſty, this danger was repreſented in ſuch a light, that directions were ſent to all the noblemen dependent upon, or in confidence with, the court, to vote againſt the bill; and it was accordingly rejected. The immediate reſult of this was a change of miniſtry; and in the new arrangement, in December 1783, Mr. Pitt united in his own perſon the offices of firſt lord of the treaſury and chancellor of the exchequer; and thus in his 24th year aſſumed the ſtation of prime miniſter. Though called to this high ſtation by the voice of the ſovereign, he had a moſt formidable oppoſition to encounter in the houſe of commons; and his firſt India bill was rejected, on the motion for its commitment, by a majority of eight, there being for the motion 214, and againſt it 222. A ſpectacle was now preſented, which in this country was regarded as very extraordinary, *viz.* that of a miniſter ſtanding unmoved, though oppoſed to the majority of the national repreſentatives; and it was obvious he had but one of two meaſures to adopt, either to retire from office, or diſſolve the parliament. He choſe the latter, which took place in the month of March 1784, and of courſe a general election ſucceeded. On this occaſion, independently of that ſort of influence, which, though nameleſs, is not leſs efficacious in obtaining a majority, it evidently appeared that the voice of the nation was decidedly in favour of the miniſter; and he had the ſingular good fortune of being ſupported as well by the friends of the royal prerogative, as by thoſe of parliamentary independence, and the new parliament opened with a large majority on the miniſterial ſide. Mr. Pitt, on this occaſion, was returned member for the univerſity of Cambridge; and his firſt meaſure of great importance in parliament was the paſſing of his India bill with ſome alterations: the eſſence of which was the conſtituting of a board of controul appointed by the king, out of the privy council, for ſuperintending the civil and military government, the revenue, and concerns of the Company; while their commercial and internal affairs were left to the management of their own directors. The king was to nominate a commander-in-chief, and to poſſeſs a negative upon all appointments of the Company; and a new court of judicature was inſtituted for the trial of offences committed in India. Another important plan, in which he occupied himſelf, was for the prevention of ſmuggling; and for this purpoſe, he, by what was denominated the Commutation Act, took off the principal duties from tea, and ſupplied the deficiency by a large addition to the window-tax. Through the whole of his career, Mr. Pitt obtained the moſt general applauſe as a miniſter of finance; and the plans which he introduced for the gradual extinction of the national debt, are ſtill operating with great benefit, and have enabled this country to carry on a twenty years' war of unexampled expence. Adopting the principle of ſome able writers on political arithmetic, of the vaſt accumulating powers of compound intereſt, he introduced, in 1786, a bill, for ſetting apart a million annually for the purchaſe of ſtock, which ſum was to be augmented by the intereſt of the ſtock ſo purchaſed. Perſeverance in this plan, with occaſional improvements, has already, amidſt all the preſſure of public burdens, extinguiſhed between two and three hundred millions of debt, and produced a very conſiderable revenue to be applied to the ſame purpoſe. For this plan the financier was indebted to the late excellent Dr. Richard Price, who, on an application from Mr. Pitt, gave him three plans, of which he ſelected the leaſt efficient; and for this he did not think it worth his while to make the ſmalleſt public acknowledgment. (See Fund and Price.) Mr. Pitt likewiſe made various alterations in the mode of collecting taxes, ſo as to obviate and prevent frauds and defalcations, render them more productive, and come in aid of the great ſyſtem. A commercial treaty with France, in 1787, founded, as it was underſtood to be, on reciprocal advantages, and ſupported upon the liberal principle that neighbouring ſtates, inſtead of being foes and rivals, might become mutual aſſiſtants in the progreſs to proſperity, exhibited, in a faint degree, the miniſter's attention to the trading intereſt. It was ſoon diſcovered, that the ſuperior information of the Engliſh negociators threw the benefits of the treaty ſo much into their own ſcale, that, upon experience of its effects, it occaſioned general diſſatisfaction among the merchants in France.

On the queſtion of the impeachment of Mr. Haſtings, Mr. Pitt, who ſeemed ever deſirous of following public opinion, voted with the majority in favour of that meaſure, though moſt of his colleagues in office inclined to the other ſide. A ſimilar attention to the prevailing ſentiments, perhaps, induced him to act as the champion of the eſtabliſhed church, in ſeveral applications from the diſſenters for the repeal of the Teſt and Corporation Acts (ſee Test); a meaſure to which it was ſuppoſed that a ſon of the illuſtrious earl of Chatham would have naturally been inclined. Mr. Pitt entered eagerly into continental politics, and the aggrandiſement of Ruſſia, under the empreſs Catharine, was conſidered by him as an object for the interference of the Engliſh court. He formed leagues to counterbalance her power in the north; and in order to prevent her from retaining poſſeſſion of the fortreſs of Otchakof, he had nearly involved the two countries in a war. The unpopularity of this meaſure was ſoon manifeſt; his reſolution was ſhaken, and he abandoned the object altogether. He next diſplayed a readineſs to recur to arms, in a diſpute with Spain reſpecting the fur-trade at Nootka ſound, which was violently oppoſed in and out of parliament, and which was at length adjuſted by a convention. His interference to preſerve the power of the ſtadtholder in Holland, and defeat the machinations of the French in that country, was a very popular meaſure.

In the autumn of 1788, the people of England were thrown into a ſtate of alarm, by a calamity which threatened to deprive them of their ſovereign. In the beginning of October, his health appeared to be ſenſibly impaired; and though he was ſufficiently recovered to hold a levee on the 24th of that month, before its concluſion the diſorder aſſumed a marked character, and moſt ſerious aſpect. Early in the enſuing month, it became generally known that it had ſettled in the brain, and had rendered his majeſty incapable of exerciſing the royal functions. Parliament having been prorogued to the 20th of November, it became neceſſary that it ſhould meet that day, as the ſovereign, by whom only it could be further prorogued, was not in a ſituation to aſſert his prerogative. In the mean time, the leaders of the different parties, who were materially intereſted in the event, aſſembled in the capital; and an expreſs was diſpatched to Mr. Fox, then abſent on the continent, to accelerate his return. This occurrence gave occaſion to a diſplay of the firmneſs and deciſion of Mr. Pitt's character. In this article we cannot enter into many particulars; but we may obſerve, that the firſt material queſtion brought up by this event was, in whom the office of regent was veſted? The prince of Wales being connected with the party in oppoſition, it was contended by them that the regency of courſe devolved upon him; while, on the other hand, Mr. Pitt ſupported the doctrine, that it lay in the two remaining branches of the legiſlature to fill up the office, as they ſhould judge proper; admitting, at the ſame time, that no other perſon than the prince could be thought of for the poſt. By adopting this principle, he carried with him the concurrence as well of thoſe who were attached to the popular part of the conſtitution, as of the king's friends, whoſe great object was to ſecure his return to power, on the ceſſation of his malady; and he was enabled to paſs a bill, greatly reſtricting the power of the regent, which his majeſty's timely recovery in the beginning of the year 1789 rendered abortive. Mr. Pitt was now left to purſue his plans of internal economy, without thoſe interruptions to which he had lately been ſubjected. He had received, during the diſcuſſions on the regency, very deciſive tokens of eſteem from many of the moſt reſpectable public bodies in the kingdom; and he had the ſatisfaction of knowing, that the firm and ſteady conduct which he obſerved, on a queſtion peculiarly calculated to try the firmneſs, ſteadineſs, and conſiſtency of a public character, had obtained for him, in a very marked manner, the confidence of their majeſties, and greatly increaſed his popularity throughout the nation.

The next great event in which he was to take a leading part was the French revolution, an event the moſt momentous in its conſequences that modern hiſtory records. (See Revolution, *French.*) The influence of this vaſt convulſion could not be viewed by the politician, and the miniſter of a great empire, but in a double light, as exerted upon France itſelf, and upon the neighbouring ſtates. Its principles and progreſs were, without doubt, watched with a jealous and anxious eye by Mr. Pitt, as well as by all others engaged in the ſervice of exiſting governments. That the tyrannies of Europe, the deſpotiſm exerciſed in the greater and the ſmaller ſtates, ſhould tremble at the effects likely to be produced by the French revolution, was not a matter of ſurpriſe; but the conſtitution of our own country, if not actually founded, yet built upon the principles of national liberty, had at that moment nothing to dread: and it is not ſaying too much to affirm, that if the miniſter had poſſeſſed a mind capable of taking advantage of the circumſtances as they roſe, and kept aloof from war, he might have rendered the continental ſtorms indefinitely uſeful, in promoting the proſperity of theſe iſlands. Had he led thoſe ſyſtems of reform, which, but a few years before, he had been eager to propoſe, and ſtrenuous to vindicate, he would have quieted the voice of diſcontent, and might have carried the country with him: inſtead of which, he now pertinaciouſly clung by thoſe very abuſes and corruptions, which he had formerly ſo ſucceſsfully expoſed, which gave room for invective, and at length excited thoſe clamours, which ſubſequently required a "vigour beyond the law to ſuppreſs." There is ſcarcely any doubt that Mr. Pitt was, at firſt, againſt engaging in the war againſt France; but finding the majority of the cabinet determined on the project, he gave up his principles rather than retire from the helm of government. If, however, he were tardy in entering upon hoſtilities, he made up in zeal for any moments that were loſt in diſcuſſing the principles of action. The war of England, as well as that carrying on by the allied deſpots on the continent, was againſt *French principles;* and in the conteſt, the government of this country was ſoon aided by all the great powers and authorities of the nation; by the magiſtracy, the law, the church, the army, the maſs of property hereditary and commercial. In oppoſition to this, the democratical party, if not very numerous, were actuated by an enthuſiaſtic zeal bordering on madneſs. The views of the Whigs, headed by a Grey and an Erſkine, extended only to ſuch temperate reforms as had been propoſed by the miniſter himſelf; but there were others, who were perpetually appealing to their country as to the neceſſity of thoſe more radical changes, which had been vindicated by the duke of Richmond, now an adherent to Mr. Pitt and the court, *viz.* annual parliaments, and univerſal repreſentation. Some few, but certainly very few in the whole realm, unleſs actuated by the hope of plunder, went much farther, and anticipated a revolution in this country ſimilar to that in France.

Under ſuch circumſtances, a vigilant eye and a ſteady hand were obviouſly neceſſary to ſteer the veſſel of ſtate amidſt thoſe dangers. By his own zealous adherents, Mr. Pitt obtained for the time the epithet of "the pilot who weathered the ſtorm;" but the manner in which he exerciſed the almoſt unlimited power entruſted to him, will not juſtify the application of this epithet. He had few of the qualities of a good pilot: he was more eager to engage in the battle, and to hurl the thunder of war, than to direct the motion of the veſſel. To ſound alarm as loudly as poſſible through the nation; to encourage the diſſemination of high principles of government, and involve in common obloquy all meaſures of oppoſition, and all projects of reform; to augment, according to the apparent or pretended urgency of circumſtances, the reſtrictions upon political liberty; and make ſacrifices of the ſpirit of the conſtitution to what was denominated by the government party, the public ſafety; appears to have been the ſyſtem of his domeſtic policy. For ſome time he probably had no participation in the plans for interfering in the internal concerns of France, which was the occaſion of the firſt hoſtilities: for Mr. Pitt, in the year 1792, when laying before parliament a very flattering ſtatement of the national revenue, did not heſitate to prognoſticate a long continuance of peace and proſperity. Before, however, the year was cloſed, the militia was ſuddenly called out, parliament ſummoned at the ſhorteſt poſſible notice, and war was eventually declared by this country, by withdrawing our ambaſſador from the court of France. The depoſition and execution of the unfortunate Lewis XVI., added to the circumſtances juſt referred to, rendered the war in which Mr. Pitt engaged extremely popular throughout the nation. At that time, it was imagined the conteſt would be very ſhort; that the democratic party of France would be deſtroyed; and either that the Bourbons would, in a few months, be reſtored, or that the empire itſelf would be divided among the neighbouring nations. The ill ſucceſs which attended this confederacy could not certainly be charged upon the want of vigour in the Britiſh miniſter, who entered into it apparently with his whole heart, and laviſhed all the reſources of the country upon its ſupport. In a few months, the direful effects of war were felt over the whole of Europe. The calamities that attached themſelves to our own commerce and manufactures, were great beyond example; but they were not peculiar to Britain. Bankruptcies ſpread over the whole continent of Europe, through France, Holland, Germany, Poland, Ruſſia, Italy, and Spain; and almoſt every where, in the year 1793, private as well as public credit was impaired, if not, for the ſeaſon, totally deſtroyed. In one reſpect England differed, at this criſis of general diſtreſs, from moſt of the other European nations: her public credit was ſound, and, by affording a prompt and liberal aſſiſtance to her manufacturers and merchants, the difficulties were in a ſhort time overcome. It was in the midſt of theſe calamities, brought on by the prevalence and extenſion of the war ſyſtem throughout Europe, that an able writer, and moſt excellent man, now, alas! no more, thus apoſtrophiſed the miniſter: "If I were bold enough to appreciate your political life, Mr. Pitt, I ſhould be inclined to allow the outſet of it extraordinary merit. The ſentiment of approbation that attended you was indeed almoſt univerſal: you were the hope of the good, the pride of the wiſe, the idol of your country. If your official career had terminated with the diſcuſſions on the regency, it may be queſtioned whether modern Europe could have produced a politician or an orator more ſtrenuous, more exalted, more authoritative; one whoſe ambition was apparently more free from ſelfiſhneſs; who afforded to his opponents leſs room for cenſure, or gave to his friends more frequent occaſions of generous triumph, and honeſt applauſe. The errors that you have fallen into are natural for men long poſſeſſed of power uncontrolled; and in imputing them to you, I accuſe you only of the weakneſſes of human nature. It is natural, I believe, for ſucceſsful ambition to ſeek new objects on which it may exert itſelf. Hence, after you had ſubdued oppoſition in England, you iſſued forth, like another Hercules, in queſt of new adventures, and traverſed the continent of Europe to ſeek monſters, whom you might ſubdue. You could not, however, but be ſenſible that the reputation of a miniſter of trade and finance, which you had juſtly obtained, was incompatible with that of a great war miniſter, in the preſent ſtate of the nation. You took, therefore, the middle line: you made preparations for fighting on every occaſion, but you took care not to ſtrike. England might perhaps bear the expence of arming, but could not actually go to war; and this ſecret, which your three ſucceſſive armaments diſcovered to all Europe, led Mirabeau on his death-bed to give you the name of *miniſtre preparatif*.

"In men long in poſſeſſion of power, a ſecret ſympathy, unknown perhaps to themſelves, is gradually ſtrengthening in favour of others in the ſame ſituation; and a ſecret prejudice, amounting perhaps at laſt to enmity, againſt oppoſition to power in every perſon. Hence the danger you ſaw to England, in the triumph of the patriots of Holland over the prince of Orange; and the ſafety we acquired from the ſubjugation of the Dutch by the Pruſſian arms. Hence alſo the perfect compoſure with which you expected the conqueſt of France, by the deſpots of Germany; and the ſudden alarm with which you were ſeized, on the repulſion of that invaſion, and the over-running of Flanders by the republican arms. By the freedom of Brabant, the conſtitution of England might be endangered; but it became more ſecure in your eye, it ſhould ſeem, by the extenſion of deſpotiſm over every corner of Europe, and the ſucceſs of foreign bayonets in rooting out liberty, as well as licentiouſneſs in France." Such was the character of Mr. Pitt, drawn in 1793, by the maſterly hand of the late Dr. Currie, under the feigned name of Jaſper Wilſon. Its likeneſs, after more than twenty years, will not be diſputed; and on that account we have transferred it into our columns.

We do not pretend to enter into the details of the war with France, and ſhall content ourſelves with noticing a few of its conſequences. Great Britain, on the whole, was triumphant on her own element; but the conteſt on the continent went entirely in favour of France, who, at length, united in a confederacy againſt England ſome of the powers who had been her allies in the commencement. She was now obliged to attend to her defence at home, and at the ſame time was preſſed by an accumulation of difficulties, which native ſtrength alone could have enabled her to ſurmount. In 1797, the bank of England was unable to anſwer the demands made upon it, and an act of parliament was paſſed to allow the governors of that eſtabliſhment to ſuſpend their payments in caſh, and to ſubſtitute for gold and ſilver, notes of every deſcription, even to thoſe for two pounds and one pound. Another ſhock to the credit of the country was a daring mutiny of the fleet; and theſe diſaſters had ſcarcely been averted, before a moſt formidable rebellion in Ireland broke out, and which was not extinguiſhed without the employment of a large military force, and the adoption of ſuch ſanguinary meaſures as were diſgraceful to thoſe who reſorted to them. The public burthens went on accumulating in a vaſt ratio, and Mr. Pitt was obliged to have recourſe to a triple aſſeſſment, and finally to an income tax, for raiſing the neceſſary ſupplies. In 1799, he, with the aid of pecuniary offers, produced a new confederacy, in which the numerous armies of Ruſſia and Auſtria were employed to overthrow the preponderancy of France, but its final iſſue was completely unfortunate. In the following year Mr. Pitt had brought to effect the great and arduous meaſure of an union between Great Britain and Ireland, a meaſure, the true policy of which has long ſince been generally acknowledged. The war with France was now become ſo hopeleſs with regard to any object with which it might have commenced, and the nation was ſo completely wearied with protracted hoſtilities, that Mr. Pitt, aware that he could make no peace correſpondent to his high language, reſolved to quit the important ſtation he had ſo long occupied. He reſigned his poſt in February 1801, and was ſucceeded by Mr. Addington, now lord Sidmouth. The peace of Amiens ſoon followed, which Mr. Pitt defended in his place in parliament. He afterward, in ſome important points, joined the oppoſition, and the new miniſter was in a ſhort time forced into a ſecond French war. His talents were ſoon found unequal to the conteſt in which he had embarked, and Mr. Pitt, in 1804, reſumed his poſt as firſt lord of the treaſury, at the head of an arrangement formed of part of the miniſters then in place, with the addition of ſome of his own friends. He now came into office as a war miniſter, and exerted all the vigour of his character to render the conteſt ſucceſsful. He engaged the two great military powers of Ruſſia and Auſtria in a new confederacy againſt France. The errors committed by them in their plan of co-operations were fatal to the cauſe, and the battle of Auſterlitz put an end to the hopes of a check to the then enormous aggrandizement of an empire which ſeemed deſtined to ſway the European continent. Mr. Pitt was in a ſtate of health ill calculated to meet this terrible ſtroke. He had, from an early period of life, given indications of inheriting his father's gouty conſtitution, with his talents, and it had been thought neceſſary to make the liberal uſe of wine a part of his ordinary regimen. The habit and the neceſſity, of courſe, gained ground upon him, and he did not eſcape the charge of convivial intemperance. This abuſe of ſtrong ſtimulants, added to the cares and exertions of office during the ſtormy period of his adminiſtration, brought on a premature exhauſtion of the vital powers. In December 1805, he was recommended to go to Bath, but the change afforded him no permanent relief. On the 11th of January he returned to his ſeat at Putney, in ſo debilitated a ſtate, as to require four days for the performance of the journey. The phyſicians, even yet, ſaw no danger, and they ſaid there was no diſeaſe, but great weakneſs, in conſequence of an attack of the gout. On the following Sunday he appeared better, and entered upon ſome points of public buſineſs with his colleagues in office: the ſubject was ſuppoſed to relate to the diſſolution of the new confederacy, by the peace of Preſburgh, which greatly agitated him. On the 17th, at a conſultation of his phyſicians, it was agreed, that though it was not adviſable he ſhould attend to buſineſs for the next two months, yet there was hope he would be able to take a part in the houſe of commons in the courſe of the winter. On the 20th, however, he grew much worſe, and it was admitted his ſituation was precarious; in other words, thoſe who till then had encouraged hope in the patient, now ſaw that he was in the moſt imminent danger, and that, probably, he had not many hours to live. The biſhop of Lincoln, who never left him during his illneſs, informed him of the opinion now entertained by ſir Walter Farquhar, and requeſted to adminiſter to him the conſolations of religion. Mr. Pitt aſked ſir Walter, who ſtood near his bed, "How long do you think I have to live?" The phyſician anſwered that he could not ſay, at the ſame time he expreſſed a faint hope of his recovery. A half ſmile on the patient's countenance ſhewed that he placed this language to its true account. In anſwer to the biſhop's requeſt to pray with him, Mr. Pitt replied, "I fear I have, like too many other men, neglected prayer too much, to have any ground for hope that it can be efficacious on a death-bed—but," making an effort to riſe as he ſpoke, "I throw myſelf entirely on the mercy of God." The biſhop then read the prayers, and Mr. Pitt appeared to join in them with a calm and humble piety. He deſired that the arrangement of his papers and the ſettlement of his affairs might be left to his brother and the biſhop of Lincoln. Adverting to his nieces, the daughters of earl Stanhope by his elder ſiſter, for whom he had manifeſted the ſincereſt affection, he ſaid, "I could wiſh a thouſand or fifteen hundred a-year to be given them; if the public ſhould think my long ſervices deſerving of it." He expreſſed alſo much anxiety reſpecting major Stanhope, that youthful hero, who fell a ſacrifice to his valour at Corunna, in company with his friend and patron general ſir John Moore, and his brother, who was alſo at Corunna at the ſame time, and who has been engaged in all the great battles in the peninſula, and more than once ſeverely wounded in his country's ſervice. Mr. Pitt died about four o'clock in the morning of the 23d of January 1806, in the 47th year of his age. A public funeral was decreed to his honour by parliament, and 40,000*l.* to pay thoſe debts which he had incurred in his country's ſervice. Public monuments have been ſince erected to his memory in Weſtminſter-Abbey, in the Guildhall of the city of London, and by many public bodies in different parts of the kingdom. There is no doubt that he died in poſſeſſion of the eſteem and attachment of a large portion of his countrymen, and his political conſequence was proved by the entire diſſolution, at his death, of the miniſtry of which he was the head, and the neceſſary admiſſion of a party, againſt whom ſtrong prejudices were known to prevail. He will long live in memory as a diſtinguiſhed orator, an able financier, and a man of uncommon talents: whether he is alſo to be ranked among great and enlightened ſtateſmen, impartial hiſtory will hereafter decide. Dr. Stock, in his intereſting life of Dr. Beddoes, ſpeaking of the "Eſſays on the public Services of Mr. Pitt," ſays, "But we are as yet too near the time of action to examine, with equal impartiality, the merits of writings ſo hoſtile to Mr. Pitt. A great portion, however, of the events anticipated in theſe eſſays, is already become hiſtory. The career of this celebrated ſtateſman is cloſed. If his meaſures were good, he can no longer direct; if bad, he can no longer reſtrain their influence. A long period muſt elapſe, perhaps it muſt be left to diſtant poſterity, to trace their full influence on the deſtinies of Great Britain. The cenſure which the author (Dr. Beddoes), has thrown upon his plans may be unjuſt, but his anticipation of their failure was prophetical. Principles were in action, the full operation of which had not been familiar to human experience. Common political calculations, and common-place ſtateſmen, were every where baffled and confounded. But however deplorably his ſchemes of foreign policy may have failed, whether from deficiency in political ſagacity, or from incapacity or treachery of allies; his advocates will triumphantly maintain that, in point of primary importance, he ſucceeded: he ſaved the Engliſh conſtitution. If this be true, no praiſe can exceed his deſerts, and no honours that a grateful nation can pay to his memory can be exceſſive. To have preſerved a conſtitution, which has raiſed man to the true level of his nature, which has *ripened ſouls*, which ſecures to every individual under its protection a degree of practical liberty of writing, of ſpeaking, and of action, greater than exiſts in any country on the ſurface of the globe, muſt emblazon his name to all poſterity. Should all the other pillars that ſupport the temple of his fame give way, ſo long as this remained unſhaken, it would, ſingly, uphold the fabric. His opponents will, however, remind us of unhallowed attempts to deprive us of theſe proud diſtinctions; and they will contend, that great as are the honours that ſhould be paid to his memory, if the meaſures of his adminiſtration ſhould appear to have been really the means of preſerving this glorious monument of the wiſdom of our anceſtors; ſo great muſt be the indignation that ſhould purſue it, if they ſhould have proved to have impaired its magnificence, to have undermined its foundations, and to have expoſed us to the hazard of a conteſt, in which not common intereſts only are involved, but on the iſſue of which is ſtaked every thing that is dear to the heart of a Briton, every thing that can render life itſelf valuable and deſirable."

It is not eaſy to underſtand what is meant by the word Conſtitution: if by it is intended ſimply the government by King, Lords, and Commons, Mr. Pitt found ſuch a government, and left it as ſafe as he found it; but it would be difficult to prove that it ever was in danger: in the very worſt period,—in the years 1793 and 4,—it may be doubted, if in the whole extent of Great Britain, there could have been found a thouſand perſons, who would, whatever were their motives, have wiſhed for any change in this reſpect; and hence no great merit can be given to Mr. Pitt as the ſaviour of our mixed form of government. If, however, by the Conſtitution are intended thoſe guards and that ſecurity of the people, which are eſſential to their exiſtence as a free nation, it would not be eaſy to ſhew in what reſpect Mr. Pitt was the ſaviour of the Conſtitution. The ſecurities to which we have referred, and which, in the eſtimation of Blackſtone and all our great conſtitutional lawyers, have been regarded as the fundamentals of our excellent conſtitution, are *Magna Charta*, the *Habeas Corpus Act*, the *Liberty of the Preſs*, and *Trial by Jury*. If theſe exiſt in a country, the people have a pure and a perfect conſtitution; they need no more to render them, in every juſt ſenſe of the word, a free people. *Magna Charta* declares, that no man ſhall be impriſoned contrary to law: during Mr. Pitt's adminiſtration, many perſons were thrown into dungeons, in defiance of this wholeſome proviſion of our anceſtors. The *Habeas Corpus Act* affords an additional ſecurity from falſe and unjuſt impriſonment, and points out effectual means, for a perſon thus maltreated, as well to releaſe himſelf, though committed by the king in council, as to puniſh all thoſe who ſhall thus unconſtitutionally miſuſe their power. Mr. Pitt not only ſuſpended the operation of the Habeas Corpus act more frequently than any former miniſter, and that often without a ſhow of reaſon, but at length bargained with his ſucceſſor for an act of indemnity for all his unconſtitutional acts, ſo that the perſons thus injured in their fortune, their health, and fair fame, were prevented from ſeeking pecuniary redreſs by the law of the land. (See Woodfall's Parl. Deb. 1801. vol. ii.) The liberty of the preſs had not for a century and more been under ſuch ſhackles as it was during the adminiſtration of Mr. Pitt, and by certain bills brought into parliament, and paſſed into laws by his influence and that of lord Grenville, the tongue was fettered, and the Bill of Rights made nugatory. In one of Mr. Pitt's treaſon bills, he endeavoured to contract thoſe advantages which the ſtatute of Edward III. allows to the accuſed, by granting them leſs time than ten days to enquire into the characters of thoſe who were to try, and thoſe who were to be brought as witneſſes againſt them. When, however, he found the Houſe determined to reſiſt the innovation, he triumphantly ſaid, that "Nothing was more eaſy than utterly to defeat that wiſe and humane law, by ſending to the men accuſed a *cloud* of witneſſes," to perplex and confound them. In 1794, what he had ſaid *might* be done, *was* done, and he was ſtill prime miniſter. On the memorable ſtate trials, each priſoner had more than 200 perſons nominated as jurymen to try him, and the names of 213 perſons were given him, as thoſe who might be produced as witneſſes in the cauſe. Hence the *trial by jury* was invaded in one of the moſt important caſes that ever arreſted the public attention. This, however, was but a ſequel to his general conduct; he had extended the Exciſe and Cuſtomhouſe laws beyond all former precedent; and in many of his fiſcal regulations, he utterly diſcarded the idea of the intervention of a jury between the king and the ſubject. In a hundred of his acts, the magiſtrate is alſo made paramount to all law, and it requires but the evidence of a common thief-taker to deprive a ſubject of his liberty. Caſes of this kind are not rare; ſcarcely a month or even a week occurs, but the public papers announce, that perſons are committed to priſon for three or ſix months by the order of a police magiſtrate, who is guided in his deciſion only by the oath of a man, perhaps much worſe than he who is ſubjected to the puniſhment.

We may, indeed, proceed one ſtep farther, and ſay, that notwithſtanding the early tincture which Mr. Pitt's mind may be ſuppoſed to have received in favour of freedom and thoſe principles, which we have aſſumed, on good authority, as the bulwarks of the Britiſh conſtitution, and the voluminous additions which he made to our acts of parliament, it will be difficult to find a ſingle diſintereſted law introduced by him in favour of the liberty of the ſubject, within the whole compaſs of our ſtatute books. This fact, if it be a fact, muſt not be imputed to the ſpirit of the times; in the early periods of the preſent reign, toleration and religious liberty received ſome important acceſſions; and ſince the death of Mr. Pitt, ſhe has, under the auſpices of the preſent adminiſtration, been ſtill better treated, and a wider ſcope has been given to ſpeculative enquiry. That all improvement in civil and religious liberty ſhould have ceaſed during the twenty years of Mr. Pitt's miniſtry, cannot be accounted for if he had been, in office, what he unqueſtionably was when he firſt entered upon public life, an ardent friend to the liberties of his country. We ſhould gladly give, if authorities would ſupport us, ſome traits of a different kind to juſtify the epithet of his friends applied to him as the ſaviour of the conſtitution. With this view, we have looked through the voluminous Hiſtory of Mr. Pitt's Political Life by Mr. Gifford; but in all the ſix volumes nothing cheering, nothing favourable appears. As a private character, he was, we believe, every thing that was excellent and amiable; to this, and to his character as a man of real talent, we ſhall turn, and with that eſtimate ſhall conclude our article.

Mr. Pitt poſſeſſed no particular advantages of perſon or phyſiognomy, the firſt of which was ungraceful, the ſecond repulſive rather than attractive. As a ſpeaker he was thought to be without a rival: ſuch was the happy choice of his words, the judicious arrangement of his ſubject, and the faſcinating effect of a perennial eloquence, that his wonderful powers were acknowledged even by thoſe who happened to be prepoſſeſſed againſt his arguments. When employed in a good cauſe he was irreſiſtible; and in a bad one he could dazzle the judgment, lead the imagination captive, and ſeduce the heart, even while the mind remained firm and unconvinced. Ambition and the love of power were his ruling paſſions; his mind was elevated above the meanneſs of avarice. His perſonal integrity was unimpeached, and ſo far was he from making uſe of his opportunities to acquire wealth, that he died involved in debts, which negligence, and the demands of his public ſtation, rather than extravagance, had obliged him to contract; for his taſtes were ſimple, and he does not appear to have had a fondneſs for ſplendour or parade. His private character has been drawn by a friend, and it correſponds perfectly with other accounts that we have had from thoſe much in his confidence, and who were frequently in his company at times, when the man and not the miniſter was diſplayed in all its native colours: "With a manner ſomewhat reſerved and diſtant in what might be termed his public department, no man was ever better qualified to gain, or more ſucceſsful in fixing, the attachment of his friends, than Mr. Pitt. They ſaw all the powerful energies of his character ſoftened into the moſt perfect complacency and ſweetneſs of diſpoſition in the circles of private life, the pleaſures of which no one more cheerfully enjoyed, or more agreeably promoted, when the paramount duties he conceived himſelf to owe the public, admitted of his mixing in them. That indignant ſeverity with which he met and ſubdued what he conſidered unfounded oppoſition; that keenneſs of ſarcaſm with which he expelled and withered, as it might be ſaid, the powers of moſt of his aſſailants in debate, were exchanged in the ſociety of his intimate friends for a kindneſs of heart, a gentleneſs of demeanour, and a playfulneſs of good humour, which no one ever witneſſed without intereſt, or participated without delight." See Roſe's Examination into the Increaſe of the Revenue, &c. during the Adminiſtration of the Right Hon. William Pitt. See alſo Monthly Mag. vol. xxi. Wyvill's Political Papers. Stock's Life of Dr. Beddoes. General Biog. New Ann. Regiſt. and Parliamentary Debates.

Pitt, in *Geography*, a county of America, in North Carolina, containing 9169 inhabitants.—Alſo, a townſhip of Allegany county, Pennſylvania, containing 2441 inhabitants.

Pitt *Iſland*, an iſland in the North Pacific ocean, near the W. coaſt of North America, between Norfolk ſound and Saliſbury ſound, about 50 miles long and 13 broad. N. lat. 57° 20′.—Alſo, a ſmall iſland in the Chineſe ſea. N. lat. 10° 57′. E. long. 114° 36′.

Pitt's *Archipelago*, a range of iſlands in the North Pacific ocean, extending along the weſt coaſt of North America, about 60 miles in length; ſo called by captain Vancouver in honour of the Rt. Hon. William Pitt. N. lat. 54° 10′. W. long. 52° 15′.

PITTACIUM, Πιττάκιον, in *Surgery*, a name which ſome authors give to a piece of cloth ſpread with a ſalve, to be laid on a part affected.

PITTACUS, in *Biography*, a warrior and philoſopher, reckoned among the ſeven ſages of Greece, was born at Mitylene, in Leſbos, about the year 650 B.C. In a war between his countrymen and the Athenians, he challenged to combat their general Phrymon, a man of great ſtrength, who had been a victor in the Olympic games, and vanquiſhed him by means of a concealed net, which he threw over the enemy's head. As a reward for his valour he was offered a very large tract of land, which he had recovered from the enemy, but he would accept no more than he could meaſure by a ſingle caſt of the javelin, and of this even he conſecrated half to Apollo. He afterwards expelled the tyrant Melanchrus from Mitylene; and having liberated his country, was placed by his fellow citizens at its head. He now governed with as much wiſdom as he had fought with bravery. He enacted many uſeful laws, and in order that they might be the better remembered he comprehended them in 600 verſes. In one of theſe he gave a ſevere check to the propenſity of the people to drunkenneſs, by enjoining a double puniſhment for crimes committed in that ſtate. After having held the reins of government during ten years with high reputation, he reſigned his authority, and ſpent the remainder of his life in ſtudy and retirement. He died about the year 570 B.C. The maxims of Pittacus were held in ſuch high eſteem, that many of them were inſcribed upon the walls of the temple of Delphi. The following may be given as ſpecimens of them: "Power diſcovers the man;" "Whatever you do, do it well;" "Be watchful for opportunities." Enfield's Hiſt. Phil.

PITTANCE, from *pictantia*, a ſmall coin of Poictou, ſee Du Cange; a ſmall portion of food, or *entremet*, in oppoſition to *generale*, or a ſolid diſh, the mention of which pittance frequently occurs in the conſtitutions of our ancient communities, where they determine how many *generalia* and how many *pictantiæ* ſhall be ſerved up on ſuch and ſuch days. Theſe pittances, from whence our preſent word pittance is derived, uſually conſiſted of plates of legumes, cheeſe, or fruit.

PITTARO, in *Geography*, a mountain of Calabria Ultra; 14 miles N.W. of Bova.

PITTEN, a town of Auſtria; 8 miles S. of Ebenfurth.

PITTENWEEM, a royal borough and ſea-port town, is ſituated in the diſtrict of St. Andrew's, and the ſouth-eaſt coaſt of the county of Fife, Scotland. It was formerly a place of conſiderable trade, but there is now few ſhipping here. The coal and ſalt-works, however, ſtill occaſion ſome little activity here and in the adjacent villages. Pittenweem was firſt conſtituted a royal borough by king James V. in 1547; and now enjoys the privilege, in conjunction with Crail, of ſending one member to the imperial parliament. In the rebellion in the ſeventeenth century this town ſuffered greatly, upwards of thirteen ſail of veſſels belonging to the port having been deſtroyed or taken by the enemy in the courſe of two or three years. Here are ſome remains of an ancient priory for canons regular of the order of St. Auguſtine, which was dedicated to the Virgin Mary, and was a cell to the mitred abbey of St. Andrew's. This priory had large landed poſſeſſions, together with the churches of Rhind, Anſtruther Weſter, &c., which are now erected into a regality called the regality of Pittenweem, under the juriſdiction of lairds of Anſtruther as heritable bailies. About half-way between the ruins and the beach is a great cave, or weem, whence the borough derives its name. It conſiſts of two ſpacious apartments, at the junction of which is a ſtair leading to a ſubterraneous paſſage, which formerly communicated with the monaſtery, but which has long been blocked up by the earth falling in. There is alſo another ſtair ſtill remaining, which leads from the refectory to the further extremity of this paſſage.

Pittenweem, with reſpect to church government, is in the preſbytery of St. Andrew's and ſynod of Fife. It is diſtant about 33½ miles N.E. by N. from Edinburgh; and according to the parliamentary returns of 1811, contains 194 houſes and 1096 inhabitants. The late learned John Douglas, D.D., lord biſhop of Saliſbury, was a native of this town. His lordſhip is well known in the literary world as the vindicator of Milton, from the charge of plagiariſm brought againſt him by Lauder. He was one of the truſtees of the Britiſh Muſeum, and co-vice-preſident of the Society of Antiquaries in London. Carliſle's Topographical Dictionary of Wales, vol. ii. 4to. Beauties of Scotland, vol. iv.

PITTERSBERG, a town of the duchy of Carinthia; 3 miles N. of Mauten.

PITTI, a ſmall iſland in the ſtraits of Malacca, N. lat. 2°. E. long. 101° 29′.

PITTONIA, in *Botany*, ſo named by Plumier, in honour of his great countryman and contemporary, Joſeph Pitton de Tournefort. (See Tournefortia.) Linnæus, according to the rule he had laid down, preferred the latter appellation, as derived from the name by which the perſon commemorated was univerſally known, out of his own country; and the example has been followed by all following writers, even in France; at leaſt in this inſtance. In ſome caſes there has been a contrariety of opinion. (See Louichea and Fontanesia.) Such difficulties are for the future removed, by the ſimplification of French ſurnames, ſince the revolution.

PITTOSPORUM, ſo named by ſir Joſeph Banks, according to Gærtner. The word is derived from πιττοω, *to beſmear with pitch*, and σπορα, *ſeed* or *offspring*; becauſe the ſeeds are enveloped in a pitchy fluid, exuding internally from the capſule as it ripens; a circumſtance altogether peculiar, thus happily expreſſed in the generic name.—Gærtn. v. 1. 286. t. 59. Schreb. 150. Willd. Sp. Pl. v. 1. 1145. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 2. 27. Lamarck Dict. v. 5. 361. Illuſtr. t. 143.—Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Dumoſæ*, Linn. *Rhamni*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in five, generally very deep, acute, equal ſegments, deciduous. *Cor.* Petals five, inſerted into the receptacle, alternate with the ſegments of the calyx, oblong, equal; their claws longer than the calyx, linear, channelled, erect, converging in the form of a tube; border ovate-oblong, ſpreading, recurved. *Stam.* Filaments five, inſerted into the receptacle, alternate with the petals, the length of the claws, linear, compreſſed; anthers incumbent, arrow-ſhaped, ſimple. *Piſt.* Germen ſuperior, roundiſh; ſtyle awl-ſhaped, the length of the ſtamens; ſtigma obtuſe. *Peric.* Capſule roundiſh, angular, pointed, of from two to five cells and as many valves, the partitions from the middle of each valve. *Seeds* three or four in each cell, angular, inſerted into the inner edges of the partitions, enveloped in a reſinous fluid produced by the inſide of the valves.

Eſſ. Ch. Calyx five-cleft, deciduous. Petals five, converging into a tube. Capſule of ſeveral cells and as many valves. Seeds enveloped in a liquid reſin.

1. P. *coriaceum*. Thick-leaved Pitch-ſeed. Ait. n. 1. Willd. n. 1. Vahl Symb. v. 2. 43. Andr. Repoſ. t. 151.—Leaves obovate, obtuſe, coriaceous, very ſmooth. Capſules of two valves.—Native of Madeira. A greenhouſe ſhrub, flowering in May, ſaid to have been firſt raiſed by Meſſrs. Lee and Kennedy, about the year 1783. The *ſtem* is ſix or eight feet high, buſhy, with round, finely downy, *branches*, leafy at their ſummits. *Leaves* crowded, alternate, two or three inches long, remarkably coriaceous, of a fine green, ſmooth and even, not ſhining, with one rib, and numerous ſcarcely viſible tranſverſe veins. *Footſtalks* ſhort, broad, channelled, downy when young. *Stipulas* large, broad, ſolitary, withinſide of the footſtalks. *Flowers* ſeveral, in terminal bracteated umbels, with downy ſtalks, white, powerfully fragrant, like Jaſmine, but of ſhort duration. *Calyx* divided to the very baſe, and finally falling off in ſeparate portions. *Petals* obovate, obtuſe, recurved, ſcarcely revolute. *Germen* elliptic-oblong. *Capſule* ſaid to have only two valves, a point we have had no means of determining.

2. P. *Tobira*. Gloſſy-leaved Pitch-ſeed. Ait. n. 2. Sims in Curt. Mag. t. 1396. (Euonymus Tobira; Thunb. Jap. 99. Willd. Sp. Pl. v. 1. 1130. Tobira; Kæmpf. Am. Exot. 796. t. 797.)—Leaves obovate, obtuſe, coriaceous, very ſmooth and ſhining. Capſules of three valves.—Native of Japan. Brought by an India ſhip from China to Kew, in 1804, where it flowers abundantly in ſummer, being a hardy greenhouſe ſhrub. This is ſo like the foregoing, that it is not eaſy to diſcern a ſpecific difference between them. The *leaves* of the *Tobira* however are of a more ſhining and darker green above; pale beneath. *Capſule*, on a ſpecimen from Kew, triangular, and of courſe having three valves. *Flower-ſtalks* and *germen* very hairy, as in the *coriaceum*, though none of the figures of either give the leaſt indication of ſuch a circumſtance. Kæmpfer's plate ſhews the *infloreſcence* to be ſomewhat racemoſe.

3. P. *revolutum*. Downy-leaved Pitch-ſeed. Ait. n. 3.—"Leaves elliptical, bluntiſh; downy beneath; revolute at the margin."—Native of New South Wales. Sent by ſir Joſeph Banks to Kew, in 1795. It flowers from March to Auguſt, and is a greenhouſe ſhrub, like the two above deſcribed. We have two ſpecimens from Port Jackſon, anſwering to the character we have copied, except that the *leaves* are acute, and indeed pointed, in both. The *flowers* in one grow five or ſix together, in a ſtalked hairy *umbel*; in the other they ſtand in pairs, on very ſhort *ſtalks*, which at length become thick and woody, ſupporting a large woody *capſule*, of three reflexed valves, whoſe partitions are but ſlightly prominent. Theſe ſpecimens appear to conſtitute different ſpecies, and probably will be better explained in the ſequel of Mr. Brown's Prodromus.

4. P. *ferrugineum*. Ruſty Pitch-ſeed. Ait. n. 4. (Cortex filarius; Rumph. Amboin. v. 7. 13. t. 7.—Leaves elliptical, taper-pointed, ſmooth. Footſtalks clothed with ruſty down. Calyx equally divided to the baſe.—We received ſpecimens of this, in March 1789, from Mr. Hoy at Sion-houſe. It is ſaid in Hort. Kew. to be a native of Guinea, and to have been introduced before 1787, by the earl of Tankerville, flowering in the ſtove from February to May. We are poſſeſſed of fine ſpecimens of this very plant, gathered by the late Mr. Chriſtopher Smith in Oma, one of the Molucca iſles, near Amboyna, but without any mention of its name or properties. Cortex filarius of Rumphius appears to be the ſame thing. The author never ſaw the *flowers*, but his repreſentation and deſcription of the bivalve *fruit* exactly anſwers to the genus before us. He ſpeaks of the bark as affording a ſort of thread. Of this indeed we can obſerve no ſigns, in our dried ſpecimens, but every other part of his deſcription agrees exactly. The *ſtem* is ſhrubby, rather ſlender, determinately branched; young *branches* round, clothed with ruſty down, leafy towards the ends. *Leaves* ſcattered or crowded, elliptic-lanceolate, pointed at each end, two or three inches long, entire, ſlightly wavy, with one rib and ſeveral tranſverſe veins ending in minute reticulations; ſmooth on both ſides, except an occaſional pubeſcence on the ribs; paler and more opaque beneath. *Footſtalks* three-quarters of an inch long, ſlender, channelled, clothed with fine, ſhining, ruſty down. *Flowers* very numerous, ſmall, white, in long-ſtalked, aggregate, ruſty, downy *umbels*. *Calyx* almoſt ſmooth, in five deep, awl-pointed, recurved ſegments, not ſo ſpeedily deciduous as in ſome other ſpecies. *Petals* folded ſpirally over each other in the bud; recurved when expanded. *Anthers* obtuſe. *Germen* very hairy. *Style* ſhort. *Stigma* capitate. We have ſeen nothing of the *fruit*, or even the enlarged germen.

5. P. *undulatum*. Wave-leaved Pitch-ſeed. Ait. n. 5. Venten. Jard. de Cels, t. 76. Andr. Repoſ. t. 383.—Leaves elliptical, pointed, ſmooth; waved at the margin. Footſtalks nearly ſmooth. Calyx five-toothed, ſplit on one ſide to the baſe.—Native of New South Wales. Communicated to Kew garden, in 1789, by ſir J. Banks. A greenhouſe ſhrub, flowering from April to June. Its habit is very much like the laſt, but every part is larger. The *leaves* are more wavy; their adult *footſtalks* ſmooth, though downy when young. *Flowers* white, fragrant, full twice as large as thoſe of *P. ferrugineum*, but much fewer, in ſolitary, nearly ſimple, ſeſſile *umbels*, whoſe ſtalks are nearly ſmooth. *Calyx* eſſentially different, being divided only one-third of its length into five acute ſegments, though ſplit down to the baſe at one ſide, ſometimes in two places; one tooth, in the latter caſe, being entirely ſeparate to the bottom. The whole *calyx* ſoon falls off. Its inſide and edges are a little downy. Ventenat's account of the *infloreſcence* differs from our's, but we find ſome parts of our ſpecimens have, as he ſays, three-flowered ſtalks. He errs in giving the Canary iſlands as the native country of this ſpecies, confounding its hiſtory with that of the *coriaceum*. What Gærtner has deſcribed, under the names of *tenuifolium* and *umbellatum*, are probably diſtinct from all the above, or he would have been cited in Hort. Kew. As he gives no ſpecific characters, we can form no juſt idea of theſe ſpecies. Poſſibly his *tenuifolium* may be our *undulatum*. Here again we muſt recur to Mr. Brown's future communications, in the long-expected continuation of his work.

PITTQUOTTING, in *Geography*, an Indian ſettlement in the ſtate of Ohio, at the mouth of Huron river, which diſcharges itſelf into lake Erie.

PITTSBOROUGH, or PITTSBURG, a town of America, the capital of Chatham county, North Carolina, ſituated on an eminence, and containing a court-houſe, a gaol, and about 40 or 50 houſes. The adjacent country is fertile and well cultivated; and is much reſorted to from the maritime parts of the ſtate in the ſickly months. The Hickory mountain is not far diſtant, and both the air and water are here as pure as any in the world; 26 miles S.W. of Hillſborough.

PITTSBURG, a poſt-town of Pennſylvania, the capital of Allegany county, ſituated on a beautiful plain terminating in a point, between the Allegany and Monongahela rivers; and about a quarter of a mile above their confluence, by which they form the Ohio. This town was laid out on Penn's plan in the year 1765. It contains between 200 and 300 houſes, 4768 inhabitants, a gaol, court-houſe, Preſbyterian church, a church for German Lutherans, an academy, a brewery, and a diſtillery. It has been lately fortified, and a party of troops has been ſtationed in it. The hills on the Monongahela ſide are very high, extend down the Ohio, and abound with coals. Before the revolution one of theſe coal hills took fire and continued burning for eight years; when it was effectually extinguiſhed by part of the hill giving way and filling up the cavity. The ſituation, in the midſt of hills covered with trees, is delightful. At the diſtance of 100 miles up the Allegany is a ſmall creek, which in ſome places boils or bubbles forth, like the waters of the Hell Gate in the ſtate of New York, from which proceeds an oily ſubſtance, deemed by the people of the country an infallible cure for weakneſs in the ſtomach, rheumatic pains, ſore breaſts in women, bruiſes, &c. The oil is collected and brought to Pittſburg for ſale. The navigation of the Ohio, in a dry ſeaſon, is rather troubleſome from Pittſburg to the Miege town, about 15 miles; but from thence to the Miſſiſippi there is always water ſufficient for barges carrying from 100 to 200 tons burden; 393 miles W. by N. from Philadelphia. This town is a thoroughfare for the incredible number of travellers from the eaſtern and middle ſtates to the ſettlements on the Ohio; and is very rapidly increaſing. At or near this place ſhip-building is an object of great attention. It was formerly in the hands of the French, and then called Fort du Queſne, afterwards fort Pitt, in honour of the late lord Chatham. General Braddock, advancing at the head of Britiſh troops to take it in 1756, fell in an ambuſcade and was killed; 4 miles from Pittſburg. N. lat. 48° 31′ 44″. W. long 80° 8′.—Alſo, a townſhip of America, in Frontinac county, Upper Canada, adjoining to Kingſton, and here opening weſtward to lake Ontario.

PITTSFIELD, a pleaſant poſt-town of Maſſachuſetts, in Berkſhire; 6 miles N. of Lenox. This townſhip, and alſo thoſe N. and S. of it, are ſituated in a rich vale from one to ſeven miles wide, on the banks of Houſatonic river. It was incorporated in 1761, and contains 2665 inhabitants.—Alſo, a townſhip of Rockingham county, New Hampſhire, incorporated in 1782, and containing 1050 inhabitants.—Alſo, the north-eaſternmoſt townſhip of Rutland county, Vermont, containing 338 inhabitants.—Alſo, a town in Otſego county, New York; 12 miles W.S.W. of Cooperſtown.

PITTSFORD, a town of America, in Rutland county, Vermont, containing 1936 inhabitants.

PITTSGROVE, a town of America, in the county of Salem, New Jerſey, containing 1991 inhabitants.

PITTSTON, a town of America, in the county of Kennebec, and diſtrict of Maine, containing 1018 inhabitants.

PITTSTOWN, a poſt-town of Hunterdon county, New Jerſey; 58 miles N.N.E. of Philadelphia.—Alſo, a townſhip of Renſſelaer county, New York.—Alſo, a poſt-town in Luzerne county, Pennſylvania.

PITTSYLVANIA, a county of Virginia, containing, in 1810, 17,172 inhabitants. At the court houſe is a poſt-office, 300 miles from Waſhington.

PITTY, the moſt weſterly of the mouths of the river Indus, which ſeparates it from the Darraway, 50 miles below Tatta, and runs into the ſea, N. lat. 24° 42′. E. long. 66° 22′.

PITUINA, in the *Materia Medica*, a name for the reſin of the pitch-tree.

PITUITA, in *Medicine*, is the ſame with the Latin writers, as the *phlegma* of the Greeks. See PHLEGM.

PITUITARY GLAND, in *Anatomy*, called alſo hypophyſis; a ſmall body lodged in the ſella Turcica of the ſphenoid bone, and connected to the baſis of the brain. See BRAIN.

PITUITARY *Membrane*, is the lining of the naſal cavities. See NOSE.

PITUITARY *Sinuſes*, are the hollows in the body of the ſphenoid bone communicating with the noſe. See CRANIUM.

PITUM HOTUN, in *Geography*, a town of Chineſe Tartary; 438 miles E. of Peking. N. lat. 40° 18′. E. long. 125° 21′.

PITUMBA, in *Botany*, a word that occurs in Schreber's index, and, by his reference, ſeems ſynonimous with his *Wolfia*, under which however it is not mentioned. Thoſe who are fortunate enough to meet with it in any book, may perhaps by that means diſcover what *Wolfia* is, of which we profeſs ourſelves ignorant.

PITY, in *Ethics*. See COMPASSION.

PITYCIA, in *Ancient Geography*, an iſland of the Adriatic ſea, on the coaſt of Liburnia.

PITYDES, a name uſed by ſome authors for the kernels incloſed in the cones of the fir or pitch-tree; they are recommended by the old phyſicians in diſorders of the breaſt.

PITYLISMA, a name of one of the exerciſes deſcribed by the ancient phyſicians, as of great ſervice in chronic caſes. It conſiſted in a perſon's walking on tip-toe, and ſtretching his hands as high above his head as he could, keeping the whole body alſo as much upon the ſtretch as might be. In this condition the patient was to walk as far as he was well able, all the while moving about both hands as much as he could, in all directions.

PITYNERA METROPOLIS, in *Ancient Geography*, the ancient Golconda on the right bank of the river Nerva, a town of India, in the interior of the peninſula on this ſide of the Ganges, according to Ptolemy, who makes it the capital of the people called "Meſoles." On the map of M. d'Anville, it is placed on a river, which runs towards the S.W. into the Meſolus.

PITYONESUS, an iſland on the coaſt of the Peloponneſus, ſix miles from the continent, over-againſt Epidaurus.

PITYRIASIS, *πιτυριασις*, in *Medicine*, from *πιτυρον*, *furfur*, *bran*, a ſlight ſcaly or ſcurfy affection of the ſkin, appearing in irregular patches, ſometimes with, and ſometimes without, ſlight redneſs or inflammation, upon which ſmall thin ſcales repeatedly form and ſeparate; but they never collect into cruſts, and are not accompanied by excoriations.

Such is the character of this cutaneous affection, as pointed out by Dr. Willan, in contradiſtinction from the other ſcaly diſeaſes of the ſkin, lepra, and pſoriaſis. The Greek writers have not preciſely agreed in their acceptation of the word pityriaſis. Galen, Aëtius, and Oribaſius, ſpeak of it as affecting the head only: Alexander of Tralles, however, and Paul of Ægina, the ableſt of the later Greeks, have deſcribed the diſorder generally, as conſiſting of "ſlight ſcaly and branny exfoliations, without ulceration." All the tranſlators of the Greek writings into

Latin have rendered the word pityriaſis by *porrigo;* not obſerving that the beſt Roman authority, Celſus, included under the term "porrigo" not only the *pityriaſis*, but the *ceria* and *achores* of the Greeks. As, however, the porrigo is a contagious diſeaſe, Dr. Willan juſtly deemed it expedient to ſeparate the non-contagious pityriaſis from it, and included only the ceria (or *favi*) and achores under the former term. See Porrigo.

Of this ſlight and non-contagious eruption, three or four varieties have been noticed. The *firſt* is the pityriaſis *capitis*, or *dandriff* (as it is called by the nurſes) of infants. This affection ſhews itſelf in a ſlight whitiſh ſcurf along the top of the forehead and temples, but in larger, flat, ſeparate, ſemi-tranſparent ſcales on the occiput. A ſimilar affection ſometimes occurs on the ſcalp of aged perſons. With a view to cure this form of the eruption, it is only neceſſary to enforce a regular ablution of the ſcalp with ſoap and water, or with an alkaline or weak ſpirituous lotion; for which purpoſe the hair muſt be removed, if it be not thin.

The *ſecond* ſpecies, or pityriaſis *rubra*, occurs moſt frequently in adult or even advanced life, and is the reſult of a ſlight inflammation of the portions of the ſkin affected. The cuticle is at firſt only red and rough, but ſoon becomes mealy or ſcurfy, and exfoliates, leaving a ſimilar red cuticle underneath, which undergoes the like proceſs; and as the exfoliation is repeated, the ſcalineſs is augmented. This complaint is attended with a dry and unperſpiring ſtate of the ſkin, and with a troubleſome itching, and a feeling of ſtiffneſs. When the redneſs and ſcales diſappear, the patches are left of a yellowiſh or ſallow hue; but the whole proceſs is apt to be repeated at ſhort intervals, and the diſeaſe to be thus greatly prolonged. It is ſometimes accompanied with a general languor and reſtleſſneſs. This form of pityriaſis is removed by the decoctions of ſarſaparilla, elm-bark, &c. combined with antimonials, and with the uſe of the warm ſalt-water baths.

The *third* form, or pityriaſis *verſicolor*, is not uncommon in adult perſons of both ſexes, and is moſt remarkable for the checquered and variegated diſcoloration of the ſkin which accompanies it. It occurs moſtly about the breaſt and pit of the ſtomach, and ſometimes on the arms and ſhoulders, in brown patches of different ſhades, variouſly branching and coaleſcing, and interſperſed with portions of the natural hue. There is generally a ſlight ſcurfy roughneſs on the diſcoloured parts; but this is in ſome caſes ſcarcely perceptible, and there is no elevation or diſtinct border to the patches. It is to be remarked, that theſe patches do not appear, like ephelides and freckles, on the face and hands, which are expoſed to the ſun, but chiefly on covered parts, as was long ago remarked by Sennertus, who has given an accurate deſcription of this eruption under the appellation of "*maculæ hepaticæ*," or *liver-ſpots*, probably from their colour. See his Pract. Med. lib. v. part iii. ſect. i. cap. 7.

The pityriaſis verſicolor is in itſelf of little moment; for it is not accompanied by internal or conſtitutional diſorder, and very rarely by any troubleſome ſenſations, if we except a ſlight itching when the patient becomes warm in bed, after ſtrong exerciſe, or drinking warm liquors. It is ſometimes, however, ſuppoſed to be the conſequence of the venereal poiſon, from its brown and almoſt coppery hue. But independently of its indiſpoſition to terminate in ulceration, however long it may remain, its diſtribution and ſituation, and the abſence of all other ſyphilitic ſymptoms, will be ſufficient to enable an obſerver of moderate experience to diſtinguiſh it. Thoſe who have reſided in warm climates ſeem to be moſt liable to this diſorder. Dr. Willan has ſtated, that internal medicines have not appeared to have much influence on this eruption: but Dr. Bateman is of opinion, that the oxygenated muriatic acid is poſſeſſed of ſome efficacy, and that the uſe of pitch, in the form of pills, would probably be ſerviceable. Externally, however, active ſtimulant applications have often decidedly removed the diſorder; ſuch as lotions containing alcohol, muriatic acid, or cauſtic potaſs, properly diluted with diſtilled water. Sea-bathing has alſo been found beneficial.

There is alſo a *fourth* variety, the pityriaſis *nigra*, which ſeems to have been noticed only in children born in India, and brought to this country. It is ſaid to have commenced in a partially papulated form, terminating in a black diſcoloration of the ſkin, with ſlight branny exfoliations; and to have ſometimes affected half a limb, as the arm or leg, or ſometimes the fingers and toes. See Willan on Cutan. Diſeaſes, part ii.; and Bateman's Pract. Synopſ. of Cutan. Diſeaſes, p. 44.

PITYRODIA, in *Botany*, πιτυρωδης, branny. Brown Prodr. Nov. Holl. v. 1. 513.—Claſs and order, *Didynamia Angioſpermia*. Nat. Ord. *Verbenaceæ*, Juſſ. in Ann. du Muſ. v. 7. 63. Brown.

Eſſ. Ch. Calyx bell-ſhaped, in five equal ſegments. Corolla funnel-ſhaped; its upper lip cloven half-way down; lower in three deep equal ſegments. Stigma cloven. Drupa dry at the ſummit, of four cells, perforated at the baſe. Seeds ſolitary in each cell.

1. P. *ſalvifolia*.—Found by Mr. Brown in the tropical part of New Holland. A *ſhrub*, with ſcaly or bran-like pubeſcence; whence the name was choſen. *Leaves* oppoſite, ſimple, lanceolate, nearly entire, rugoſe, with a ſtrong ſmell, and nearly the taſte of mint. *Flower-ſtalks* axillary, oppoſite, many-flowered, denſely cluſtered. *Flowers* white. This genus is very nearly akin to *Callicarpa*. *Brown*

PITYUS, in *Ancient Geography*, a town ſituated upon the Euxine ſea, at the diſtance of 44 miles W. from Dioſcurias, or Sebaſtopolis, which was conſidered as the utmoſt boundary of the Roman empire, according to Arrian. This city was provided with a convenient port, and fortified with a ſtrong wall. The Goths, in their firſt naval expedition, met at this place with reſiſtance more obſtinate than they had reaſon to expect from the feeble garriſon of a diſtant fortreſs; they were repulſed; and their diſappointment ſeemed to diminiſh the terror of the Gothic name. As long as Succeſſianus, an officer of ſuperior rank and merit, defended that frontier, all their efforts were ineffectual; but as ſoon as he was removed by Valerian to a more honourable but leſs important ſtation, they reſumed the attack of Pityus; and, by the deſtruction of that city, obliterated the memory of their former diſgrace.—Alſo, a river of Aſia, in the Colchide.

PITYUSA, an iſland of the Ægean ſea, in the Hermonic gulf, S.E. of the peninſula of the Argolide, and S. of the promontory Bucephalium.

PITYUSÆ Insulæ, iſlands of the Pityuſes, or of Pines, ſo called on account of the number of theſe trees which grow upon theſe iſlands. Ebuſus or Ivica, &c. belonged to this group.

PITYUSE Isles, in *Geography*, are iſlands of the Mediterranean, contradiſtinguiſhed from the *Balearic*, and ſo called, according to Ptolemy, Strabo, and Pomponius Mela, from the Greek word πιτυς, *a pine*, whence πιτυεσσα, abounding in pines. Theſe are Ivica, which is the largeſt, (ſee Ivica,) Fromentera, S. of Ivica, ſeparated from the coaſt by a channel one league and a quarter in breadth, three leagues in extent from E. to W., and from two leagues to a quarter of a league in breadth, containing about 200 inhabitants, and ſupplying wood, ſtone, and corn, from which laſt article it is ſaid to derive its preſent name; the three Conejeras to the weſt of the former, which, though of conſiderable extent, are deſtitute of habitations, and furniſh food for the flocks of the neighbouring iſles; three ſmall iſlands, called the gates of Ivica; the iſle of Groſſa; the iſles of Santa Eulalia y de Arabi, lying towards the E.; the iſles of Margueritas, &c. The inhabitants of theſe iſlands, the climate of which is mild and healthy, pay little attention to commerce; but as the land, which is mountainous and well wooded, is adapted to all ſorts of huſbandry, the occupiers cultivate olives, vines, and corn; and raiſe from theſe productions a greater quantity than they conſume; but they are forbidden to export corn, oil, and fruits, and therefore, notwithſtanding the richneſs and productiveneſs of their ſoil, they almoſt all live in a ſort of indigence; ſalt and wool are the only commodities which are exported in foreign bottoms. Their habits are much the ſame with thoſe of the inhabitants of the Balearic iſlands, one of the chief of which is indolence; their language is alſo much the ſame. They keep a number of holidays, which they devote to the purpoſes of religion, or ſuperſtition; and they have aſſemblies and ſome amuſements. They are reckoned courageous, and diſplay proofs of valour in their conteſts with the pirates on the coaſt of Barbary. The people are in general ignorant, and have hitherto little availed themſelves of any opportunities or means of improvement.

PITZEN, a town of Pruſſia, in the province of Bartenland; 9 miles S.S.W. of Raſtenburg.

PITZIUNTA, or Dandar, a town of Circaſſia. N. lat. 43° 45′. E. long. 59° 10′.

PIVA, *Ital.*, a bagpipe. See Cornamusa.

PIUHEGA, in *Geography*, a town of Italy, in the department of the Mincio; 4 miles N. of Mantua.

PIVOT, or Pevot, a foot or ſhoe of iron, or other metal, uſually conical, or terminating in a point; whereby a body intended to turn round bears on another fixed at reſt, and performs its circumvolution.

The pivot uſually bears or turns round in a ſole or piece of iron or braſs, hollowed to receive it.

Large gates, &c. uſually turn on pivots. The ancients tell us, they had theatres in Rome, that held eighty thouſand people, which have yet turned on a ſingle pivot.

Pivot (*Fr.*), in *Military Language*, is that officer, ſerjeant, corporal, or ſoldier, upon whom the different wheelings are made in military *evolutions*; which ſee. Of theſe pivots, two ſorts are diſtinguiſhed according to the poſition of the troops that are governed by them; *viz. ſtanding* and *moveable* pivots. When a battalion, *e. g.* ſtands in open column of companies, the "right in front," the laſt man upon the left of the front rank of each company, is called the *inner*, or *ſtanding* pivot; and the firſt man upon the right ditto is called the *outer*, or *wheeling flank*. The accurate poſition of the different pivots is an object of great importance with regard to military movements, and officers, in particular, ought to recollect, that when they are poſted upon the flanks, they become abſolutely neceſſary to the preſervation of that perpendicular and parallel order of a march, without which direction, the beſt concerted manœuvres muſt be ultimately rendered uſeleſs. At the inſtant when an officer has wheeled his diviſion, he muſt reſume his perpendicular poſition, look ſteadfaſtly on his leading pivot, maintain his relative diſtance, and keep his perſon perfectly ſquare. He ought likewiſe to be particularly correct in ſtepping off when the wheel is completed. The *moveable* pivot is one which, during the wheel of its diviſion, advances in a circular direction, inſtead of turning on the ſpot where it originally ſtood. Thus, when diviſions, &c. are ſucceſſively wheeled, without being firſt halted, the pivot upon which they wheel is ſaid to be *moveable*. In the drill, ſingle ranks are frequently wheeled on a moveable pivot. In which caſe, both flanks are moveable, and deſcribe concentric circles round a point, which is a few paces diſtant from that which otherwiſe would be the ſtanding flank; and all eyes are turned towards the directing pivot man, whether he is on the outward flank, or on the flank to which the wheel is made.

Pivot-*Flanks*, the flanks upon which a line is formed from column. When the right of the battalion is in front, the pivot-flanks are on the left of its ſeveral companies, platoons, &c. and *vice verſâ*, when the left is in front.

Pivot-*Flank Officer*, the officer who is on the firſt flank. In all wheelings during the march in column, the officer on that flank upon which the wheel is made, muſt conſider himſelf as the pivot.

Pivots, *Platoon*, the men upon whom a battalion marches in column of platoons, is wheeled up into line, or backward into column, when the line has been formed according to a given point.

PIURA, in *Geography*, a river of Peru, which runs into the Pacific ocean, S. lat. 5° 33′.

Piura, a town of Peru, and capital of a juriſdiction of the ſame name, in the biſhopric of Truxillo. This was the firſt Spaniſh ſettlement in that country, and was founded in the year 1531, by don Franciſco Pizarro, who built the firſt church in it. It ſtood firſt in the valley of Targaſale, and was called "St. Miguel di Piura;" but it was removed, on account of the inſalubrity of the air, to its preſent ſituation, on a ſandy plain. The houſes are conſtructed either of bricks baked in the ſun, or of a kind of cane called quincas, and they have generally only one ſtory. The corregidor, and an officer for collecting the royal revenue, reſide here and at Payta ſix months alternately. The town contains about 1500 inhabitants, none of whom are perſons of diſtinction. Although the climate is hot and dry, it is not upon the whole unhealthy. As the country is level, water is eaſily conveyed to different parts by canals. But in ſummer, when water is ſcarce, they are under a neceſſity of procuring it by digging wells in the bed of the river. This town has an hoſpital, under the care of the Bethlehemites, which is remarkable for the cures afforded to a great number of perſons labouring under the venereal diſeaſe; 25 miles S.S.E. of Payta. S. lat. 5° 15′. W. long. 80° 40′.

PIUS I., pope, in *Biography*, a native of Aquileia, who flouriſhed in the ſecond century, was probably the ſucceſſor of Hyginus, and in that caſe commenced his pontificate about the year 143. According to Euſebius, he died in the year 157. Other hiſtorians, as Cave, Pearſon, and Dodwell, imagine that he preſided over the ſee of Rome between the years 127 and 142, while Bellarmine and Baronius date his elevation to that high dignity in the year 158. In the Roman martyrology he is ſaid to have ſuffered death, for the ſake of his religion, under the reign of Antoninus Pius, but there ſeems no good authority for this fact, and the title of martyr is not given to him by Irenæus. Two "Letters" to "Juſtus of Vienne," which were formerly attributed to Pius, may be found in the ſecond volume of the "Orthodoxographia," and likewiſe in the "Bibl. Patrum," but they have long ſince been given up as ſpurious, and allowed to be the production of a much later age. Moreri. Bower.

Pius II., pope, whoſe original name was Æneas-Sylvius-Piccolomini, was deſcended from one of the moſt illuſtrious families of Sienna, in Tuſcany, which had been expelled from that city, together with the reſt of the nobility, by the popular faction, and ſettled at the ſmall town of Corſignano. At this place he was born in 1405, and afterwards initiated in the rudiments of grammar learning, but by the loſſes ſuſtained by his father in thoſe times of trouble and turbulence, he was unable to procure for Æneas the benefits of a college courſe of education, and the youth was under the neceſſity of aſſiſting in the labour by which the family was ſupported. His talents and deſire of literary improvement led ſome of his friends and relations, about the year 1428, to ſend him to the univerſity of Sienna, where he was maintained at their expence. He quickly afforded ſtrong proofs of an extraordinary genius. He applied himſelf with ardour to the ſtudy of the belles lettres, making himſelf acquainted with the writings of the poets and orators, and during his academical courſe, he publiſhed ſeveral Latin and Italian poems, which were received with applauſe by the learned. After this he directed his attention to the civil law. In the year 1431, his learning and accompliſhments recommended him to the notice of cardinal Copronica, whom he accompanied to the council of Baſil in the capacity of ſecretary. Here he gained the confidence of the fathers, by the zeal with which he eſpouſed their cauſe againſt pope Eugenius, and the many learned and elegant ſpeeches which he made, to prove the ſuperiority of general councils over the biſhops of Rome. He was immediately raiſed to the important offices of ſecretary to the council, clerk of the ceremonies, abbreviator of the letters, and one of the collators to benefices. He was alſo employed by the council on miſſions of importance to Trent, Conſtance, Frankfort, Swabia, Straſburg, Savoy, and the Griſons, and as a compenſation for his very uſeful ſervices, he was preſented to the provoſtſhip of the collegiate church of St. Lawrence at Milan. He was ſuperior to the threats and anathemas of Eugenius, and continued firm in his adherence to the fathers, while a multitude of others deſerted their cauſe through fear. His example prevented many from defection, who were wavering as to the ſide they ſhould eſpouſe. On account of his reſolution and zeal, when the council paſſed ſentence of depoſition againſt the pope, in the year 1439, and elected Amadeus, duke of Savoy, in his ſtead, Æneas was made ſecretary to the newly elected pontiff. Shortly after this, he was ſent to promote the intereſt of Felix, at the court of the new emperor, Frederic III., where he was honoured by that ſovereign with the title of poet-laureat, and even admitted into the number of his perſonal friends. In 1442 the emperor prevailed upon him to reſign his other offices, and to enter wholly into his ſervice, on which occaſion he was made prothonotary, or ſecretary to the empire, and diſtinguiſhed with the dignity of ſenator. From this time he appears to have had higher objects of ambition than he had before conceived, and he omitted no means of ſtrengthening his own intereſt, by adopting all the ſentiments of his imperial maſter. When, therefore, the emperor embraced a neutrality between the council of Baſil and Eugenius, Æneas, notwithſtanding what he had before done, followed his maſter's example. Afterwards, when the emperor ſeemed inclined to the cauſe of Eugenius, in oppoſition to that of the council and Felix, Æneas conformed himſelf to his ſentiments, and repreſented his perſon at the diet of Ratiſbon, where the means of putting an end to the ſchiſm in the church were taken into conſideration. At length, in 1446 and 1447, he was ſent by Frederic to Rome, to negociate the ſubmiſſion of Germany to Eugenius; of which opportunity he availed himſelf to ſhew contrition for his paſt conduct, and ſolicit with all humility the forgiveneſs and favour of his holineſs. Eugenius met his wiſhes, but did not live long enough to beſtow upon him any ſubſtantial mark of his regard. By his ſucceſſor, Nicholas V., Æneas was preferred to the vacant ſee of Trieſte, in Iſtria; and upon his return to Germany he was made one of the council to whom was entruſted the management of the moſt important concerns of the empire. Four years afterwards he was tranſlated to the vacant ſee of Sienna. In the year 1451, he accompanied Frederic to Rome, when he went thither to be crowned by the pope, and on his return, the biſhop was inveſted with the legantine power over Bohemia, and the whole Auſtrian dominions. After this, in the year 1456, he was promoted by Callixtus III. to the dignity of cardinal, and upon the death of that pontiff he attained the great object of his ambition, being raiſed, by the unanimous ſuffrages of the conclave, to the popedom, and at his coronation, he aſſumed the name of Pius II. Much was expected from him on account of his great learning, and the zeal which he had formerly ſhewn in ſetting forth the corruptions that had been introduced into the church. He, however, ſoon convinced his friends, and the friends to a better order of things, what they had to hope for now he was elevated to the higheſt ſtation in the world. His ambition was gratified, and what formerly had been deemed corrupt principles and practice, he found means to juſtify, or at leaſt overlook. One of the firſt meaſures of his government was an attempt to unite the Chriſtian princes againſt the Turks: for this purpoſe he appointed a council to meet at Mantua in 1459, at which he invited all thoſe princes to attend, either in perſon or by their ambaſſadors, for the purpoſe of deliberating on the moſt effectual methods of delivering Chriſtendom from the bondage with which it was threatened by thoſe formidable enemies. At this council Pius himſelf preſided, and the attendance of princes or their repreſentatives was very numerous; but their various and oppoſing intereſts rendered all the endeavours of the pope to unite them quite ineffectual, and the council broke up without concurring in any reſolution to oppoſe the progreſs of the common enemy. He next declared the kingdom of Naples devolved as a fief of the church to the apoſtolic ſee, and confirmed the bull of king Ferdinand's legitimation, upon his reſtoring to the church ſome places that had been captured by his father. He alſo granted Ferdinand the inveſtiture, and ſent a cardinal to perform the ceremony of his coronation. The king, on his part, engaged to aſſiſt the pope againſt his enemies with the whole ſtrength of his kingdom. To ſecure the throne of Naples to Ferdinand, Pius ordered all the clergy and barons, under pain of excommunication, to acknowledge him, and no other, for their lawful ſovereign, and ſent a body of troops to his aſſiſtance when John of Anjou invaded the kingdom. In 1460 he gave a moſt decided proof of his bad faith, by publiſhing a bull, condemning the doctrine, which he had formerly defended, of the ſuperiority of a general council to the pope, and forbidding all appeals to ſuch a council under the ſevereſt penalties. He alſo attempted to obtain from Charles VII. king of France, the revocation of the PRAGMATIC *Sanction*, (ſee that article,) which he pronounced to be an edict highly derogatory to the honour and dignity of the holy ſee. This edict had been drawn up by Charles, or at leaſt by the prelates of his kingdom, and it was thought neceſſary, in order to deliver the French clergy from the vexations which they ſuffered from the encroachments of the popes, ever ſince the latter had fixed their reſidence at Avignon. It had been drawn up in concert with the fathers of the council at Baſil, and the articles of which it conſiſted were taken from the decrees of that council. In anſwer to Pius's requeſt, the French king replied, that the edict conſiſted of the very decrees of the council of Baſil, which Pius himſelf had approved, had penned, and probably had ſuggeſted, when ſecretary to that aſſembly, and which it had received with one conſent, and obſerved for the ſpace of twenty-five years by the whole French nation. Upon the death of Charles, the pontiff renewed his application to his ſucceſſor Lewis XI., who conſented to aboliſh the edict by a ſolemn declaration, for which he and his ſucceſſors were rewarded by the title of "Moſt Chriſtian," a title which deſcended uninterruptedly to Lewis XVI., and was only aboliſhed with the deſtruction of the monarchy. Though the king thus degraded himſelf by becoming a tool to the pope's ambition, his council better conſulted the dignity of their ſovereign, and their own reputation, by reſiſting, to a man, the pope's demand; and the full execution of Lewis's declaration was prevented by the noble ſtand made by the univerſity of Paris, and the parliament, in favour of the "Pragmatic Sanction."

During the years 1462-3, Pius again, but unſucceſsfully employed all his talents and eloquence in endeavouring to unite the Chriſtian princes againſt the Turks, who had at that time made themſelves maſters of almoſt all Greece. Finding his efforts of no avail, he equipped a fleet at Ancona, avowing his determination, notwithſtanding his age and bodily infirmities, to face the inconveniences and dangers of war, imagining, that with ſuch an example, the Chriſtian princes would be aſhamed of remaining quiet and inactive at home. While, however, he was thus buſily employed, he fell ſick, and was adviſed by his phyſicians to pay a viſit to Sienna, for the benefit of his native air. Before he left Rome, he publiſhed a ſolemn retractation of all that he had written in favour of the council of Baſil, and declared, without ſhame or heſitation, that, as Æneas Sylvius he was a damnable heretic, but as Pius II. he was an orthodox pontiff. After a very ſhort ſtay at Sienna he returned to Rome, but being informed of the inroads of the Turks, and that they had actually laid ſiege to Raguſa in Dalmatia, he ſet out without delay for Ancona, though at that time he was in ſo infirm a ſtate of health, as to be obliged to travel in a litter. The journey, however, proved too much for him, and he died in the ſummer of 1464, at the age of fifty-nine, having filled the pontifical throne ſix years within a few days. According to Platina, he was endowed with every virtue that became his exalted ſtate; but the conduct of the pope certainly militated againſt the excellent qualities which he had diſplayed, previouſly to his advancement to that high dignity. No man ever laboured harder, and perhaps few more ſucceſsfully than Æneas Sylvius, to reſtrain the power of the pope within the boundaries admitted by the canons, and no pope ever ſtrove more than Pius II. to extend that power beyond all the bounds of reaſon and law. To effect his purpoſes, he ſpared neither kings, dukes, nor people, when he aſſumed that they invaded the rights of the church, or entrenched upon the emoluments of the clergy. When young he indulged his paſſion for the ſex without reſtraint, and in his more mature years, he ſeems to have thought tranſgreſſions againſt the rules of chaſtity to be very venial ſins, if they could even be denominated ſins. As a ſcholar, he was an elegant writer in Latin, and left behind him various works, moſt of which he compoſed before his elevation to the popedom. Of theſe an abridged liſt is given in the General Biography, but a complete catalogue of them may be found in Cave and Dupin. The following ſeem to be the moſt generally important: "Comment. de Geſtis Concilii Baſilienſis;" "De Ortu, Regione, ac Geſtis Bohemorum ad Ann. 1458;" "Coſmographiæ, ſeu Hiſtoriarum de Mundo univerſo;" "Epiſtolarum Liber," containing four hundred and thirty-two letters, many of which are intereſting and curious. The whole works of this pope were publiſhed in a collective form at Baſil in 1551, and again at Helmſtadt in 1700. A hiſtory of his life was publiſhed at Rome in 1584, which was generally believed to have been drawn up by himſelf. Moreri. Moſheim.

Pius III., pope, whoſe original name was Francis Todeſchini, was a native of Sienna, and born in the year 1429. He was nephew on the maternal ſide to Pius II., and was permitted to take the name of Piccolomini, and to bear the arms of that family. When he was but twenty-two years of age, Pius raiſed him to the dignity of cardinal, and nominated him to the biſhopric of Sienna. He was employed in ſeveral legations by popes Paul II., Innocent VIII., and Alexander VI., to whom he gave the moſt entire ſatisfaction, by the prudence and integrity with which he diſcharged the ſeveral commiſſions and high truſts repoſed in him. Upon the death of Alexander VI. in 1503, the city of Rome was thrown into the utmoſt confuſion by the ſtruggles for power between Valentine Borgia, the ſon of Alexander, and the Orſini, and others whom he had deprived of their eſtates. Scarcely a day paſſed in which there were not battles fought in the ſtreets by the partiſans of theſe rivals. The cardinals, therefore, found it quite neceſſary to raiſe a conſiderable body of troops for their own defence, while they ſhould be ſhut up in conclave. They alſo applied to the ambaſſadors then reſiding in Rome, by whoſe means the heads of the oppoſite factions were prevailed upon to withdraw from the city, till the election of the new pope ſhould be declared. The choice ſoon fell upon Piccolomini, who, out of grateful reſpect to the memory of his uncle, aſſumed the name of Pius III. As ſoon as the intelligence of his election had reached the hoſtile factions, they returned to Rome, and renewed the war within the walls, throwing the city into the utmoſt confuſion. Valentine was ſoon obliged to ſubmit to the enemy, and he was then left to the mercy of the pope, who permitted him to retire unmoleſted wherever he pleaſed. Pius, by this event, had the happineſs to ſee peace reſtored to the city, but he did not live long to enjoy it, as he died on the 26th day after his election, being in the 75th year of his age. It was generally believed, that he was taken off by poiſon. He was regarded as a perſon of unblemiſhed moral conduct, and in every reſpect worthy of the high dignity to which he had been raiſed. Bower. Moreri.

Pius IV., pope, whoſe original name was John Angelo di Medici, was born at Milan in the year 1499. He wiſhed to be thought a branch of the famous houſe of Medici, to which he had no real pretenſions, being, in fact, of low origin, and whoſe real name was Medicino inſtead of Medici. He enjoyed the advantages of a liberal education; and having applied himſelf chiefly to the ſtudy of the civil law, he was in early life admitted to the degree of doctor. After this he practiſed with high reputation as a civilian, and by his abilities, united with the intereſt of a brother, he obtained the office of prothonotary under Clement VII. In this ſituation he recommended himſelf to the favour and patronage of cardinal Farneſe, who, after his elevation to the papal dignity under the title of Paul III., employed him in various legations. By the ſame pope he was appointed commiſſary to the army of the church; nominated archbiſhop of Raguſa; and created cardinal prieſt of Santa Priſca in the year 1549. Upon the death of pope Paul IV., in 1559, the conclave was agitated for more than four months by the intrigues of different cardinals of noble families, whoſe power was ſo equally balanced, that neither of them could obtain the requiſite ſuperiority over his rivals; till at length, wearied out with their fruitleſs ſtruggles, they gave their united votes in favour of the cardinal of Santa Priſca; who, at his conſecration, took the name of Pius IV. He began his pontificate with granting a general pardon to all who had been concerned in the outrages committed ſince the death of his predeceſſor, and he then took meaſures for bringing to juſtice the perſons whoſe oppreſſive enormities had provoked them to their irregular conduct. The Caraffas were accordingly arreſted, tried, and convicted of crimes, for which they were condemned to forfeit their lives and their eſtates. The cardinal was, in purſuance of the ſentence, ſtrangled; and his two brothers, the duke of Pagliano and marquis of Montebello, were beheaded, with ſeveral of their accomplices. One of the early meaſures of this pope's adminiſtration was to terminate the differences between the papal and imperial courts, occaſioned by the late pope's refuſal to approve Ferdinand's ſucceſſion to the imperial crown, reſigned to him by his brother Charles V., without applying in the firſt inſtance for the conſent of his holineſs. He next adopted certain meaſures, with a view, if poſſible, of putting a ſtop to the progreſs of the reformation. The power and influence of the Proteſtants were now every day becoming more and more conſiderable. England and Scotland had diſclaimed allegiance to the ſee of Rome, and had new-modelled their religion. In the Netherlands, the reformers had greatly multiplied; and in France, there was reaſon to apprehend that they ſoon might become too powerful for the Catholics. The new opinions had penetrated even to Italy. From Naples they were extirpated by Philip II., who iſſued orders to his viceroy to put all heretics to death without mercy. But the duke of Savoy was inclined to attempt to enlighten and convert them; and, with this view, he deſired the pope's permiſſion to hold a conference of the principal eccleſiaſtics in his dominions, on the ſubject of religion. France determined to have recourſe to the ſame expedient. The pope promiſed that he would ſummon a general council without delay, which he did, to meet at Trent. The bull was drawn up in ſuch equivocal expreſſions, as might be interpreted to ſignify either a new council, or a continuation of the former one at the ſame place. The emperor, the French king, Philip, and the other Catholic princes, received the bull, and gave orders to the eccleſiaſtics in their dominions to repair to Trent, at the time appointed. An invitation to attend was alſo ſent to the ſeveral Proteſtant powers; but they all reſolved to give no encouragement to a council, which was called by one whoſe authority they could not acknowledge, and in which only thoſe were to have deciſive votes, who had ſworn allegiance to the pope and the ſee of Rome. The council opened in January, 1562. Attempts were ſoon made to abridge the authority of the pope, which created in his holineſs perpetual anxiety, and he was on the point of ſuddenly diſſolving the aſſembly; but he found it more expedient to flatter and cajole, than to have recourſe to violent meaſures. In 1563 it was brought to an end, but not until decrees were paſſed, deſigned as an acknowledgment of the ſubordination of the council to the holy ſee. When information of the diſſolution of the council was brought to Pius, he received it with great joy, and ordained a ſolemn thankſgiving on the occaſion; and in a very ſhort time, he publiſhed a bull of confirmation, requiring all the prelates and princes to receive and enforce the decrees of the council of Trent, prohibiting perſons from writing any explication or commentary of them, and commanding the Catholics every where to have recourſe in all doubtful caſes to the apoſtolic ſee. By the republic of Venice, the ſeveral Italian princes, moſt of the Catholics in Germany, and the king of Spain, the authority of the council was acknowledged, and the decrees received; in ſome countries, without any limitation whatever; but in Spain, and all through the Spaniſh dominions, with the clauſe, "Saving the rights of the crown, and the privileges of the ſubjects." Pius had the mortification to find that they met with a different treatment in France. The court refuſed to receive and publiſh the decrees, as derogatory to the liberties of the Gallican church, and the rights of the crown. In the year 1564 the pope, at the preſſing inſtance of the emperor Maximilian II., granted the uſe of the cup to the laity of Auſtria and Bohemia; but he could not be perſuaded to conſent to the marriage of the prieſts, though earneſtly intreated by the emperor, and the other Catholic princes of Germany, who declared that they could no longer bear with the impure celibacy of the clergy. This pope died in 1565, in the 67th year of his age, and after a pontificate of nearly ſix years. That event is ſaid to have been accelerated by his apprehenſions for the loſs of Malta, which was then beſieged by the Turks. The news of the fact was received with great joy by the Roman people, who hated the pontiff, on account of the ſeverity and oppreſſion of his government. This hatred, united with religious enthuſiaſm, had given riſe to a conſpiracy againſt him not long before his death; but it was diſcovered, and the parties concerned in it were executed with much torture. Pius is praiſed for the vaſt ſums which he laid out on public works, for the convenience and ornament of Rome. According to Onuphrius, he was poſſeſſed, or at leaſt ſeemed to be poſſeſſed, while cardinal, of every virtue that could render him worthy of the high ſtation to which he had been raiſed; but no ſooner had he attained the ſummit of his ambition, than he abandoned himſelf, without reſtraint, to all the oppoſite vices; ſtopping at no means of accumulating wealth, that he might enrich and aggrandiſe his nephews and other relations.

Pius V., pope, whoſe original name was Michael Ghiſlieri, was deſcended from an obſcure family, and born at Boſchi, a ſmall town near Alexandria, in the north of Italy, in the year 1504. When he was fourteen years of age, he embraced the monaſtic life in a Dominican convent, where he was ſoon diſtinguiſhed by the ſtrictneſs of his conformity to the rules of the order, and acquired a high character for piety and virtue. He was ordained prieſt at Genoa, and became a very celebrated preacher, being maſter of a moſt powerful and perſuaſive eloquence. Afterwards he was elected prior of the convent of Vigevani, and nominated inquiſitor by cardinal Caraffa, commiſſary-general of the holy office, who had conceived a ſtrong attachment to him. In a ſhort time after, that cardinal was elevated to the papal throne, under the name of Paul IV. He made Ghiſlieri biſhop of Sutri; and when, in the year 1557, our prelate was preparing to reſign his dignity, and to return to the monaſtery, he was prevented by the interpoſition of his holineſs, who promoted him to the purple, by the title of cardinal *de ſancta Sabina*, though he was moſt commonly known by the name of cardinal Alexandrini, from his native country. He was, at the ſame time, appointed to the poſt of commiſſary-general to the inquiſition. This office he executed with ſo much ſeverity in the Milaneſe and Lombardy, that he was obliged to quit thoſe countries; and his zeal was afterwards checked by the government, when he attempted to diſcharge the functions of inquiſitor at Venice. Pius IV. tranſlated him from Sutri to the ſee of Mundovi; and upon the death of that pontiff in 1566, by the unanimous ſuffrages of the conclave, he was elected his ſucceſſor, when he aſſumed the name of Pius V. The people expreſſed no joy at his coronation: they dreaded a ſevere government under a man, in whoſe rigid and auſtere manners his ſucceſſive promotions from the condition of a ſimple monk had made no change. Senſible of the coldneſs of the reception he met with, he obſerved to thoſe about him, "I hope that, ſome time hence, the Romans will be as ſorry for my death, as they are now grieved at my advancement." To render his name worthy of the grateful remembrance of virtuous and good men, he diſplayed great zeal and diligence in promoting a reformation in the manners and morals of all ranks of the people. He repreſſed the exceſſive pride and oſtentation of the cardinals, as well as the luxury in dreſs and mode of living of the other orders of the clergy. He gave directions for baniſhing all the proſtitutes from Rome, and he prohibited the bull-fights in the circus, as well as all other diverſions which had a tendency to promote irregularity and diſſipation among the lower claſſes. He gave directions for ſtrictly enjoining on the clergy reſidence, and commanded that no perſons ſhould be admitted to eccleſiaſtical benefices, who would not reſide; and when he was told, that a ſtrict adherence to ſuch a decree would cauſe the court of Rome to be deſerted, he replied, that it was better that the court ſhould be deſerted, than that the ſervice of the altar ſhould be neglected. He ordered his own relations to retire from Rome, providing them all with ſmall penſions for their ſubſiſtence, excepting two nephews, who were attached to ſtudy; one of whom, Michael Bonello, who poſſeſſed ſhining talents and an excellent diſpoſition, he was perſuaded by his friends to raiſe to the dignity of cardinal. While Pius V. was engaged in introducing a partial reformation among the eccleſiaſtics and community of Rome, he diſplayed a furious zeal againſt the Proteſtants, by perſecuting them with the ſame ſavage ſeverity, which rendered him odious in his former character of inquiſitor. Peter Carneſecchi, a perſon of diſtinction at Florence, was, by his expreſs order, condemned to the flames, after having been convicted of correſponding with ſome of the reformed religion in Germany, and with ſome of his countrymen in Italy, who were ſuſpected of hereſy. Aonius Palearius (ſee his article), one of the ornaments of his age as an elegant and liberal ſcholar, underwent the ſame fate, for ſaying that in ſome things the Lutherans were excuſable, particularly for calling the inquiſition "the dagger drawn againſt literature in general." Not ſatisfied with his endeavours to extirpate the reformed opinions out of Italy, he, in 1568, encouraged Charles IX., king of France, to make war upon his Proteſtant ſubjects; ſending a conſiderable body of troops to join the royal army, and permitting ſome of the eſtates of the church in France to be alienated, in order to ſupply funds for carrying on hoſtilities. Pius V. was not outdone by any of his predeceſſors in zeal for maintaining the high claims of the papal ſee. In 1568 he publiſhed his famous bull, entitled "In Cœna Domini," which it was uſual to publiſh at Rome on Maundy Thurſday every year, till it was ſuppreſſed by pope Clement XIV. By this bull, anathemas were pronounced againſt ſuch perſons as ſhould appeal to general councils from the decrees of the popes, and againſt thoſe princes who ſhould impoſe reſtraints on eccleſiaſtical juriſdictions, or exact contributions from the clergy. This bull, evidently calculated to deprive princes of their ſovereignty, and to render them and their ſubjects entirely dependent on the will of the Roman pontiffs, was never received in any kingdom out of Italy. Some French biſhops did, a few years afterwards, attempt to introduce it into their dioceſes; but their offence againſt the liberties of the Gallican church was moſt ſeverely puniſhed. In 1569 Pius conferred the title of grand duke of Tuſcany upon Coſmo de Medici, duke of Florence, who went to Rome, where he received the crown at the hand of his holineſs; and during the ſame year, the pope iſſued a bull of excommunication againſt Elizabeth, queen of England, abſolving her ſubjects from their allegiance. This paper was fixed up in the night on the biſhop of London's palace, and in other parts of the metropolis; but it was very harmleſs, for none but a few bigotted Catholics noticed it with the ſmalleſt regard: they indeed endeavoured to excite ſome commotions, but their efforts were fruitleſs, and for the feeble attempt they paid the forfeit of their lives.

In the year 1571, the zeal of this pontiff was directed againſt Selim the Turkiſh ſultan, who, in violation of a ſolemn treaty, had invaded the iſland of Cyprus. The Venetians, to whom the iſland belonged, ſolicited his holineſs to employ his influence in procuring aſſiſtance for them from the Chriſtian princes. With their requeſt Pius readily complied. He was, however, ſucceſsful in his application only with Philip II., who, without heſitation, entered into a league with his holineſs and the republic, by which he bound himſelf to pay one-half of the expence of a powerful armament which it was judged neceſſary to employ, while the Venetians engaged to defray three-fourths of the other half, and the pope the remainder. The preparations of the combined powers were carried on with ſo much celerity and diſpatch, that about the middle of September a fleet was ready to ſail from Meſſina, conſiſting of more than 250 ſhips of war, and other veſſels, carrying nearly 50,000 men. The command of this mighty armament was given to don John of Auſtria, whom the pope, indulging the moſt ſanguine hopes with regard to the iſſue of the war, exhorted to embrace the firſt opportunity of engaging with the enemy, aſſuring him that he would obtain a complete victory. He ſent him, at the ſame time, a conſecrated ſtandard, and a number of eccleſiaſtics to officiate in ſacred things on board the ſhips; and, moreover, he ordered a faſt and jubilee to be proclaimed, with an abſolution from their ſins to all who ſhould acquit themſelves with honour againſt the infidels. A victory was ſoon afterwards obtained by this fleet over the Turks near the gulf of Lepanto, the intelligence of which ſpread univerſal joy throughout all Chriſtian Europe. When the important news was brought to the pope, he cried out, in the words of ſacred writ, "There was a man ſent from God, whoſe name was John," in reference to the prince under whoſe command the victory was obtained. (See John *of Auſtria.*) Pius ſurvived this event only a few months, and was carried off by an attack of the ſtone in 1572, when he was about the age of ſixty-eight, after a pontificate of little more than ſix years. Notwithſtanding his defects, compared with many of his predeceſſors, his name appears with honourable diſtinction among the liſt of popes. He was a lover and patron of learned men, and ſcarcely preferred any perſons to conſiderable dignities who were not ſtrongly recommended by their abilities, and the endowments of their minds. In his private conduct he was irreproachable and exemplary. He was beatified by Clement VIII., and canonized in 1712 by Clement XI. A volume of his letters was publiſhed at Antwerp in 1640, under the title of "Apoſtolicarum Pii Quinti Pontificis maximi Epiſtolarum, lib. v." Moreri. Bower.

Pius VI. pope, originally known by the name of John Anthony Braſchi, was deſcended from a noble, but reduced family, and born at Ceſena, a ſmall town belonging to the eccleſiaſtical ſtate, in the year 1717. Being deſtined for the church, and poſſeſſing a promiſing capacity, he received the beſt education that could be procured. His ſplendid talents recommended him to the patronage of cardinal Ruffo, who appointed him to the poſt of uditore; a charge which, in the eſtabliſhment of the Roman church, compriſed the offices of vicar, counſellor, and aſſiſtant. In this ſituation he conducted himſelf with ſo much good ſenſe, probity, and zeal, that he ſecured the affection of the cardinal, and acquired the reputation of being one of the beſt informed perſons in Rome. As a mark of his eſteem for Braſchi, this generous prelate, when on his death-bed, left him the continuation of his appointment for life, and ſuch was Braſchi's veneration for his patron, that, out of reſpect for his memory, he retained the ſituation of uditore, even after he became pope. He continued to make rapid advances in the church, and under the pontificate of Clement XIV., more generally known by his family name of Ganganelli, Braſchi was raiſed to the purple; and in this progreſſive advancement, he conſtantly diſplayed a love of juſtice, the ſtricteſt morality, cloſe application to buſineſs, and the moſt unaſſuming manners. After the death of Clement XIV., cardinal Braſchi was raiſed to the pontifical throne, and he was proclaimed pope under the title of Pius VI. He began his government with correcting various abuſes which had taken place in the internal adminiſtration of affairs, as well as in the police of Rome, and with endeavours to reſtore the dilapidated finances to order and regularity. With this view he liberally patronized ſeveral uſeful reforms, and beneficial eſtabliſhments in the ſtate. Soon after his acceſſion he had a difference with the court of Naples, which led him to diſplay great firmneſs in ſupport of his dignity. The king of the two Sicilies had appointed M. Filangeri, formerly viceroy of Sicily, to the archbiſhopric of Naples; and as the laws of that metropolis required that the archbiſhop ſhould be a cardinal, application was made to Pius VI. to beſtow upon him that dignity. The pope returned for anſwer, that although the laws enacted that a cardinal ſhould be the archbiſhop, it did not follow that the archbiſhop ſhould become a cardinal; and that his majeſty, who could not be inſenſible of the difference, might have promoted to the archbiſhopric ſome one or other of the Neapolitan cardinals reſiding at Rome, inſtead of thus indirectly aſſuming authority to confer one of the greateſt dignities of a foreign hierarchy on one of his ſubjects. The pope was reſolute, and Filangeri actually died of a broken heart, in conſequence of the refuſal. Pius VI. derived real and very great honour from the works of magnificence and utility, on which he expended the revenues of his ſee. He augmented and completed the noble Clementine Muſeum in the Vatican, founded by his predeceſſor, as a receptacle for the monuments, vaſes, ſtatues, medals, and other remains of antiquity, which were procured by excavations in the eſtates of the church. The engravings and deſcriptions of the treaſures in this collection were afterwards publiſhed in ſix volumes folio. He projected and finiſhed the erection of the preſent majeſtic veſtry of St. Peter's. He built a church and eſtabliſhed a library in the abbey of Subiaco; he founded a number of hoſpitals for the relief of the ſick and indigent; and he ſhewed a great regard for the intereſts of commerce by repairing the port of Ancona, and erecting the beautiful light-houſe, which is at once an ornament to the city, and of the higheſt utility in the navigation of the Adriatic ſea.

But the greateſt economical undertaking of this pontiff's adminiſtration, was the draining of the Pontine marſhes; and if he did not completely ſucceed, yet he is not entitled to leſs praiſe for the grandeur and utility of the attempt. The marſhes extended upwards of forty miles in every direction, occupying the whole valley from the Apennines to the ſea. To fit this vaſt ſpace for the purpoſes of agriculture, and by ſo doing to purify the air from peſtilential vapours ariſing from it, had been an object that employed the thoughts and the labours of the cenſor Appius Claudius, who carried through it the famous Appian way. Several of the Roman emperors, and ſeveral of the popes had directed, at different times, their attention to the ſame deſign, and though all their attempts had been unſucceſsful, Pius VI. reſolved to undertake the arduous work. He employed the beſt engineers in Rome, and went regularly every year to inſpect, in perſon, the progreſs which they had made. He cauſed immenſe canals to be dug, for the purpoſe of receiving the water from the marſhes, and by this means rendered conſiderable tracts of land fit for huſbandry. On the ſide of theſe canals he conſtructed a large and beautiful road, about forty miles in length, ornamented with four rows of poplar trees, and interſperſed with houſes of accommodation; and at its termination he built a large and ſplendid palace. Pius likewiſe diſplayed his magnificence in the reception which he gave to ſeveral royal perſonages from various parts of Europe, who came to viſit Rome during his pontificate, among whom were Joſeph II. emperor of Germany; Paul, then grand duke, afterwards emperor of Ruſſia; Guſtavus Adolphus, king of Sweden; and his royal highneſs of England, prince Auguſtus Frederic, the preſent duke of Suſſex, illuſtrious as well for his attachment to the principles of civil and religious liberty, as for his high birth.

Pius VI. ſpent the firſt ſix years of his pontificate in the moſt perfect tranquillity, excepting the difference, which has been referred to, with the court of Naples, occupied in regulating the internal government of his ſtate, and in carrying on the undertakings already noticed. Soon after the death of the empreſs queen, Maria Thereſa, towards the end of the year 1780, he began to feel mortifications and afflictions in abundance. As ſoon as Joſeph II. came into poſſeſſion of his hereditary territories, he began to carry into execution the ſchemes which he had long formed for promoting a reform in eccleſiaſtical affairs, and emancipating his ſubjects from papal juriſdiction. With this view he iſſued edicts and ordinances, by which the ſecular clergy were ſubjected to lay-magiſtrates: all donations to religious houſes, by thoſe who ſhould enter them, were prohibited; various religious houſes, in all parts of his dominions, were ſuppreſſed; all Auſtrian, Hungarian, and Lombard biſhops were enjoined never to accept the dignity of cardinal; all ſubordination to the holy ſee in ſecular affairs was diſclaimed, and many other vigorous ſteps towards a complete emancipation were purſued. Theſe proceedings excited the greateſt alarm in the breaſt of Pius VI. At firſt he hoped that ſome oppoſition would be made to ſuch innovations by the imperial ſubjects themſelves; and he was encouraged in that hope by the ſtrong remonſtrances which were ſent to the emperor, from the clergy of Brabant, Flanders, and Lombardy. They, however, produced no effect on Joſeph, who perſiſted in his ſchemes, ſupported by the aſſiſtance of the lay magiſtrates and the military power. Even the archduke Ferdinand, his brother, had been nearly deprived by him of the government of Lombardy, for ſeconding the remonſtrances of the Milaneſe clergy. Under theſe circumſtances, his holineſs thought it high time to remonſtrate himſelf againſt the imperial meaſures, and directed his nuncio at the court of Vienna to preſent the moſt preſſing ſolicitations to his majeſty, that he would conſider the conſequences of his proceedings. But theſe produced no effect whatever, and the prince Kaunitz told him, that his maſter was fully aware of the effects of what he had done, and was determined to carry into execution all the edicts that he had iſſued.

The thunders of the Vatican were no longer objects of terror, and of this Pius VI. was fully aware; he therefore reſolved to try whether his perſonal entreaties might not have the effect of prevailing with the emperor to deſiſt from his hoſtile purpoſes. He accordingly determined to viſit that prince at Vienna. This determination was highly diſapproved by the members of the ſacred college; Pius was, however, reſolute, ſaying that he had rather ſubmit to humiliation in his dignity than remorſe in his conſcience. At that time, inauſpicious as his proſpects were, he little thought of the afflictions that were in reſerve for him in another quarter, and from another power then on the beſt terms with the papal ſee.

The pope, after the fatigues of a winter's journey over the Alps, arrived at Vienna in March 1782, where he was received by the emperor with every mark of external reſpect, and who treated him with the ſame diſtinction as if he were in poſſeſſion of that vaſt power which his predeceſſors had enjoyed, and was reigning in his own capital. The emperor and pope had repeated conferences on the ſubject of the changes which Joſeph was making in eccleſiaſtical matters; but the arguments of Pius were not ſufficiently ſtrong to induce the emperor to repeal any of his late edicts, and he could only obtain a reſpite for ſome religious foundations which were threatened with diſſolution. While Pius continued at the Auſtrian capital, he is ſaid to have received ſeveral Proteſtant princes, noblemen, and clergy, with the greateſt affability; and it has been likewiſe aſſerted, but upon no proper evidence, that he converted to the Catholic religion many thouſand Proteſtants, who had come to Vienna for the purpoſe of ſeeing him perform the duties of his high office on Eaſter Sunday. After the pope's return from his viſit to Vienna, he employed much of his time in the improvement of his temporal dominions, and in the enriching and aggrandizement of his own relations. One nephew he made a cardinal, and another he raiſed to the dignity of a ducal coronet, circumſtances that created much diſaffection to his government from the people, who ſaw them grow wealthy by the plunder of the eſtates belonging to the apoſtolical chamber, and the moſt oppreſſive public ſpoliations. In the mean time he was involved in new diſputes with the court of Naples, which, encouraged by the example of the emperor, had aboliſhed ſome of the perogatives that the court of Rome had for ages been accuſtomed to exerciſe in the Neapolitan dominions, as well as the ſingular cuſtom of delivering a white horſe to his holineſs on St. Peter's day, as a token of feudal vaſſalage to the holy ſee. In 1787 the matter was carried much farther, and the king of Naples abſolutely prohibited any appeal from his deciſions to the court of Rome, and at one blow aboliſhed for ever certain feudal homages which he conceived as diſgraceful to his own dignity any longer to ſubmit to. When the pope heard of theſe proceedings, he iſſued a ſolemn proteſt againſt the innovations made by them on the ſovereignty of the holy ſee over the kingdom of Naples. He ſent his internuncio to Naples with certain apoſtolical bulls; but the decrees produced no effect, and the meſſenger of them was baniſhed the kingdom of Naples. This was in the autumn of the year 1788, at a time when Pius had a miſunderſtanding with the grand duke of Tuſcany, reſpecting ſome innovations of the biſhop of Piſtoia; this at length changed into a violent quarrel, in which the grand duke undertook to annihilate the ſpiritual power of the pope in his dominions, and to counteract his ſupremacy in the hierarchy of the ſtate. The effects of a ſimilar ſpirit were manifeſted by the Venetian republic, the ſenate of which had, in the early part of this pope's reign, ſecularized a number of abbeys, and other rich eſtabliſhments, and incorporated them with thoſe belonging to the nobility. On account of theſe proceedings, the pope had threatened them with the effects of his apoſtolical anger, and even gone ſo far as to talk ſeriouſly of compelling them to obedience, by the force of temporal arms. This quarrel had at one time been appeaſed, by the intervention of certain cardinals, but the ſenate continued in it's laudable labours of ſuppreſſing and reforming conventual houſes in favour of hoſpitals and other charitable eſtabliſhments, without paying any regard to the murmurs and complaints of the pontiff. The duke of Modena, likewiſe, without the concurrence of the holy ſee, ſuppreſſed the inquiſition in his ſtate, and was preparing, if it ſhould appear neceſſary, to arm againſt the pope in defence of certain territorial rights. After all, theſe were the commencement of evils, and of no ſort of conſequence, compared with what Pius VI. was on the point of enduring from revolutionary France. In that country, before the aſſembling of the ſtates-general, a diſpoſition was ſhewn by many of the higher clergy to introduce reforms in matters of an eccleſiaſtical nature, without any application for the concurrence of the holy ſee. The French government, likewiſe, without communication with the court of Rome, had ſuppreſſed the order of the Celeſtines in France, and ſeized upon the eſtates of thoſe of the ſame order, who, living under the Roman juriſdiction at Avignon, had property in the French territory. Theſe circumſtances filled the heart of Pius VI. with an overwhelming anxiety, which was augmented by the edict that was paſſed in favour of the Proteſtants, granting them a civil exiſtence, and legitimating their children. Pius was urged by ſome of the members of the ſacred college to adopt violent meaſures in defence of his dignity and juſt right; but he preferred moderate meaſures, and was contented to mourn in ſilence over theſe daring attacks upon his office, and that toleration of heretics which threatened ultimate ruin to the Catholic church.

In the following ſketch we ſhall be as brief as poſſible, and endeavour to omit every circumſtance that is not connected with the ſubject of the preſent article. The downfall, however, of the papal authority is of too great importance to the world to be lightly paſſed over: that power that tyranniſed over the conſciences and temporal rights of mankind for many centuries, ſo that to have lived to behold its humiliation and almoſt entire deſtruction, is no ſmall privilege of the exiſting generation.

After the ſtates-general in France had aſſembled in 1789, one of the firſt abuſes which was the object of public attention, and which, it is believed, the court even had previouſly reſolved to ſacrifice, was the payment of eccleſiaſtical tribute to Rome, under the form of bulls, diſpenſations, and other objects of ſpiritual traffic. This was followed by a decree of the National Aſſembly, at the cloſe of the year, declaring the church eſtates to be national property, which filled the court of Rome with general conſternation. At length the pope's temporal poſſeſſions in Vennaiſſin and Avignon were confiſcated by the National Aſſembly. Againſt this ſeizure of his property, briefs and bulls were iſſued by the pope; and the partizans for his holineſs, and the friends to the French revolution in the country which was the object of diſpute, carried on againſt each other what was called a *civil*, but a bloody conteſt. At length the revolutioniſts of Avignon gained the aſcendancy; and after dethroning the archbiſhop, and diſperſing the clergy for refuſing to take the civic oath, they depoſed the pope from his ſovereignty, ſeized his revenues, and Avignon, with the whole of the papal territory in France, was converted into republican departments. When the National Aſſembly had formed their civil conſtitution for the clergy, the pope was ſolicited by the anti-conſtitutionaliſts, with the abbè Maury at their head, to ſuppreſs it by an apoſtolical bull. Accordingly he diſpatched, with this view, his celebrated monitory of the 13th of April, 1791. But this inſtrument, ſo formidable in former times, now ſerved no other purpoſe than to excite ridicule, increaſe the ſeverity of the proceedings againſt the non-conforming clergy, and to excite popular odium againſt his holineſs. In Paris it was regarded as the tocſin for a civil war, and the mob, without heſitation, to expreſs their reſentment againſt the power which iſſued it, burnt the effigy of the pope, in all his pontifical inſignia, in the garden of the Palais Royal.

The hoſtility of the court of Rome to what was tranſacting in France was not confined to briefs and bulls, but was diſplayed in proſecutions againſt ſuch perſons as were ſuſpected of any attachment to the revolution which had taken place. Several officers, natives of France, but in the pope's employ, were degraded, and ſent to the gallies, for having diſcovered ſentiments favourable to the new order of things. A kind of proſcription, likewiſe, was begun againſt every thing or perſon which bore the name of French or Frenchman, till it was ſuſpended in conſequence of the interference of the executive council of the French republic, which threatened hoſtilities, if redreſs were not inſtantly obtained. After the appearance of the *famous* manifeſto iſſued by the duke of Brunſwick of the coalition of crowned heads, againſt the French republic, menacing with extermination all who ſhould dare to reſiſt the forces employed in maintaining the cauſe of royalty, military preparations were begun to be made in the papal dominions, which could not but be conſidered by the French government as intended to ſtrengthen the power of their enemies. This ſuſpicion was confirmed by the circumſtances connected with, and immediately following the murder of Baſſeville, the French ambaſſador, by the mob of Rome. That miniſter had been ſent, in 1793, to diſſuade the pope from joining the league againſt the republic, and had been inſtructed to eraſe the royal arms from the French academy, and all public buildings belonging to the nation, and to ſubſtitute the republican inſignia in their place. Pius, however, refuſed to acknowledge him as the repreſentative of France, till a reparation had been made to the holy ſee for its wrongs. Baſſeville being prevented from diſplaying on the public buildings the emblems of his own government, determined to maintain its honour in his own perſonal appearance, and without heſitation openly paraded the ſtreets with the national cockade in his hat. He had not worn it many days before he was aſſaſſinated in the ſtreets. This deed was condemned in very gentle terms by the pope, who probably was not grieved at what had happened; inſtead, therefore, of making conceſſions, and endeavouring to diſcover and puniſh the perpetrators of the act, he openly declared againſt the French republic. His manifeſto, which ordered a general armament, avowed the intention of aſſiſting to exterminate the ſworn enemies of all thrones and altars. The manifeſto offered alſo amneſty and abſolution to criminals who ſhould take up arms for the church and ſtate, and exempted no perſons from the riſing in maſs but children, old men, and prieſts, "who were to raiſe up their hands on the mountain, while the faithful fought in the plain." The pope, for want of money, was unable to keep his army together, and in a very ſhort time he was glad to change his tone, and to declare himſelf neutral; he had not, however, wiſdom and prudence ſufficient to be ſteady in his neutrality. In 1796, when Bonaparte was every where victorious, Pius committed an act of aggreſſion by ſuffering the Neapolitan cavalry who were haſtening to their ſuccour to paſs through the territories of the church, and even directed their march. No ſooner had the conqueror diſperſed the Auſtrian armies in Italy, than he proceeded againſt thoſe Italian ſtates which had either joined or favoured them. Having with his main army entered the territory of the pope, and without reſiſtance taken poſſeſſion of Bologna, Ferrara, and Urbino, the pontiff was under the neceſſity of throwing himſelf on the clemency of the conqueror, who would not even grant him an armiſtice but on very ſevere conditions. By the terms of it, the pope was compelled to ſet at liberty thoſe perſons who were at that time confined for their political conduct or opinions, to renounce the friendſhip of the coaleſced powers, and to ſhut up his ports againſt them; to ſurrender to the French the cities of which they already had poſſeſſion, as well as the citadel of Ancona, to pay nearly a million ſterling, and to deliver one hundred pictures, buſts, vaſes, ſtatues, &c. and five hundred manuſcripts, to be ſelected by commiſſioners who ſhould be ſent to Rome for that purpoſe. When the terms of peace came to be diſcuſſed, the pope refuſed to accede to thoſe conditions to which he had agreed when the armiſtice was concluded.

The court of Rome had now the temerity to reſolve trying the fortune of its arms againſt thoſe of France, having been promiſed the aſſiſtance of a conſiderable body of troops by the court of Vienna. Every effort was now made by the pope, but he was ill-ſeconded by his ſubjects, many of whom were more anxious to welcome the French to Rome than prevent their arrival. The criſis ſoon arrived which brought affairs to an iſſue, and expoſed the fatal policy which had directed the determination of the papal cabinet. A ſeries of ill ſucceſs obliged his holineſs to confirm all the conditions of the armiſtice without reſerve; to admit the annexation of Avignon and Vennaiſin to the French republic; and he likewiſe conſented to pay thirty millions of livres, as well as to furniſh the French army with 16,000 horſes, by way of ranſom for the remnant of his dominions which he was permitted to retain. By this peace the political exiſtence of the holy ſee was prolonged for a ſhort time, but it was left in a ſtate of extreme embarraſſment: and the pope, who had already demanded of his ſubjects the half of their plate, was now obliged to call upon them for the remainder, requeſting that it might be brought into the pontifical treaſury within three days. This requiſition produced much diſcontent and murmuring among the people, and ſtrong ſymptoms of a revolutionary ſpirit were diſcoverable in all parts of the eccleſiaſtical ſtate. The popular odium was particularly manifeſted againſt the duke of Braſchi, on whom was laviſhed every expreſſion of indignation and contempt. To check and reſtrain theſe tokens of public hatred and diſaffection, the government of the court of Rome became ſevere and tyrannical. To overawe the people a ſtrong garriſon was placed in the caſtle of Angelo, and ſoldiers were diſtributed in different quarters of the city. Theſe ſeverities directed the public reſentment againſt the pope, who could never appear abroad without receiving the ſtrongeſt marks of diſapprobation. Political conſpiracies were every day forming, and in this diſtracted ſituation of affairs Joſeph Bonaparte, the brother of the general, arrived at Rome in the quality of ambaſſador from the French republic. This was highly acceptable to thoſe who were planning a change in the government, and towards the end of December 1797, an inſurrection broke out, attended with very diſaſtrous circumſtances, in conſequence of which the French ambaſſador quitted Rome, and retired to Florence. In the commotion the French general Duphot had been moſt inhumanly murdered, of which the directory at Paris made a handle for ſeizing the remaining treaſures of the ancient metropolis of the world, and for aſſuming the glory, if ſuch it could be denominated, of erecting the Gallic ſtandard on the Capitol. Orders were inſtantly given for the march of the French and Ciſalpine forces to Rome. To deprecate, if poſſible, the wrath of the French government, and ward off the fatal blow, ſolicitations were made for the mediation of the Spaniſh ambaſſador, and that of the courts of Naples, Florence, and Vienna. The intervention of heaven was alſo ſought by prayers, faſtings, proceſſions, and jubilees. The theatres were ſhut up; and new and numerous arreſts of ſuſpected perſons were ordered to be made. In contempt of theſe acts of government, the revolutionary party covered the walls with ſatirical and menacing placards; and they alſo diſtributed among the people portraits of Bonaparte, with the title of the new ſaviour of the world. In the mean time the French and Ciſalpine armies, under the command of general Berthier, marched to Rome, preceded by a proclamation, in which the general declared that the only object of his viſit was the puniſhment of the murderers of Duphot and Baſſeville, and that the people of Rome ſhould find in the French army protectors and friends. The revolutionary party, encouraged by this proclamation, actually proclaimed the Roman republic on the 15th of February 1798. Pius, however, reſolved to make one more effort to preſerve the government of the holy ſee from annihilation, and ſent to Berthier, who was encamped without the walls of the city, his cardinal-vicar and other deputies, accompanied by the Neapolitan miniſter, who were inſtructed to negociate for the continuance of his temporal exiſtence, by the further ſacrifices of provinces and of millions. His hopes were quickly diſſipated by the peremptory refuſal of the general to admit any other deputation than that of the Roman people. As the ſtorm was approaching, ſome of the cardinals prudently fled from the city, but the majority waited the event, hoping, no doubt, to retain their rank and poſſeſſions, though probably at the expence of conſiderable ſacrifices. For a ſhort time they were treated with forbearance, but were obliged formally to abdicate their authority. After this, their eſtates were confiſcated for the benefit of the nation, while the cardinals themſelves were included under one common proſcription, and confined as priſoners in a convent at Rome. From this priſon they were ſent to one, not ſo commodious, at Civita-Vecchia, where they were ſubjected to ſuch menaces and inſults, that the greater part of them were glad to purchaſe their liberty by the ſacrifice of all their wealth. In the mean time the pope remained confined to his apartments at the Vatican, in anxious and trembling uncertainty with reſpect to his fate. That of his nephews, already mentioned, had been decided. The cardinal was a fellow ſufferer with the other members of the ſacred college, and the eſtates of the duke of Braſchi were confiſcated to the public uſe. His magnificent and ſumptuous furniture, his pictures, engravings, antiquities, and his muſeum, were brought to the hammer. The eſtates and property of the pope himſelf were involved in the ſame confiſcation with thoſe of the cardinals: and the French commiſſaries, judging that his preſence, in Rome, was incompatible with the tranquillity of the ſtate, decreed that he ſhould be ſent beyond the boundaries of the Roman territory. Pius VI. was now eſcorted by a body of French cavalry to Sienna, where his firſt reſidence was in the convent of St. Barba, which he was obliged to quit by an earthquake that overthrew the apartments adjoining to thoſe which he occupied, and damaged thoſe in which he was. He now took up his abode within the walls of the city. In the month of May, he removed to a Carthuſian convent within two miles of Florence. In this retired place Pius kept his little court, with great circumſpection, to avoid giving umbrage either to the French or Tuſcan government. He even offered to leave the nomination and regulation of his houſehold to the inſpection of the French miniſter. It was ſcarcely poſſible for papal humiliation to be carried much farther, for this miniſter happened to be a Proteſtant of the Lutheran perſuaſion. But ſtript of his pontifical dignity, Pius is ſaid to have exhibited an excellent example of chriſtian-like reſignation. He ever expreſſed a meek and forgiving diſpoſition towards thoſe who had deſpoiled him of his power and authority. Unembarraſſed by the cares of government, his health became more ſtable, his ſpirits increaſed, and adverſity ſeemed to prove to him the true road to happineſs. He was not, however, allowed to enjoy the bleſſings of this ſtate of humble retirement; the French directory enjoined the grand duke to diſmiſs him from the Tuſcan territory: and it was decided by the republican tyrants that he ſhould be ſent to the iſland of Sardinia, where a papal conſpiracy, if ſuch an event ſhould happen, muſt neceſſarily be circumſcribed within very narrow bounds, but the attack of ſerious illneſs made his removal impoſſible. After his health was reſtored, he was permitted to remain in peace in the Carthuſian convent, till the renewal of the war between France and Auſtria which had been terminated by the peace of Campo Formio, when it was reſolved that he ſhould be removed into the interior of France. In the courſe of a long and painful journey, frequently expoſed to the inſults of the illiberal and unfeeling, who could not but exhibit ſigns of exultation in the deſtruction of the papal power, he caught a feveriſh diſorder which put an end to his ſufferings on the 29th of Auguſt, 1799, being in the 82d year of his age. The French directory refuſed to his remains the accuſtomed ſepulchral rites, but upon a change in the government of that country, the conſuls of the republic ordered that he ſhould be buried, with the honours commonly due to a perſon of his rank, and that a ſimple monument ſhould be erected over the place of his interment, with an inſcription expreſſive of the dignity which he bore. In 1802 his ſucceſſor, Pius VII., obtained permiſſion to remove his body to Rome.

"Pius VI." ſays the excellent writer of his article in the General Biography, to whom we have very frequently referred in our own, "though poſſeſſed of many eſtimable qualities as a private man, had few of thoſe talents which are neceſſary to govern in times of difficulty and danger. Yielding often to the impulſe of the moment, the impetuoſity of his character led him into ſome errors, which were followed by a ſpeedy repentance. Preſumptuous with reſpect to his own opinion he was blind to the future, where men of common ſagacity had the cleareſt foreſight; and filled with ideas of the importance and dignity of his office, he prepared for himſelf many mortifications and inſults, which he had neither the addreſs to avoid, nor the power to avenge. As the viſible head of the church, his attention to the duties of his ſtation was uniform and exemplary, and his piety, though oſtentatious, was devoid of hypocriſy or fanaticiſm, and his morals were pure and irreproachable. In his youth he had been one of the handſomeſt men of his time. To a very lofty ſtature he joined a noble and expreſſive ſet of features, a benign countenance, a ſonorous voice, and an elegant engaging manner. Of theſe advantages he was but too ſenſible, and he betrayed a puerile vanity in diſplaying them on all public occaſions, which expoſed him to many bitter ſarcaſms, and which the ſeriouſly devout were at a loſs to reconcile with the acknowledged ſanctity and gravity of his character." See alſo New Ann. Regiſter. Monthly and Gent. Mag.

We beg leave, in this place, to correct an error in the article Lewis XVI., vol. xx., in which the daughter of that unfortunate monarch is mentioned as having died in 1796. She was, we are happy to ſay, living, at that time, in London; pitied and reſpected for her misfortunes, and honoured and beloved on account of her many virtues.

PIUZANO, in *Geography*, a town of Italy, in Friuli; 14 miles W. of Gemona.

PIX, in *Coinage*, a box, in which a ſmall proportion or ſample of the coins ſtruck at the mint is reſerved, in order to be aſſayed and compared with a check-piece or ſtandard kept in the exchequer for the occaſion. This operation, which is called the "trial of the pix," is performed with great exactneſs in the preſence of the privy council, the officers of the mint, and a jury of the goldſmiths' company; and there is no inſtance upon record of the coins thus tried being found to vary from the full ſtandard.

PIXITES, in *Ancient Geography*, a river of Aſia, in the Colchide, towards the north of the town called Trapezus.

PIZARRO, Francisco, in *Biography*, the diſcoverer and conqueror of Peru, was the natural ſon of a Spaniſh gentleman by a woman of the loweſt rank. His father, not thinking himſelf bound to raiſe him to a condition ſuperior to his maternal birth, not only left him deſtitute of all education, but employed him in the ſervile office of keeping ſwine. Indignant at this treatment, he ran away and enliſted as a common ſoldier. After ſerving ſome time in Italy, he joined the adventurers who were embarking at Seville for America. He was preſent in all the wars of Cuba and Hiſpaniola, and upon every occaſion he ſtood pre-eminent for undaunted courage, perſeverance, and enterprize, and was in a ſhort time conſidered as fully qualified for command. His mind and body were equally adapted for difficult and laborious undertakings, and experience had prepared him to meet all emergencies. In 1524, having acquired ſome property, he, with Diego de Almagro, and Hernando Luque, entered into an aſſociation for the conqueſt of the ſuppoſed rich countries on the coaſt of the South ſea. Pizarro made the firſt attempt. He ſailed in November from Panama in a ſingle veſſel with 112 men, ſo feeble were the means by which the ſubverſion of a great empire was to be effected. (See Peru.) Pizarro made ſeveral voyages, and with his aſſociates acquired the moſt important conqueſts, till at length the conquerors quarrelled among themſelves, and in April, 1538, the two hoſtile parties of Spaniards, each bearing the royal ſtandard, met and engaged with all the fury of inveterate foes, while an immenſe multitude of Indians, who had borne the cruelties of both, aſſembled on the ſurrounding mountains, enjoying, to them, the edifying ſpectacle of their ſavage foes deſtroying each other by mutual ſlaughter. The battle was fatal to the cauſe of Almagro, who was himſelf taken priſoner after the total and bloody defeat of his troops. In a very ſhort time the mercileſs Pizarro brought his old aſſociate to trial, condemned and executed him. Afterwards Pizarro was the unrivalled maſter of theſe extenſive regions, and without any regard to the Spaniſh court, he divided them like a conqueror among his followers, ſetting apart the moſt valuable lots for himſelf, his brothers, and favourites. His partiality excited much diſcontent among perſons, all of whom were actuated by the thirſt of gain. The partizans of Almagro ſighed in ſecret for revenge; but as no open hoſtility was manifeſted, the plan of diſcovery was carried on with vigour, and Gonzalo Pizarro was diſpatched by his brother upon the arduous enterprize of croſſing the Andes, and exploring the countries to the eaſt of that chain. It was on his return to Quito that he learnt the deſtruction of his brother. The followers of Almagro had repaired in great numbers to Lima, where the ſon of their late chief received them with much kindneſs, and engaged their warmeſt attachment by his popular qualities. In their private meetings a conſpiracy was formed againſt the life of Pizarro. He was apprized of the fact, but, in the confidence of uncontrolled power, he diſregarded them. The plot was, however, matured; and on the 26th of June 1541, at mid-day, a time, in thoſe hot climates, devoted to repoſe, Herroada, one of the principal of the Almagrian officers, at the head of eighteen determined aſſociates, ſallied out armed from Almagro's houſe, and proceeded to the palace. They paſſed unobſerved through the outer courts, and were arrived at the foot of the ſtaircaſe before an alarm was given. Pizarro was in a large hall with ſome friends. One of theſe who came to the top of the ſtairs to enquire into the cauſe of the tumult, was laid dead, while others eſcaped through the windows. The conſpirators ruſhed into the hall; Pizarro, with his half brother Alcantara, was killed, and the others mortally wounded: the former defended himſelf till he was abſolutely exhauſted with fatigue, when, unable any longer to parry off the weapons, he received a thruſt full in the throat, fell, and expired. His memory lives and ever will live as a ſignal contributor to his country's aggrandizement, but blackened with the ſtain of atrocious cruelty and perfidy. Univer. Hiſt. Robertſon's America.

PIZOLO, in *Geography*, a town of Sicily, in the valley of Noto; eight miles S. of Modica.

PIZZATI, Giuseppe, in *Biography*, publiſhed at Venice in folio, with a ſeparate volume of plates, in 1782, a treatiſe "On the Science of Sounds and of Harmony:" "La Scienza de' Suoni, e dell' Armonia." The author clearly explains the phenomena of ſound, as far as concerns practical muſic, from d'Alembert, another modern writer on harmonics, and gives an account of late diſcoveries in the ſcience, and of the ſyſtems of Rameau and Tartini, from Rouſſeau, explaining the laws of harmony in their preſent uſe.

PIZZICATO, in *Italian Muſic*, from *pizzicare*, to pinch, is a term that announces to the performers on bowed inſtruments the uſe of the fingers inſtead of the bow. When the bow is to be reſumed, it is expreſſed by the words *con arco*.

PIZZIGHITONE, in *Geography*, a town of Italy, in the department of the Upper Po, on the Adda; nine miles N.W. of Cremona. N. lat. 45° 10′. E. long. 9° 48′.

PIZZO, a town of Naples, in Calabria Ultra, near the coaſt; 13 miles N.E. of Tropea.

Pizzo *Ferrato*, a town of Naples, in Abruzzo Citra; 13 miles E.S.E. of Sulmona.

Pizzo *di Gotto*, a town of Sicily, in the valley of Demona; ſix miles S. of Melazzo.

PLA, a town of Spain, in the province of Catalonia; five miles S. of Urgel.

PLABENNEC, a town of France, in the department of the Finiſterre, and chief place of a canton, in the diſtrict of Breſt; ſeven miles N.E. of Breſt. The place contains 3255, and the canton 11,833 inhabitants, on a territory of 230 kiliometres, in 12 communes.

PLACAGNODIAUGIA, in *Natural Hiſtory*, the name of a genus of ſpars.

The word is derived from the Greek πλαξ, *a cruſt*, αγνος, *pure*, and διαυγης, *pellucid*.

The bodies of this genus are cryſtalline terrene ſpars, or ſparry bodies with much of the brightneſs and tranſparence of cryſtal, but debaſed by an admixture of earthy matter, and are imperfectly pellucid, and formed into thin plates with flat ſurfaces, but covered at times, either in part or entirely, with tubercles or botryoide prominences, and are compoſed of arrangements of oblong concretions, of no determinately angular figure.

Of this genus there are only two known ſpecies, *viz.* a hard ſemipellucid and yellowiſh-brown one, and a brittle pellucid and whitiſh one. Hill.

PLACAGNOSCIERIA, the name of a genus of ſpars.

The word is derived from the Greek *πλαξ*, *a cruſt*, *αγνος*, *pure*, and *σκιερος*, *opaque*.

The bodies of this genus are dull and opaque cryſtalline terrene ſpars, formed into cruſts, and of an irregular and not ſtriated texture within.

Of this genus there are three known ſpecies, *viz.* a hard whitiſh-brown one, a dull crumbly whitiſh one, and a dull pale brown friable one, of a very coarſe texture, which encruſts the ſides and bottoms of veſſels, in which water is frequently boiled. Hill.

PLACANICA, in *Geography*, a town of Naples, in Calabria Ultra; 27 miles E.S.E. of Reggio.

PLACARD, or Placart, *Placaert*, a foreign term, frequent in gazettes, ſignifying a leaf, or ſheet of paper, ſtretched and applied upon a wall, or poſt. Edicts, regulations, &c. are to be made public in placards.

The word placard is alſo uſed for a libel or lampoon. At Rome, placards againſt the pope are frequently fixed, in the night-time, to the ſtatue of Paſquin. See Pasquinade.

Placard, in *Architecture*, denotes the decoration of the door of an apartment, which is ſometimes a corniche ſupported by conſoles.

Placard, in our *Cuſtoms*, denotes a licence whereby a perſon is permitted to ſhoot with a gun, or to take otherwiſe unlawful game.

PLACCIUS, Vincent, in *Biography*, a learned juriſt, was born at Hamburg in the year 1642. After ſtudying at Leipſic, and other places, he travelled into Italy and France, and became a licentiate in law at Orleans. Returning to his native city, he practiſed at the bar; and in 1675, was appointed profeſſor of moral philoſophy and eloquence, the duties of which he performed till his death, in 1699. He was author of a volume of Latin poems, and of many other works, of which the principal are, 1. A curious bibliographical piece concerning anonymous writers, firſt publiſhed at Hamburg in 1674, under the title of "De Scriptis et Scriptoribus anonymis atque pſeudonymis Syntagma;" together with the "Catalogus Auctorum ſuppoſitiorum" of Rhodias. The work was well received, and he prepared a new edition of it, with conſiderable additions, which was printed after his death, in 2 vols. folio, in 1708, under the care of John Albert Fabricius. A ſupplement to it was publiſhed by Mylius, in 1740, at Hamburg. 2. "De Arte Excerpendi," 1689. Placcius has always been eſteemed a learned and able writer, but his ſtyle is ſaid to be obſcure, and occaſionally confuſed. Moreri.

PLACE, Peter de la, a learned French magiſtrate, and various writer, was born at Angoulême in the year 1526. He applied with ſucceſs to the ſtudy of juriſprudence, and in 1548 publiſhed a Latin paraphraſe on the Titles of the Imperial Inſtitutes, "De Actionibus, Exceptionibus et Interdictis," in 4to. After this he was called to the bar of the parliament of Paris, and pleaded with ſo great ſucceſs, that he acquired the character of a learned, eloquent, and virtuous counſellor. Francis I. appointed him advocate of his court of aids at Paris, and he diſcharged the duties of that office with ſo much talent and integrity, that Henry II. nominated him his firſt preſident in the ſame court. It was believed that he was a convert to the Proteſtant religion in the year 1554, but he did not make an open profeſſion of it till the death of Francis II. On the breaking out of the civil war, he retired to one of his houſes in Picardy; but upon the concluſion of peace in 1562, he ſeized the earlieſt opportunity of vindicating himſelf before the king from the ſeveral charges which had been preferred againſt him. He was now appointed by the prince of Condè ſuperintendant of the houſhold; and upon the rupture of that prince with the court, about the year 1566, M. La Place retired to the caſtle of Vè in the Valois, where he continued after the death of the prince, till Charles IX. granted the Proteſtants advantageous terms of peace in 1569, with the deſign of the more eaſily extirpating them. La Place, deceived by royal treachery, returned to Paris, and reſumed the office of preſident to the court of aids, which he retained till he fell a victim in the horrible and accurſed maſſacre of the Proteſtants, on St. Bartholomew's day, in the year 1572, at the age of 46. He is ſaid to have poſſeſſed great ſoundneſs of judgment, clearneſs of diſcrimination, and a truly philoſophic ſpirit, which admirably qualified him for the office of magiſtrate, and which were ſeldom found united in the profeſſional men of that time. His chief works are, "Commentaries on the State of Religion, and of the Commonwealth, from 1556 to 1561;" "A Treatiſe on the right Uſe of Moral Philoſophy in connection with the Chriſtian Doctrine;" and "A Treatiſe on the Excellence of the Chriſtian Man." Moreri.

Place, *Locus*, in *Philoſophy*, that part of immoveable ſpace which any body poſſeſſes.

Ariſtotle, and his followers, divide place into *external* and *internal.*

Place, *Internal*, is that ſpace, or room, which the body contains.

Place, *External*, is that which includes or contains the body; which is alſo called, by Ariſtotle, the firſt or concave and immoveable ſurface of the ambient body.

It is controverted, in the ſchools, whether internal place be a real entity, or only an imaginary being; *i. e.* whether it be any thing intrinſically, or only an aptitude and capacity of receiving bodies.

Some maintain it a poſitive being, incorporeal, eternal, independent, and infinite; and aſſert it even to conſtitute the immenſity of the godhead.

The Carteſians, on the contrary, hold internal place, abſtractedly conſidered, to be no other than the very extenſion of the bodies contained in it; and therefore in no wiſe different from the bodies themſelves.

The ſchoolmen likewiſe diſpute, whether external place be moveable, or immoveable? Its immobility is argued from this conſideration; that what moves, muſt neceſſarily leave its place; which it cannot do, if it go along with the moveable. Others charge an abſurdity on this opinion of Ariſtotle; *viz.* that hence it follows, that a body really at reſt is continually ſhifting place: a tower, for inſtance, on a plain; or a rock in the middle of the ſea; becauſe the one and the other, continually incloſed with new air, or new water, muſt be ſaid to be in motion or to change place.

To ſolve this difficulty, and ward off the abſurdity which follows from Ariſtotle's laying down external place as immoveable, many expedients have been had recourſe to. The Scotiſts contend for place's being only immoveable, by equivalence. Thus, when the wind blows, the air which inveſted

veſted the ſurface of the tower does indeed recede, but then other ſimilar and equivalent air takes place. The Thomiſts chooſe to deduce the immobility of external place, from its keeping the ſame diſtance from the centre, and the cardinal points of the world; and the Nominaliſts, from a correſpondence with certain virtual parts of the divine immenſity.

The Carteſians deny external place to be either a ſurrounding ſurface, or a body ſurrounded, or a mean term between the two; and conceive it to be the ſituation of a body among adjacent bodies conſidered as at reſt. Thus the tower ſhall be deemed to remain in the ſame place, though the ambient air be changed; ſince it retains the ſame ſituation with regard to the neighbouring hills, trees, and other parts of the earth.

Sir Iſaac Newton better, and more intelligibly, diſtinguiſhes place into *abſolute*, and *relative*.

PLACE, *Abſolute*, and *primary*, is that part of infinite and immoveable ſpace which a body poſſeſſes.

PLACE, *Relative*, or *ſecondary*, is the ſpace it poſſeſſes, conſidered with regard to other adjacent objects.

Dr. Clarke adds another kind of relative place, which he calls *relatively common* place; and defines it, that part of any moveable or meaſurable ſpace which a body poſſeſſes; which place moves together with the body.

PLACE, Mr. Locke obſerves, is ſometimes likewiſe taken for that portion of infinite ſpace poſſeſſed by the material world, though this, he adds, were more properly called extenſion.

The proper idea of place, according to him, is the relative poſition of any thing, with regard to its diſtance from certain fixed points; whence we ſay, a thing has or has not changed place; when its diſtance is, or is not altered with reſpect to thoſe bodies.

For the viſion of place, ſee VISION, and VISIBLE.

PLACE, in *Optics*, or *Optical Place*, is the point to which the eye refers an object.

Thus the points D and E (*Plate* XVII. *Optics*, *fig.* 11.) to which two ſpectators in *d* and *e* refer the object C, are called *optic places*.

Here, if a right line joining the optic places D and E, be parallel to a right line paſſing through the eyes of the ſpectators *d*, *e*; the diſtance of the optic places D, E, will be to the diſtance of the ſpectators *d* and *e*, as the diſtance of one of the optic places from the place of the object E C, to the diſtance of the other ſpectator from the ſame object *d* C.

PLACE, *Optic*, of a ſtar, is a point in the ſurface of the mundane ſphere, as C or B (*Plate* XVIII. *Aſtronomy*, *fig.* 4.), wherein a ſpectator in E, or T, ſees the centre of the ſtar S.

This is divided into *true* and *apparent*.

PLACE, *True*, or *real optic*, is that point of the ſurface of the ſphere B, in which a ſpectator, placed in the centre of the earth, ſees the centre of the ſtar, or phenomenon. Or, it is a point among the fixed ſtars, determined by a line drawn from the centre of the earth through that of the ſtar, and terminated in B among the ſtars.

PLACE, *Apparent*, or *viſible optic*, is that point of the ſurface of the ſphere, in which a ſpectator, placed on the ſurface of the earth in E, ſees the centre of the ſtar S. Or, a point C found by a line paſſing from the ſpectator's eye through the ſtar, and terminated in the ſphere of the ſtars.

The diſtance between the two optic places makes what we call the *parallax*.

The *apparent* place, in optics, is different from the *real* one; for when, by refraction through glaſſes, that parcel of rays which falls on the pupil of the eye, from each point of any near object, is made to flow as cloſe together, as that which comes from a diſtant one; or when, by the ſame means, the rays coming from diſtant objects are made to diverge as much as if they flowed from near ones; then the eye muſt neceſſarily ſee the place of the object changed; which change is its apparent place.

If an object be placed nearer to a convex glaſs than is the diſtance of its focus, its apparent place may be determined; but if the object be in the focus of the glaſs the *locus apparens* of the object cannot be determined; only that it will appear vaſtly remote.

Nor can the *locus apparens* be determined if the object be beyond the focus of the convex glaſs; but if the object be farther diſtant from a convex glaſs than its focus, and the eye lie beyond the diſtinct baſe, its apparent place will be in the diſtinct baſe. See LENS.

PLACE *of the ſun*, a *ſtar*, or *planet*, ſimply, denotes the ſign and degree of the zodiac, which the luminary is in.

Or, it is that degree of the ecliptic, reckoned from the beginning of Aries, which the planet's or ſtar's circle of longitude cuts; and therefore it coincides with the longitude of the ſun, planet, or ſtar.

As the ſine of the ſun's greateſt declination 23° 30′: to the ſine of any preſent declination given or obſerved, *v. gr.* 23° 15′ :: ſo is radius 10 : to the ſine of his longitude 80° 52′, which, if the inclination were north, would give 20° 51′ of Gemini, if ſouth, 20° 52′ of Capricorn, for the ſun's place.

PLACE, *Aſtronomical*. See ASTRONOMICAL.

PLACE, *Moon's*, is that point of her orbit in which ſhe is found at any time.

This, by reaſon of the great inequalities in the lunar motions, which render a number of equations and reductions neceſſary before the juſt point be found, is of various kinds.

PLACE, *Excentric*, of a planet in its orbit. See EXCENTRIC, and P, *Plate* XVI. *Aſtron.* *fig.* 148.

PLACE, *Heliocentric*, of a planet. See HELIOCENTRIC, and R, *fig.* 148.

PLACE, *Geocentric*. See GEOCENTRIC, and R, *fig.* 148.

PLACE *of Radiation*, in *Optics*, is the interval, or ſpace in a medium or tranſparent body, through which any viſible object radiates.

PLACE, in *Geometry*, is a line uſed in the ſolution of problems; more uſually called by the Latin name *locus*.

See the doctrine of geometrical places under LOCUS.

PLACE, in *War*, is a general name for all kinds of fortreſſes, where a party may defend themſelves.

In which ſenſe it may be defined to be a place ſo diſpoſed, as that the parts which encompaſs it defend and flank one another.

PLACE, *Strong*, or *fortified*, is a place flanked and covered with baſtions. See FORTIFIED *Place*.

PLACE, *Regular*, is that whoſe angles, ſides, baſtions, and other parts are equal; and this is uſually denominated from the number of its angles; as a pentagon, a hexagon, &c. Palma Nova, built by the Venetians, is a dodecagon.

PLACE, *Irregular*, is that whoſe ſides and angles are unequal.

PLACE *of Arms*, in *Fortification*, is a ſtrong city or town, pitched upon for the chief magazine of an army.

PLACE *of Arms*, in a city or garriſon, is a large open ſpot of ground, uſually near the centre of the place, where the grand guard is commonly kept, and the garriſon holds its rendezvous at reviews, and in caſes of alarm, to receive orders from the governor.

PLACE *of Arms*, of an attack, in a ſiege, is a ſpacious place covered from the enemy by a parapet or epaulement, where the ſoldiers are poſted ready to ſuſtain thoſe at work in the trenches, againſt the ſoldiers of the garriſon. It is cuſtomary to make three places of arms, when the ground will permit; the firſt and moſt diſtant from the place is about three hundred toiſes from the glacis of the covert way; the ſecond is within one hundred and forty toiſes; and the third at the foot of the glacis. See PARALLELS.

PLACE *of Arms particular*, in a garriſon, is a place near every baſtion, where the ſoldiers, ſent from the grand place to the quarters aſſigned them, relieve thoſe that are either upon the guard, or in fight.

PLACE *of Arms without*, is a place allowed to the covert-way, for the planting of cannon; to oblige thoſe who advance in the approaches to retire.

Thoſe places of arms that are in the covered way, are places made at the entering and ſaliant angles, conſiderably larger than the ſtreet of the covered way, and formed by turning the head of the glacis into two faces, projecting towards the country: thoſe at the ſaliant angles are formed by the rounding of the counterſcarp; thoſe at the entering angles are conſtructed by taking the gorges at the head of the glacis of a certain length, drawing the faces at a certain angle, and parallel to thoſe faces drawing a glacis.

PLACE *of Arms*, in a camp, is properly the bell-tents at the head of each company, where the arms are lodged. It alſo denotes a large ſpace at the head of the camp, for the army to be ranged in and drawn up in battalia.

PLACE *of Arms* of a troop or company, is the ſpot of ground on which the troop, or company, draws up.

PLACE, *Face of a*. See FACE.

PLACE, *Tenaille of the*. See TENAILLE.

PLACE, *View of a*. See VIEW.

PLACE, *Fire*. See FIRE-PLACES.

PLACE, among logicians and orators, denotes the ſeat or ſource of an argument; or that from which it is taken.

PLACE is uſed in the doctrine of artificial memory: and theſe places may be either ſuch in a proper ſenſe, as a door, a window, a corner, &c. or familiar and known perſons; or any thing at pleaſure, provided that they be placed in a certain order, animals, plants, words, letters, characters, hiſtorical perſonages, &c. though ſome of theſe are more and ſome leſs fit for the purpoſe; but ſuch kinds of places greatly help the memory, and raiſe it far above its natural power. See MEMORY and MNEMONICS.

PLACE, *Common*. See COMMON *Place*.

PLACE *of Units, Tens, &c.* See UNIT and NUMERATION.

PLACES, *Hylegial*, in *Aſtrology*. See HYLEGIAL.

PLACE, *Whiſpering*. See WHISPERING.

PLACE, *Additions of*. See ADDITION.

PLACE, *Unity of*. See UNITY.

PLACE *Bricks*, were kiln-burnt red bricks of a full ſize, now entirely diſuſed in the metropolis; but in lieu of them, the ſoft inſufficiently burnt bricks from the outſide of the clamps are called, by way of diſtinction from ſtock or hard burnt bricks, place bricks. Theſe are of a foul red colour, and will eaſily break or cruſh to pieces. The particular manner in which place bricks were formerly made was by dipping the mould in water before the clay was put in; which made the outer ſurfaces when burnt very coarſe and hard. See BRICK.

PLACENTA, in *Anatomy*, a vaſcular ſpongy body, containing the ramifications of veſſels from the uterus, and of others from the fœtus, and forming the medium by which the mother and child are connected. See GENERATION.

PLACENTA, in *Natural Hiſtory*, the name of one of the claſſes of the echini marini. The characters of theſe are, that they are of a depreſſed or flatted form, and are wrought in various ſhapes, as the paſtry people make their cakes; they all have a cinquefoil flower at their top, and their mouth is in the middle of the baſe; the aperture for their anus is uſually near the edge.

Of this claſs there are three genera: 1. The melitta. 2. The laganum. And 3. The rotula: which ſee under their ſeveral heads.

PLACENTA, among the *Ancients*, a kind of cheeſe-cake, the moſt ſimple kind of which was made of flour mixed with oil and cheeſe, to which honey was added: but the more luxurious ſort of people added likewiſe a great variety of herbs and fruits, as alſo ſugar, eggs, butter, &c.

PLACENTIA, or PIACENZA, in *Geography*, a city of Italy, and capital of a duchy annexed to Parma, on the S. ſide of the Po. This city was built and colonized by the Romans about 218 years B.C., and not long after, ſerved as an aſylum to the Roman army, when defeated by Hannibal at the Trebia. It was afterwards aſſaulted by that Carthaginian general, without ſucceſs. This city became very flouriſhing and municipal, but it ſuffered much in the troubles that attended the elevation of Otho to the empire; and when attacked by a party of the Vitellians, it effectually reſiſted, and in the bloody conteſt had only to lament the loſs of its amphitheatre, remarkable for its capaciouſneſs and architecture, which was ſet on fire and reduced to aſhes. Placentia, after having frequently changed maſters, was annexed to Parma, and thus remained till the expulſion of the late duke, when, with the whole of its territory, it was occupied by the French. It is a large and well built city. Its cathedral is Saxon; the town-houſe, with ſome other public buildings in the great ſquare, Gothic. Several churches, particularly that of St. Agoſtino, are of fine Roman architecture, and ſome of them adorned with paintings of great celebrity. The great ſquare is ornamented with two braſs equeſtrian ſtatues, one of Alexander Farneſe, and the other of his brother Ranuccio, which are much admired, particularly the former, for attitude, animation, and drapery. The ſtreets of Placentia are handſome, broad, and ſtraight: one in particular, called the Stradone, is reckoned the longeſt and moſt beautiful in Italy, being 3000 feet in length. Placentia is a biſhop's ſee, and contains, beſides the cathedral, 1 collegiate, 12 parochial, and 38 other churches, 8 abbies, 16 convents, and an univerſity. The number of inhabitants is about 20,000, including 2000 eccleſiaſtics. The neighbourhood of Placentia is, perhaps, more intereſting than the town itſelf, as it was the theatre of many bloody engagements. The duchy is about thirty miles long from N. to S., and from 8 to 15 broad from E. to W.; the ſoil is fertile, and furniſhes mines of iron, copper, and vitriol; 52 miles S.E. of Milan. N. lat. 45° 3'. E. long. 0° 43'.

PLACENTIA *Bay*, a ſpacious bay on the S. coaſt of Newfoundland, which forms a good harbour for ſhips, and is frequented by ſhips employed in the cod-fiſhery, and by thoſe that are bound into the gulf or river St. Lawrence. It opens between Chapeau Rouge Point W. and cape St. Mary's on the E., 15½ leagues apart; lying between N. lat. 46° 43' 30" and 47° 54', and between W. long. 54° 1' and 55° 21' 30". The poſt-town, which gives name to the bay, is on the eaſtern ſhore; 67 leagues to the E. of the iſland of Cape Breton, 40 miles W. by S. of St. John's, in N. lat. 47° 15' and W. long. 55° 13'. The harbour is ſo capacious, that 150 ſail of ſhips may lie in ſecurity, and fiſh as quietly as in any river. The entrance into it is by a narrow channel, which will admit but one ſhip at a time. Sixty ſail of ſhips can conveniently dry their fiſh on the Great Strand, which lies between two ſteep hills, and is about three miles long. One of the hills is ſeparated from the ſtrand by a ſmall brook, which runs out of the channel, and forms a ſort of lake, called the Little Bay, in which are caught great quantities of ſalmon. The inhabitants dry their fiſh on what is called Little Strand. The French had formerly a fort called St. Louis, ſituated on a ridge of dangerous rocks, which contracts the entrance into the harbour. In going in the ridge muſt be left on the ſtarboard.

PLACENTIA *Lagoon*, a bay on the coaſt of Yucatan. N. lat. 18° 38′. W. long. 89° 40′.

PLACENTIA *Iſland*, an iſland near the coaſt of Maine. N. lat. 44° 10′. W. long. 68° 10′.

PLACER *de Abraxas*, a rocky iſlet, near the S. coaſt of Cuba. N. lat. 21° 18′. W. long. 80° 52′.

PLACETTE, JOHN DE LA, in *Biography*, an eminent French miniſter and moraliſt, was born at Pontac, in Bearn, in the year 1639. He received the early part of his education under his father, who was miniſter of his native place; and after he had made good proficiency in the claſſics and the belles-lettres, he applied to the ſtudies requiſite to qualify him for the profeſſion of a divine. His firſt ſettlement was with the church of Orthès in Bearn; from which he removed, in about four years, to that of Nay, in the ſame province. Here he continued till the year 1685, when the revocation of the edict of Nantes compelled him to renounce his country for an aſylum among ſtrangers. He now gladly accepted an offer made him by the queen of Denmark, to become paſtor of a French church, which ſhe had founded at Copenhagen. He enjoyed the favour and patronage of that illuſtrious princeſs till her death, in 1711, when he removed into Holland. Here he firſt reſided at the Hague, and afterwards at Utrecht, where he died in 1718, in the 80th year of his age. His works are very numerous, of which ſome of the chief are as follow: "New Moral Eſſays," in 6 vols. 12mo.; "A Treatiſe on Conſcience," which was tranſlated into Engliſh by Baſil Kennet, under the title of "The Chriſtian Caſuiſt;" "A Treatiſe on Oaths;" "A Treatiſe on the Games of Chance;" and "A Compendium of Chriſtian Morality," of which the beſt edition is ſaid to be that of 1701. The character of this writer is thus drawn: "His knowledge was extenſive, his penetration lively, and his judgment calm and diſpaſſionate. His diſpoſition was benevolent, his manners affable, and his charity was extended to Chriſtians of all communions. With great clearneſs of perception, and ſoundneſs of judgment, he has very happily diſentangled and elucidated the moſt intricate and embarraſſed queſtions. Leſs profound than Nicole, and leſs ingenious than Rochefaucault, he will pleaſe good men by his ſolid morality, equally removed from exceſſive rigour and criminal remiſſneſs." His ſtyle, as a writer, is ſimple and equable, though frequently diffuſe. Moreri.

PLACIA, in *Ancient Geography*, a town of Aſia Minor, in Myſia, on the borders of the Propontide, between Panormus to the W., and the mouth of the Rhyndacus to the E. According to Pomponius Mela, and alſo Herodotus, this town was colonized by the Pelaſgi. Cybele was held in great veneration in this place, and as Cyzicus was very near it, the Cyzicanians worſhipped her under the name of the "Mother Placia."

PLACIDE, in *Biography*, a French monk, celebrated as an able geographer, was, probably, born at Paris in the year 1648. He was nearly related to, and pupil of, Peter Duval; and, at the age of 18, embraced the religious life in the convent of the Auguſtinian bare-footed friars, at the Place des Victoires. Here he appears to have made geography the principal purſuit of his life, and drew ſeveral maps and charts that were highly eſteemed, of which the moſt celebrated is that of "The Courſe of the River Po," conſiſting of ſeveral ſheets. On account of his great ſkill and ingenuity in this branch of ſcience, he was, in 1705, appointed geographer in ordinary to the king. He died in 1734, at the advanced age of 86. An engraved likeneſs of this able man is ſometimes to be met with as a frontiſpiece to collections of his maps. But the monks of his fraternity obtained poſſeſſion of the plate, and deſtroyed it, out of reſentment to Placide, who refuſed to ſubmit to their newly adopted faſhion of being ſhaved; and he is repreſented in the engraving as wearing a beard. Moreri.

PLACIDIA, a Roman empreſs, the daughter of Theodoſius the Great, by his ſecond wife Galla. She was born about A.D. 388, and was brought up in the palace of Conſtantinople. When her brother Honorius was ſeated upon the throne of the weſtern empire, ſhe took up her reſidence in Rome, and was in that capital when it was inveſted by Alaric in 408. At the third ſiege and ſack of Rome in 410, Placidia was one of the captives whom the conqueror carried away with him; ſhe was, however, treated with the reſpect due to her rank and ſex. After the death of Alaric, Ataulphus, who ſucceeded him as king of the Goths, refuſed to reſtore her, and at length made propoſals of marriage to her. She ſubmitted, ſays Gibbon, without reluctance to the deſires of the conqueror, a young and valiant prince, who yielded to Alaric in loftineſs of ſtature, but who excelled him in the more attractive qualities of grace and beauty. The marriage of Ataulphus and Placidia was conſummated before the Goths retired from Italy. The bride, attired and adorned like a Roman empreſs, was placed on a throne of ſtate, and the king of the Goths, who aſſumed on this occaſion the Roman habit, contented himſelf with a leſs honourable ſeat by her ſide. The nuptial gift, which, according to the cuſtom of the nation, was offered to Placidia, conſiſted of the rare and magnificent ſpoils of her country. Fifty beautiful youths, in ſilken robes, carried a baſin in each hand, and one of theſe baſins was filled with pieces of gold, the others with precious ſtones of ineſtimable value. Theſe, however, formed an inconſiderable portion of the Gothic treaſures. She brought forth a ſon, who ſoon died, and ſhortly after, in 415, Ataulphus was murdered by one of his domeſtics in Spain. Singeric, who uſurped the Gothic throne, treated Placidia with great ignominy, and obliged her to walk twelve miles before his chariot with a crowd of other captives; but Singeric was aſſaſſinated a few days after his elevation. By a treaty between the Romans and Goths, ſhe was afterwards ranſomed at an immenſe price, and returned to Italy. In 417, her brother Honorius, as a reward for the ſervices of his general Conſtantius, compelled her to give him her hand in marriage. She manifeſted great reluctance to this union, which, nevertheleſs, was productive of a ſon and daughter, named Valentinian and Honoria. Placidia again became a widow in 421, after her huſband had occupied the throne only ſeven months. After this Placidia ſought for herſelf and children a retreat at Conſtantinople, where ſhe was honourably received by her nephew Theodoſius, who granted to Placidia the title of Auguſta, and to her ſon that of Cæſar. In 425, Placidia again recovered her authority, and aſſumed the reins of government, as regent, during the minority of her ſon. Her adminiſtration was not remarkable for wiſdom or vigour, and ſhe has been charged with the deſpicable and criminal policy of corrupting her ſon by a diſſolute education, that ſhe might the longer keep the power in her own hands. At any rate, ſhe ſeems to have governed with abſolute ſway till her death, at the age of 62, in the year 450. She was interred at Ravenna, where her tomb, and even her corpſe ſeated in a cypreſs chair, were preſerved for many ages. This empreſs received many compliments from the orthodox clergy, and St. Peter Chryſologus aſſured her, that her zeal for the Trinity had been recompenſed by an auguſt trinity of children. Univer. Hiſt. Gibbon, vols. v. and vi.

PLACITA, Pleas, a term frequent in our laws and cuſtoms. Originally, placita ſignified certain public aſſemblies of all degrees of men, in which the king preſided, and where the great affairs of the kingdom were conſulted upon.

Theſe aſſemblies were called *placita generalia;* becauſe *generalitas univerſorum majorum tam clericorum quam laicorum ibidem conveniebat.* And hence the decrees, ordinances, ſentences, &c. of this aſſembly, were alſo called *placita.*

Sim. Dunelmenſis tells us, they were held in the open fields; for, ſays he, *nullam oportet regem in literis aſſignare curiam, quia ubi rex judicat in aperto ibi eſt curia ſua.*

Some will have theſe *placita generalia,* and *curiæ regis,* of ancient times, to be much the ſame with what we now call a *parliament.*

The lords courts came hence alſo to be called *placita generalia,* though oftener *curiæ generales;* becauſe all their tenants and vaſſals were obliged to appear in them.

We alſo meet with *placitum nominatum,* for the day appointed a criminal to appear in, and make his defence. Leg. Hen. I. And *placitum fractum, i. e.* when the day is lapſed.

Lord Coke derives the word *placitum à placendo, quia beneplacitare ſuper omnia placet:* indeed, this ſeems a very fanciful etymon; and others have more reaſon in deriving the word from the German *platz,* or the Latin *plateis, fields,* or *ſtreets,* where theſe aſſemblies were originally held.

PLACITARE, in the old *Law Books,* ſignifies to plead cauſes. See Pleading.

"Mos placitandi, ante Conquæſtum, fuit coram aldermanno, et proceribus, et eorum hundredariis, ſc. baronibus, majoribus, melioribus, ſenioribus, et urbanis." Miſc. in Bibl. Cott. ſub. tit. Vitellius.

Hence, *placitator, a pleader.* Ralph Flambard is recorded to have been *totius regni placitator,* in William II.'s time.

PLACITUM, in *Law,* a ſentence of the court; or an opinion, ordinance, or decree.

Cuſtos Placitorum *coronæ.* See Custos.

PLACKET, or Plaquette, in *Commerce,* a ſmall ſilver coin of the Netherlands, of 3½ ſtivers current. The old plaquettes have been reduced to 2½ ſtivers. The aſſay of the placket is W. (worſe than the Engliſh ſtandard) 5 oz. 8 dwt.; its weight, 1 dwt. 18 gr.; its contents in pure ſilver grains, 20: and its value in ſterling, 0*s.* 2¾*d.*

PLACODIUM, in *Botany,* from πλακωδης, *broad and cruſtaceous,* a diviſion of the natural order of *Lichenes,* as firſt diſtributed by Hoffmann, and conſtituting the fourth ſection of his ſeventh genus, *Lobaria.* It compoſes the ſecond tribe in the *Prodromus* of Acharius, but has no part in the ſubſequent arrangement, publiſhed in his *Methodus.* See Lichenes.

PLACUS, from πλακους, *a cake,* becauſe the inhabitants of Cochinchina uſe the fragrant juice of the genus in queſtion, as an ingredient in cakes.—Lour. Cochinch. 496.—Claſs and order, *Syngeneſia Polygamia-ſuperflua.* Nat. Ord. *Compoſitæ nucamentaceæ,* Linn. *Corymbiferæ,* Juſſ.

Gen. Ch. Common calyx imbricated, inverſely turbinate, ſcales linear, ſlender, erect. *Cor.* compound, equal to the calyx, erect; *florets* of the diſk few, all perfect, tubular, five-cleft; thoſe of the circumference very numerous, naked. *Stam.* (in the perfect florets) Filaments five, very ſhort; anthers forming a cylindrical tube. *Piſt.* (in all the florets) Germen oblong; ſtyle thread-ſhaped, ſhort; ſtigmas two, oblong, erect in the perfect florets, reflexed in the female ones. *Peric.* none, except the unchanged calyx. *Seed* to each of the florets oblong, moſt ſlender in the female ones; down capillary. *Recept.* naked, convex.

Eſſ. Ch. Receptacle naked. Down capillary. Calyx imbricated, inverſely turbinate, with linear ſcales. Florets of the radius without a corolla.

1. P. *tomentoſus.* Lour. n. 1.—Leaves ovate, obtuſe, downy on both ſides.—Found wild, as well as cultivated, in Cochinchina. *Stem* herbaceous, two feet high, erect, branched. *Leaves* alternate, ſeſſile, ſerrated, odoriferous. *Flowers* violet, in terminal, erect, oblong panicles.

2. P. *lævis.* Lour. n. 2.—Leaves ovate, pointed, ſmooth. Native of the ſame country.—*Stem* not quite ſo tall, ſmooth. *Flowers* pale yellow, in ſhort terminal panicles. *Calyx* tumid at the baſe. We know nothing of theſe plants but from the account of Loureiro. See Elichrysum, Gnaphalium, and Erigeron.

PLADAROTIS, from ϖλαδαρος, *fluid,* in *Surgery,* a fungous tubercle upon the inſide of the eye-lid.

PLADIA, or Bladia, in *Geography,* a town of Pruſſia, in the province of Natangen; 22 miles S.W. of Konigſberg.

PLADLING, a town of Bavaria, ſituated on the Iſer; 8 miles N.W. of Oſterhofen.

PLAFOND, or Platfond, in *Architecture,* the ceiling of a room, whether it be flat or arched; lined with laths and plaſter, and ſometimes alſo enriched with paintings, &c. See Ceiling.

Plafond is alſo more particularly uſed for the bottom of the projecture of the larmier of the corniche; called alſo the ſoffit.

PLAGALIS, Lat. ϖλαγιος, *obliquus, à latere.* Plagal and authentic, in the eccleſiaſtical modes, or canto fermo, imply the different diviſions of the octave: the diviſion is called *authentic,* when the 5th is in the acute; and *plagal,* when the 4th is in the grave. (See Plain Chant, and Modes, *Eccleſiaſtical.*) The terms *authentic* and *plagal* are with reaſon cenſured by Meibomius and Bontempi as barbarous. Bontempi propoſes, inſtead of the word *authentic,* to ſubſtitute *principal;* and for *plagal, relative* or *collateral.* Theſe diſtinctions in the Romiſh church are ſimilar to the diſcriminations made by the Greek muſical writers where they claſs their modes under the denominations of *principal* and *ſubordinate,* with the diſtinction of *hyper* and *hypo.* It is not ſurpriſing that the primitive Chriſtians ſhould give Greek names to the ſpecies of octaves in imitation of the Greek modes; nor, if we reflect on the ſimplicity that was aimed at, and the humble ſtate of thoſe who firſt employed muſic in their religious worſhip, ſhall we wonder at the incorrect and artleſs manner in which it was done. How the Roman church acquired Greek terms in canto fermo it is eaſy likewiſe to imagine, if we recollect that it was a preſent from Greek fathers: and Gregory, in reforming the maſs, not only retained theſe Greek terms, but adopted others, both from the Greek and Hebrew languages and ceremonies, in order to conciliate parties, and acquire converts: as *Kyrie Eleïſon* from the Greek, and *Hallelujah* from the Hebrew.

PLAGIANTHUS, in *Botany,* ſo called by Forſter, from πλαγιος, *oblique,* and ανθος, *a flower,* becauſe of the oblique diſpoſition of the petals, which gives the flower an irregular appearance.—Forſt. Gen. t. 43. Schreb. 459. Willd. Sp. Pl. v. 3. 719. Mart. Mill. Dict. v. 3. Juſſ. 274.—Claſs and order, *Monadelphia Dodecandria.* Nat. Ord. *Columniferæ*, Linn. *Malvaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth ſimple, of one leaf, inferior, bell-ſhaped, with five ſmall acute ſegments. *Cor.* Petals five, obovate, rounded, with claws, two of them folding over each other, at a diſtance from the reſt. *Stam.* Filaments united into a cylinder, the length of the petals; anthers about twelve, ovate, crowded about the top of the cylinder. *Piſt.* Germen ſuperior, ovate, very ſmall; ſtyle thread-ſhaped, concealed within the tube of the ſtamens; ſtigma club-ſhaped. *Peric.* Berry . . . . *Seeds* . . . .

Eſſ. Ch. Calyx ſimple, five-cleft. Petals five; two of them together, remote from the reſt. Style one. Stigma club-ſhaped. Berry . . . .

1. P. *divaricatus.* Forſt. Prodr. 47. Willd. n. 1.—Found by Forſter in New Zeeland.—A *ſhrub*, with alternate, ſmooth, ſlender *branches*, clothed with a ſmooth, ſhining, purpliſh-brown bark. *Buds* alternate, of two or three brown membranous ſcales. *Leaves* three or four from each bud, linear, ſomewhat obovate, bluntiſh, with a little point, entire, ſmooth, about half an inch long; tapering at the baſe, but ſcarcely ſtalked. *Flowers* ſolitary, adjoining to the leaf-buds, whitiſh, each on a recurved ſmooth *ſtalk*, not half the length of the leaves. We have, like Willdenow, merely ſeen one of Forſter's dried ſpecimens. Nothing can bear much leſs reſemblance to a malvaceous plant, except that the inner bark ſeems fibrous. Willdenow moſt truly remarks that this genus has nothing in common with *Connarus*, to which it ſeems, by a manuſcript note of the younger Linnæus, ſome great botaniſts had referred it.

PLAGIARA, or Plagiaria, in *Ancient Geography*, a town of Spain, in Luſitania, upon the route from Oliſipo to Emerita, between Emerita and Budua, according to the Itinerary of Antonine.

PLAGIARY, in *Philology*, *Author-theft*; or the practice of purloining other people's works, and putting them off for a man's own.

Among the Romans, *plagiarius* was properly a perſon who bought, ſold, or retained a freeman for a ſlave; ſo called, becauſe the Flavian law condemned ſuch a perſon *ad plagas*, to be whipped.

Thomaſius has an expreſs treatiſe *de plagio literario*; wherein he lays down the laws and meaſures of the right which authors have to one another's writings. Dictionary writers, at leaſt ſuch as meddle with arts and ſciences, ſeem in this caſe to be exempted from the common laws of *meum* and *tuum*; they do not pretend to ſet up on their own bottom, nor to treat the reader at their own coſt. Their works are ſuppoſed, in great meaſure, compoſitions of other people; and whatever they take from others, they do it avowedly. In effect, their quality gives them a title to appropriate every thing that may be for their purpoſe, wherever they find it, and they do no otherwiſe, than as the bee does, for the public ſervice.

Their occupation is not pillaging, but collecting contributions; and if you aſk them their authority, they will produce you the practice of their predeceſſors of all ages and nations.

PLAGIAULUS, Πλαγιαυλος, among the *Ancients*, a kind of flute.

PLAGIOPLATEUS, in *Natural Hiſtory*, a term uſed by Artedi and others, to ſignify depreſſed, in oppoſition to the term cathetoplateus, which ſignifies compreſſed.

PLAGIUM, in *Civil Law*, the offence of ſpiriting away and ſtealing men and children: whence the offenders were called plagiarii, and were puniſhable with death. See Kidnapping.

PLAGIURI, in *Natural Hiſtory*, the name of one of the great claſſes, or families of fiſh: the characters of which are, that the tail is placed horizontally; they reſpire by means of lungs, and have uſually a double fiſtule in the head; they are viviparous, and the males have a penis and teſtes, the females the vulva, ovaria, mammæ, &c. and they bring up their young with milk.

The term is derived from the Greek πλαγιος, *tranſverſe*, and ουρα, *a tail.*

Under this claſs of fiſh are comprehended the following genera: the phyſeter, delphinus, balæna, monodon, catodon, and trichechus; which ſee under their reſpective articles.

PLAGUE, λοιμος, *Peſtis*, in *Medicine*, called alſo *peſtilence*, *peſtilentia*, *peſtilitas*, a term which has been applied to various epidemic and fatal diſeaſes, but is now limited by phyſicians to a contagious and malignant fever, which is accompanied by buboes and carbuncles.

Some correſponding appellation is to be found in all languages by which an extenſive and deſtructive malady of this kind is deſignated. There is little doubt, however, that theſe raging epidemics have conſiſted of different maladies in different inſtances; having been ſometimes the remittent fever originating from marſh effluvia, ſometimes the true plague, and ſometimes perhaps the ſmall-pox, or ſcarlet fever; occaſionally, too, even the *ignis ſacer*, or epidemic land-ſcurvy, the reſult of a dearth of nutriment, appears to have been denominated peſtilence. (See Ignis *Sacer.*) In many inſtances, the plagues deſcribed by hiſtorians are only depicted by the extent of the mortality and miſery which they carried with them, and their peculiar ſymptoms are not detailed; ſo that it is impoſſible to aſcertain the nature of the malady itſelf. And in ſome caſes, though the phenomena of the diſeaſe are partially deſcribed, yet the general deſcription is obſcure and doubtful. Such is the character of the ſtriking hiſtory of the plague at Athens, which has been left by Thucydides: it ſeems to be ſufficiently diſtinct to prove that that epidemic was not the true plague; ſince the glandular ſwellings were not among the ſymptoms. The deſcription of the ſtate of the ſkin, indeed, impreſſes the notion of ſmall-pox, rather than of any other contagious diſeaſe; for it is ſaid to have been "reddiſh or livid, with an eruption of *ſmall puſtules and ſores.*" (φλυκταίναις μικραῖς καὶ ἕλκεσιν ἐξηνθηκος. Thucyd. lib. ii. § 49.) But ſome of the ſymptoms apparently belong to the *ignis ſacer.* Lucretius has given a poetical tranſlation of this hiſtory of the plague, as detailed by Thucydides. (Lib. vi.) Some of the plagues mentioned by Livy, as occurring among the Romans, do not appear to have been accompanied by the glandular tumours and carbuncles of the true plague.

In more modern times, the various forms of peſtilence have been ſomewhat more accurately diſtinguiſhed; and during the fifteenth, ſixteenth, and ſeventeenth centuries, various countries both of Europe and Aſia have been afflicted with the viſitations of the true plague; ſo that its form and character have been but too well recognized. We ſhall endeavour to collect into one view the various appearances which it exhibits.

The noſological definition of the plague given by Dr. Cullen, is "a typhus fever, in the higheſt degree contagious, and accompanied with extreme debility. On an uncertain day of the diſeaſe there is an eruption of buboes or carbuncles." (Noſol. Method. Gen. 30.) On the whole, this brief character of the diſeaſe is as correct as any that can be given; for, in fact, the diſeaſe varies greatly in its appearances in different inſtances; inſomuch that even fever is by no means invariably preſent; and in the more fatal caſes of plague, death terminates its courſe, before a ſufficient time has elapſed to admit of the formation of buboes and carbuncles.

It is not eaſy to give a general hiſtory of the ſymptoms of the plague; becauſe, in its different degrees of violence, its courſe and character exhibit very material variations. Hence it has been the practice of almoſt all the phyſicians, who have publiſhed their obſervations on the diſeaſe, to divide the congeries of ſymptoms into ſeveral claſſes: the phyſicians of Marſeilles deſcribed five ſpecies of the malady, and Dr. Ruſſell divided it into ſix; while Lange, Orræus, and others, ſpeak only of three types which it aſſumed, or three degrees of violence, the mild, ſevere, and malignant.

The general derangement of the ſyſtem, which uſhers in an attack of the plague, is much like that which commences the courſe of ordinary fever. A ſenſe of cold, with ſome ſhivering, which is ſoon followed by heat, and acceleration of the pulſe, with giddineſs, head-ache, depreſſion of ſtrength and ſpirits, white tongue, vomiting, or diarrhœa, and great oppreſſion about the præcordia, are among the firſt ſymptoms of the diſeaſe. Theſe are ſucceeded by a burning pain about the pit of the ſtomach, by a peculiar muddineſs of the eyes, by coma, delirium, and other affections of the ſenſorium, which terminate by death in ſome caſes on the ſecond or third day, before the pathognomonic ſymptoms, buboes, and carbuncles, have appeared; but which, in others, continue to increaſe, while theſe morbid changes enſue, together with purple ſpots and ecchymoſes, which belong to the plague, in common with other malignant fevers. Without attempting a deſcription of the different claſſes of the plague as ſubdivided by the writers above-mentioned, we ſhall follow the laborious Dr. Ruſſell through ſome of his remarks on the particular ſymptoms, as he obſerved the diſeaſe at Aleppo.

The fever is preſent at one ſtage or other of the plague with very few exceptions, though it differs materially in its degree, duration, and ſymptoms, in different individuals. It is uſually preceded by a wearineſs and a confuſion of head, which becomes a ſevere pain as the fever advances. The cold ſtage is ſhort, and leſs marked than in an intermittent; but the changes in the ſucceeding hot fit are ſudden, anomalous, and alarming. Nauſea and vomiting frequently occur from the beginning; but theſe ſymptoms are abſent in a large proportion, even in caſes which terminate fatally. Indeed in many the attack is ſcarcely to be diſtinguiſhed from that of ordinary fevers before the ſecond night, unleſs where buboes and carbuncles ariſe within the firſt twenty-four hours. Although theſe remove all doubts about the nature of the fever, they do not, however, afford any certain prognoſis of the event of the diſeaſe. In ſome caſes clear remiſſions occur on the ſecond or third day; but in general the changes from better to worſe are frequent in the courſe of the firſt twenty-four hours, and more ſudden and various than in common fevers. The diſeaſe in moſt caſes advances with extreme rapidity, inſomuch that the patient on the ſecond or third day is often in point of debility, diſorder of the ſenſes, and of the vital functions, reduced apparently to the condition of one in the laſt ſtage of a malignant fever; yet to this deſperate ſtate will ſucceed a remiſſion, in which his ſenſes and intellectual faculties are reſtored, and weakneſs only ſeems to remain. Nevertheleſs, theſe remiſſions, when occurring early in the diſeaſe, or when not preceded by a ſweat, are often ſhort and fallacious: but when they follow a perſpiration on the third day or later, and are of ſome hours continuance, they afford hopes of a favourable iſſue.

Delirium in the plague ſeldom becomes ſo violent and phrenitic, as in ſome other fevers. It ſometimes comes on the firſt night, but in general not before the ſecond; and is higheſt in the febrile exacerbations. Sometimes delirium alternates with coma, which laſt is in general a more dangerous ſymptom, but moſt particularly ſo when it comes on early, and does not abate in the remiſſions.

The change in the *eyes*, which has been deſcribed as a *muddineſs*, is extremely remarkable. It ſometimes takes place on the firſt day, but more commonly on the ſecond or third, and remains till ſome favourable turn of the diſeaſe occurs. "It reſembled ſomewhat the dull fixed eye obſervable in the laſt ſtages of malignant fevers, but the dullneſs was different, muddineſs and luſtre being ſtrangely blended together:" and Dr. Ruſſell adds, that it contributed much to that confuſion of countenance, which enabled him, after a little experience, to pronounce with tolerable certainty on the exiſtence or nonexiſtence of the plague. The *tongue* very often retains its natural appearance; and where it change its colour, it becomes only white, and remains moiſt, ſeldom becoming parched, and never putting on ſo thick a fur, or aſſuming ſo dark a colour, as in the advanced ſtages of ſome other fevers. The *pulſe* is generally low, quick, and equal; and in the latter ſtages it becomes exceedingly quick and ſmall, eſpecially during the exacerbations, ſo as to be ſcarcely perceptible; yet in ſome caſes, when the diſeaſe is conſiderably protracted, and other ſymptoms denote much diſorder, the pulſe varies little from its natural ſtate. In fact, the variations of the pulſe are often quite incongruous with the other ſymptoms. The reſpiration is little diſordered, except in the advanced ſtage: there is no fætor of the breath, nor cough; but there is an extreme anxiety and oppreſſion about the præcordia, which produce great inquietude, and where they come on early, always dangerous ſymptoms. They are often accompanied by a pain and diſtreſſing ſenſe of heat in the epigaſtrium, probably connected with the ſtomach, and rather increaſed than relieved by the vomiting.

The functions of the brain and nerves are particularly affected by the attack of the plague; ſo that a ſudden and extreme proſtration of ſtrength belongs to the diſeaſe under all circumſtances, and is, in fact, the moſt marked characteriſtic of its ſevere and fatal forms; the vital principle appearing to be ſuddenly as it were extinguiſhed, or ſo enfeebled at once as to be incapable of reſiſting the violence of the diſorder.

Vomiting did not occur in a very large proportion of the ſick at Aleppo: but where it appeared at the beginning, and continued with ſhort intervals, it generally denoted a fatal termination. The matter ejected from the ſtomach was various at the beginning, it was only the ordinary contents of the viſcus; but after repeated reachings, bile commonly followed. Dr. Ruſſell did not obſerve any fetid diſcharges from the ſtomach; but a blackiſh liquor ſometimes came off in the laſt ſtage of the diſeaſe. A diarrhœa began ſometimes on the firſt day, but more commonly in the advance of the complaint, and was generally conſidered as a dangerous ſymptom; but the ſtools were leſs offenſive than thoſe in tertian fevers in the ſame climate. Sometimes dark coloured blood was diſcharged by ſtool unmixed with fæces, and without griping pains. As a looſeneſs of the bowels was generally detrimental; ſo, on the other hand, a ſtate of coſtivineſs was attended with no harm or inconvenience.

But the peculiar and characteriſtic ſymptoms of the plague, as before ſtated, are the *buboes* and *carbuncles*, the former being obſerved in almoſt all thoſe patients who are not carried off too rapidly to admit of their formation. The carbuncles, however, do not occur in more than one-third of the caſes of plague, and very rarely exiſt alone, being generally conjoined with buboes. Buboes occur in the glands of the groin and arm-pits, and alſo in the parotid, maxillary, and cervical glands; but thoſe of the groin are moſt frequently affected.

The inguinal peſtilential bubo ſometimes appears in the ſame place as the ordinary venereal tumour, but is commonly ſituated lower in the thigh. A burning and ſhooting pain is often felt in the part before any ſwelling is perceptible by the finger; but when once diſtinguiſhable, the gland is always painful on preſſure. In the incipient ſtate of the bubo, a ſmall, hard, round tumour is felt under the finger, moveable under the ſkin, ſoft, and of its natural colour; but as the ſwelling increaſes, it aſſumes more of an oblong form, becomes leſs moveable, and the integuments become thickened and tumid. In ſome caſes the ſwelling is acutely painful, in others obtuſely ſo, and its progreſs is not leſs variable. The ſkin is ſeldom inflamed in any degree during the firſt week, though tenſe and painful; ſo that in the fatal caſes, it generally retains the natural colour; indeed, unequivocal ſigns of the tendency to ſuppuration ſeldom occur till the fever abates, and is manifeſtly on the decline, as about the eighth or ninth day; the external inflammation then advances, the ſwelling becomes ſofter, and breaks between the fifteenth and twenty-ſecond day, when treated ſimply with poultices. Thoſe buboes which do not terminate in ſuppuration, uſually diſperſe gradually, and diſappear altogether in the ſecond month: ſome of the inguinal tumours, however, remain hard and indolent for a longer time.

In a very large proportion of thoſe who are attacked by the plague, the buboes begin to appear on the firſt day of the diſeaſe; ſometimes they are even the very firſt ſymptom of infection; and ſometimes they do not ariſe until the third day, or even later. Sometimes there is a ſucceſſion of two or three buboes in the ſame patient.

The *anthrax*, or *carbuncle*, which is not unfrequently conjoined with the bubo, appears under ſome variety of form. Dr. Ruſſell has deſcribed five, Dr. Gotwald (who ſaw the plague at Dantzic) four, and others three varieties of this peſtilential ſore. In different inſtances, it commences in the form of an inflamed puſtule, of various ſize and colour, or of an angry pimple, tubercle, or ſlightly elevated red or livid ſpot; and inſtead of ſuppurating kindly, it becomes black, and forms a gangrenous eſchar, ſurrounded by an inflamed and tumid margin. The part is affected with a pricking and burning pain. Dr. Bancroft obſerves, that when carbuncles appear very early, they aſſume a dark brown or black colour, and remain forty-eight hours or more without being circumſcribed by an inflamed margin: they generally indicate the greateſt danger. Moſt commonly, however, they appear only in the advanced ſtages; and where ſeveral occur in the ſame ſubject, they generally appear in quick ſucceſſion. They are ſeated in different inſtances, on every external part of the body, even on the ſcrotum, and on the eye-brows; and when they concur with buboes, they uſually appear on the ſame ſide of the body: ſometimes, however, the carbuncles and buboes appear on the oppoſite ſides. Sympathetic buboes occaſionally ariſe in conſequence of carbuncles; but they are leſs intenſely painful than primary buboes, and diſperſe when the carbuncles ſuppurate kindly.

Some other eruptive appearances occur during the plague, which are among the ſymptoms of all malignant fevers: theſe are eſpecially *petechiæ* and *vibices*, or purple dots and blotches; ſome of them reſembling in ſize and appearance the marks of flea-bites, and ſome the ſtripes and bruiſes of a whip. In ſome caſes, a ſort of marbled appearance of the ſkin takes place, or the ſurface is diſcoloured by narrow ſtreaks of a brown, purpliſh, red, or livid colour. Moſt of theſe appearances, which are obviouſly of a petechial nature, were vulgarly called *tokens* in the plagues of London; being conſidered, and not unjuſtly, as commonly betokening the approach of death. Some of theſe indeed ſeem, from the deſcription given by Dr. Hodges, to have been elevated, as if blood had been effuſed under the cuticle. "The *tokens*," he ſays, "were of various ſizes, ſometimes as ſmall as a pin's head, ſometimes larger, and as broad as a ſilver penny. Some were depreſſed, others prominent. They differed alſo in their degrees of hardneſs, ſome being eaſily penetrable by a needle or a pen-knife, &c. They were not all of the ſame colour, but often bore ſo ſtrong a reſemblance to warts, that they were often miſtaken for them, not only by the vulgar, but even by the ſurgeons; and the author himſelf was ſometimes obliged to have recourſe to the needle for diſtinguiſhing them. A quick ſenſibility was a good ſign, and thoſe which went no farther than the ſkin would often ſlough off; whereas when they went deeper, they were deemed dangerous, eſpecially when the part loſt its feeling, and threatened ſphacelation." (Hodges, Loimologia, p. 133.) The ſame excellent author deſcribes another peſtilential eruption; thoſe of this kind were popularly called *blains*, and were a ſort of blebs or *bullæ*, containing ichor or ſerum. Theſe, he ſays, were "veſications of ſize from a pea to a nutmeg, encompaſſed with a variegated circle, generally reddiſh. They aroſe with exquiſite and ſhooting pain, and contained an ichor of a yellowiſh or ſtraw colour, which was ſo acrid or cauſtic, that it ſoon corroded the veſicle, and burſt out, of a colour yellowiſh, livid, or black. Theſe puſtules broke out in many parts of the body, their ſtation and number being uncertain; ſometimes few, ſometimes many: in one caſe, the whole body was covered all over with them." (Loc. cit. p. 110.) In the directions publiſhed by the College of Phyſicians for the ſearchers, the latter are ordered to examine "whether there be any blains which may riſe in any part of the body in form of a bliſter, much bigger than the ſmall-pox, of a ſtraw colour or livid colour, which latter is the worſer; either of them hath a reddiſh circuit, ſomething ſwollen, round about it; which circuit remains after the bliſter is broken, encompaſſing the ſore." See Certain neceſſary Directions, by the King's ſpecial Command, Lond. 1665.

Such are the ſymptoms which characterize the formidable malady, the plague. In different caſes, they are of courſe variouſly combined, and aſſume various degrees of violence, according to the age, ſtrength, and conſtitution of the patient. They differ alſo materially according to the ſeaſon, and to the particular period of the epidemic; inſomuch that the proportion of fatal caſes, among thoſe who are attacked at different periods of its prevalence, varies greatly. But the fatality of the diſeaſe is greater in general than that of any other malignant fever, and cuts off the majority of thoſe whom it ſeizes, from two to ſeven days from its attack. All ages and conditions, every variety of conſtitution, ſtrong and feeble, and both ſexes under every circumſtance, are liable to the infection; which, during thoſe particular ſeaſons in which it has become epidemic, has therefore

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committed the moſt dreadful deſtruction in the population of thoſe towns and diſtricts, which it has unhappily viſited.

It may ſeem extraordinary that the origin of a diſeaſe, which has in all ages been the ſcourge of mankind, ſhould have been always the ſubject of doubt, or at leaſt of much difference of opinion. It is, however, to this day diſputed, whether the plague be propagated by contagion or not; and it muſt be admitted that there are ſome difficulties attending either ſuppoſition. A ſimilar diſcuſſion, indeed, has been carried on, with ſome acrimony, reſpecting the epidemics of our own times, eſpecially reſpecting the yellow fever of the Weſt Indies and America; and ſome even diſputed the nature of the fever, which ſpread ſo extenſively and fatally among our troops in the recent expedition to Walcheren. The moſt intelligent writers, however, concur in aſcribing epidemic diſeaſes to two ſources; namely, to the miaſmata or effluvia of marſhes, and to contagion, or the exhalations and ſecreted matter from the bodies of perſons diſeaſed. To the former ſource, marſh effluvia, the intermittent and remittent fevers, which are endemic in particular diſtricts at certain ſeaſons of the year, and often extenſively prevalent and fatal, are generally aſcribed; and they are diſtinctly traceable to certain combinations of heat and humidity acting upon vegetable and animal ſoils. (See EPIDEMIC.) Hence in the autumnal ſeaſon, flat, marſhy countries, the ſeat of camps and other large congregations of men, and the uncleanly parts of crowded cities, have generally been obſerved to be productive of intermittent and remittent fevers. (See HEALTH *of London.*) Now ſome of theſe circumſtances alſo concur in favouring the propagation, if not in giving origin to the plague; whence the difficulty of admitting the contagious ſource of the latter has ariſen. It has alſo been ſtated, as an objection to the opinion that the plague is propagated by contagion, that, in many places, the diſeaſe is ſeldom entirely abſent; yet that it rages epidemically and fatally only at particular times. Thus, it is collected from the bills of mortality of London, that, although there were but four great plague-years in this metropolis during the ſeventeenth century, namely, the years 1603, 1625, 1636, and 1665, (in the two firſt of which about 35,000, and in the laſt 68,000 died,) yet that there were but three years, from the commencement of the bills of mortality in 1603 until 1670, which were entirely free from the plague. In many of theſe intermediate years, indeed, the mortality of the diſeaſe was very conſiderable: for the bills exhibit 900 deaths by the plague, in 1604; 400, in 1605; 2000, in 1606; the ſame in the two following years; and even ſo late as from 1640 to 1648, the number every year exceeded 1000. (See Dr. Heberden's Treatiſe on the Increaſe and Decreaſe of different Diſeaſes, p. 75.) Diemerbroeck remarks, in his excellent Treatiſe on the Plague, that whenever the plague has been excited out of its proper ſeaſon, it has not ſpread; and it has been obſerved by Dr. Ruſſell, that, in winter time, when infected perſons have come to places about Aleppo, ſome of whom have died of the diſeaſe in the families where they lodged, the diſtemper was not by ſuch means propagated. Dr. Hodges has alſo ſtated, in a ſtrong point of view, the total freedom from infection experienced by thoſe perſons, who had fled from London during the ravages of the plague, in the autumn of 1665, when they returned in the winter to the houſes and beds in which their friends had died of the malady, without any previous purification having been made of the very linen and clothes which they had uſed. See his Loimologia.

It is likewiſe an indubitable fact, that the plague has always firſt appeared and eſtabliſhed its head-quarters in the filthieſt parts of crowded, ill-conſtructed, and large cities, and has committed its moſt fatal ravages among the loweſt of the people. Thus at Grand Cairo and Conſtantinople it appears almoſt annually. Blackmore takes notice that the impurity and filth, connected with the galleys and ſlaves at Marſeilles, filled the air with offenſive ſmells, eaſily perceivable by thoſe that paſſed along the adjoining ſhore; and in 1720 the plague broke out there, in a part of the town thronged by the pooreſt people. In London, Dr. Heberden obſerves, the plagues of 1626 and 1636 broke out at Whitechapel, a part of the town which abounded with poor and with ſlaughter-houſes: that of 1665 is ſaid to have broken out firſt at St. Giles's; and there it would probably break out again, if ever we ſhould ſuffer ſuch another calamity. Hodges affirms, that in 1665 the diſeaſe was ſo much more prevalent among the lower claſſes, that it acquired the appellation of the *poor's plague.*

All theſe facts, however, when taken into conſideration, along with the more poſitive evidence in favour of the actual contagion of the plague, perhaps tend only to prove that the human body is more prediſpoſed to be acted upon by the contagion, under certain circumſtances, which materially influence the ſtate of the conſtitution. It muſt be admitted, indeed, as a matter of daily obſervation, that a certain prediſpoſition of the body is requiſite for the production of all diſeaſes, and for the operation of contagion in particular: otherwiſe it could not happen that great numbers ſhould eſcape during the whole reign of an epidemic; that at different ſeaſons of the year, one and the ſame cauſe (a chill, for inſtance, or an act of intemperance) ſhould produce very different diſeaſes, a catarrh, a cholera, or a bilious fever. A particular ſtate of the air is, in fact, abſolutely neceſſary for the propagation of the contagion of the plague; for it is only during a ſeaſon of moderate heat that it has ever been obſerved to prevail extenſively. In Europe it has invariably raged moſt violently and fatally in the ſummer and autumnal months, eſpecially in September. Thus in the plague of London in 1665, the deaths from the plague were, in June, 590; in July, 4129; in Auguſt, 20,046; in September, 26,230; in October, 14,373; in November, 3449; and in December, they were under 1000. (See the Bills of Mortality.) The cold weather of northern climates has invariably been obſerved to check the ravages of the plague. On the contrary, however, the extreme heat of ſouthern latitudes is equally adverſe to the propagation of the contagion; ſo that the diſeaſe is, in fact, unknown in tropical climates. In Egypt and Syria, its progreſs is always ſuſpended during the hotteſt months of the year. (See Ruſſell on the Plague, and Bancroft on Yellow Fever, p. 579.) "But a proper ſtate of the air," to uſe the words of Dr. Heberden, "is not the only circumſtance neceſſary to promote the operation of contagion. During the epidemical conſtitution, it is highly probable that good diet, and good ſpirits, and cleanlineſs, and freſh air, and proper clothing, and exerciſe, may all contribute to render the body leſs ſuſceptible of diſeaſe; the ſeeds of which, like thoſe of vegetables, will then only ſpring up and thrive, when they fall upon a soil convenient for their growth." (On the Increaſe and Decreaſe of different Diſeaſes, p. 68.) Theſe obſervations are corroborated by the fact, univerſally obſerved during the prevalence of the plague, that the principal ravages are committed upon the lower claſſes of the people; and they are perhaps farther confirmed, by the frequent occurrence of peſtilence in combination with dearth and famine, according to the general teſtimony of hiſtorians, during which the people are not only ill-fed, but ill ſupplied with fuel, clothing, and other healthful accommodations, and alſo diſpirited in the extreme.

Dr. Bancroft has collected ſome facts and teſtimonies which concur in pointing out the circumſtances which induce a prediſpoſition in the body to receive the contagion of the plague, or to reſiſt its influence. He quotes Dr. Pugnet's opinion, that the ſuſceptibility of a perſon for the contagion is greatly increaſed by a moderately warm and moiſt atmoſphere; that children, females, and perſons of delicate feeble conſtitutions, are moſt apt to become infected; and that thoſe who are naturally robuſt and vigorous ſeldom take the diſeaſe, unleſs weakened by exceſſive fatigue, watching, exceſſive venereal indulgence, or intoxication. Dr. Deſgenettes remarks, that the plague ſeemed more particularly to attack thoſe who are expoſed to ſudden tranſitions from a hot to a cold atmoſphere, and *vice verſâ*, ſuch as bakers, cooks, and blackſmiths; and that men addicted to exceſſes with women and ſpirituous liquors, very ſeldom recovered from the diſeaſe.

Dr. Bancroft has alſo adduced ſome obſervations, made by himſelf, in proof of the influence of atmoſpheric heat and cold, in both their extremes, in rendering the contagion dormant, or in ſuſpending that ſuſceptibility or affinity of the human body, without which it cannot produce diſeaſe in ordinary circumſtances. Peſtilential contagion, he obſerves, probably exiſts at all times in Lower Egypt, Syria, and many of the great cities of the Levant, and it is frequent on board Turkiſh and Greek veſſels. When he was in Egypt, he remarked, that the obvious effect of heat in leſſening the ſuſceptibilities of individuals, or their aptitudes for taking the diſeaſe, was moſt evident in thoſe who had lately arrived from cold climates, and who were comparatively moſt affected by the ſummer's heat; and aſcribed his own eſcape, at that time, to that circumſtance. "There were, however, perſons in Egypt," he adds, "who had been long accuſtomed to greater degrees of heat, and who were therefore not rendered inſuſceptible of the diſeaſe, and ſome few of theſe caught it after it had become extinct in the Britiſh army, and when a perſon landed from England would not receive it, though he ſlept in an infected bed; and it was from this cauſe, that in the autumn of the ſame year, the diſeaſe began at Roſetta nearly two months before the uſual time, *i. e.* on the 13th of September, when I firſt diſcovered it in two natives of the Eaſt Indies, attached to the Indian army; and it was propagated with ſome rapidity for ſix or eight weeks, among perſons who were either born in, or had juſt come from, a climate *much hotter* than Egypt, whilſt the Britiſh troops directly from England did not receive, and probably could not have been made to take the diſeaſe." On Yellow Fever, p. 591.

It is fortunate for mankind, as the ſame able author has remarked, that the communication of the contagion of the plague depends upon the co-operation of ſo many favourable circumſtances, and particularly upon that of a ſuitable temperature, and of certain aptitudes and ſuſceptibilities in the human ſubject; for without ſuch requiſites, or ſuch obſtacles to its propagation, the earth might have long ſince become deſolate.

It would ſeem ſuperfluous to enter into a long detail of facts to prove that the plague is a *contagious* diſeaſe, notwithſtanding the refuſal of ſome perſons to admit the fact. The majority of the hiſtories of the plague teem with evidences from which it is undeniably inferred. It is more eſpecially to be inferred, however, from the circumſtance of the multitude of medical attendants on the ſick under this malady who have periſhed by its attacks, and particularly of thoſe who have been under the neceſſity of the moſt cloſe contact with the infected. Dr. Samoilowitz, who for many years officiated as an army ſurgeon in places where he had numerous opportunities of ſeeing perſons under the plague, and eſpecially during that of Moſcow in 1771, has filled nearly one hundred pages of his treatiſe "ſur la peſte," with proofs of its contagious influence; and among theſe he mentions, that having ſucceſſively volunteered his ſervices as chief ſurgeon, in three of the principal hoſpitals of Moſcow, *all* the aſſiſtant ſurgeons who were employed under him, fifteen in number, took the diſeaſe, which terminated fatally in eleven of them. The medical officers of the French army, during their campaign in Egypt, experienced the effects of the contagion to a great extent; about *eighty* of them periſhed by the plague within one year, according to Dr. Sotira, who was one of the ſurvivors. He adds, that in the two following years, it was thought expedient to employ Turkiſh barbers to dreſs buboes, carbuncles, and bliſters, as well as to bleed, and apply frictions of oil, under the inſpection of French phyſicians and ſurgeons, and that, in conſequence of this arrangement, only twelve medical officers died in twice the former time. He alſo ſtates, that more than half of the Turks, who were thus employed to aſſiſt the French ſurgeons, took the plague, which, in ſeveral inſtances, proved mortal; though among a conſiderable number of other Turks, employed at Roſetta by the French *to bury the dead*, only one caught the diſeaſe. This is one of the many facts which indicate that there is comparatively little danger in handling the bodies of infected perſons *after death*, than while alive. See Bancroft, loc. cit. and Gaetan Sotira, Mem. ſur la Peſte, obſervée en Egypt, p. 5.

The plague, which ravaged Marſeilles in 1720, appears to have afforded ample evidence of its contagious nature. The report tranſmitted to the regent by M. Chicoyneau on the 18th of Auguſt, repreſents the phyſicians and ſurgeons as unanimous in their declaration, "that when one perſon in a family was attacked and died, the reſt ſoon underwent the ſame fate, inſomuch that there were inſtances of families entirely deſtroyed in that manner; and if any one of an infected family fled to another houſe, the contagion accompanied him, and proved fatal to the family where he had taken refuge." (Relation Hiſtorique, p. 115.) It appears, too, from the hiſtorical record juſt quoted, that the firſt hoſpital opened for the infected proved fatal to all the attendants. The introduction of the plague into the Hôtel Dieu was traced to a woman received as a patient from the rue de l'Eſcale, the ſtreet in which the diſtemper firſt broke out. Two of the nurſes who aſſiſted at her reception, and the matron who changed her linen, were taken ill the next day, and died after a few hours' illneſs. In conſequence of the dreadful rapidity with which the contagion ſpread in that eſtabliſhment, it deſtroyed phyſicians, ſurgeons, apothecaries, confeſſors, and all the other officers and ſervants, with the whole of the poor in the hoſpital, including above three hundred foundlings. The prieſts and monks who attended the infected ſuffered in the ſame manner as the medical aſſiſtants. And, laſtly, of two hundred and thirty galley-ſlaves, employed in going into the infected houſes, and burying the dead, two hundred and twenty periſhed in the ſpace of ten or twelve days. The whole tenour of the hiſtory of that plague, indeed, concurs to eſtabliſh the fact of its contagious nature. We ſhall, therefore, conclude this brief detail with the obſervations of Dr. Ruſſell, ſuggeſted by his experience in the Eaſt.

"If of one hundred perſons, expoſed to the infection of the plague by a near approach to the ſick, ninety ſhould fall ill, ſhall human inability to aſſign ſatisfactory reaſons for the preſervation of the other ten, be converted into a poſitive argument againſt the diſeaſe having been caught by contagion? If perſons retired from all commerce with the infected and their attendants, breathing the ſame air with the reſt of the inhabitants, and nouriſhed by the ſame aliment, remain untouched during the ravage of the plague, as long as they continue ſecluded, but upon unguarded communication are taken ill like others,—can any rational doubt ariſe about the cauſe of their former ſecurity? Or if through ſtealth, or neglect of requiſite precautions, ſubſtances tainted by the ſick ſhould be conveyed into theſe ſecluded retreats; and perſons living temperately as before, ignorant of what had happened, and conſequently in the midſt of imaginary ſecurity, happen to be ſeized with the diſtemper,—can it with any ſhow of reaſon be aſcribed, not to contagion, but to terror, or to colluvies in the ſtomach and bowels, produced by intemperance and bad aliment? The inſtances here alluded to are not the creation of fancy, but ſtrictly conſonant to repeated experience in Turkey; to ſay nothing at preſent of what has been obſerved at Marſeilles, and in various cities in Europe." Ruſſell on the Plague, p. 208.

We cannot, therefore, but conſider the *contagious* nature of the plague as ſatisfactorily proved, though not demonſtrable. The principal difficulty in the way of an unqualified admiſſion of the propoſition, is the complete and often ſpeedy eradication of the diſeaſe in a place, where no particular means of purification have been employed, by which the contagion might be removed or deſtroyed. But this difficulty is not inſurmountable, as we have already attempted to ſhew, and as might be farther illuſtrated by a reference to the progreſs of thoſe contagious diſeaſes, which admit of no diſpute, ſuch as the ſmall-pox and meaſles. For even theſe are only widely epidemic and ſeverely fatal at particular ſeaſons, when circumſtances, that are not always cognizable, give a peculiar virulence to the contagion, or a prediſpoſition to the human conſtitution to receive its influence.

The contagion of the plague, like that of the common malignant fever, or typhus, of temperate climates, and unlike that of ſmall-pox, may infect a perſon a ſecond time. Dr. Bancroft ſays, "two caſes of *re-infection*, or ſecond attacks of plague, fell under my obſervation in Egypt; one occurred in Mr. Webſter, then an aſſiſtant ſurgeon, and the other in a ſoldier of the 27th regiment, each of whom had a bubo: they were, however, but ſlightly indiſpoſed, the weather having become hot. Dr. Buchan had a ſecond attack, but with only a ſmall carbuncle, as he informed me. Dr. Price alſo had a ſecond attack, without either bubo or carbuncle, but, according to his account, with a violent affection of the head and nervous ſyſtem." In general," he adds, "I think ſecond attacks are milder than the firſt, though Dr. Price informed me of his having ſeen a lad, who, under ſuch an attack, died on the ſecond day. Pugnet ſays, that re-infections, when they occurred, were ofteneſt in perſons who had been mildly treated by the firſt attack; and that ſeveral of theſe had the diſeaſe very violently the ſecond time, immediately after uſing the bed or blanket of perſons who had died of it." (Loc. cit. p. 599.) The fact of the occurrence of the plague in the ſame individual more than once, is, indeed, fully eſtabliſhed upon the beſt authorities, although ſome have diſputed it. Merteus ſays of the plague at Moſcow, "Experientia comprobatum ſit, hanc (peſtem) illos non ſolum in variis vitæ periodis, ſed et eadem epidemia, bis, aut ſæpius occupare poſſe." (Obſ. Med. p. 123.) Dr. Ruſſell alſo bears teſtimony to the ſame fact in the epidemics which he witneſſed at Aleppo. Nevertheleſs, a ſecond infection is admitted to be rather a rare occurrence, at leaſt during the ſame epidemic. In above one hundred and twenty peſtilential caſes recorded by Diemerbroeck, there are only two in which the patients had been infected twice during the ſame ſeaſon; but he had met with ſeveral inſtances of perſons attacked at Nimeguen, who had ſuffered the plague ſome years before. (See Diemerbroeck De Peſte, lib. iv. Hiſt. 37, and 45.) Whether the obſervation of Thucydides is thus ſanctioned, as applicable to the true plague, may be queſtioned. He ſays that, in the plague of Athens, "thoſe who recovered had much compaſſion on thoſe who were dying, and thoſe who lay ſick, as having known the miſery themſelves, and *were now in a ſecure condition, for it never ſeized the ſame perſon twice ſo as to be fatal.*" (Thucyd. de Bello Pelopon. lib. ii.) As the ſymptoms deſcribed by Thucydides were more analogous to thoſe of the ſmall-pox than of the true plague, as above ſtated; ſo this confidence of the convaleſcents in their ſecurity (which is not uſual in caſes of the true plague when epidemic) rather confirms the opinion the plague of Athens was ſmall-pox.

With reſpect to the *treatment of the plague*, very little that is ſatisfactory can be collected from the writings of thoſe who have witneſſed its ravages. Dr. Bancroft expreſſes an opinion, that, until we know more of the ways and means by which nature endeavours to overcome it, we can perhaps do but little for her aſſiſtance, except by reſtraining all violent and dangerous ſymptoms, all exceſſive and debilitating evacuations, and ſupporting, when neceſſary, the powers of life, by a moderate uſe of wine, ether, opium, volatile alkali, and Peruvian bark. "The inſtances of perſons who have ſtrangely recovered from the plague, after having wandered alone about the country, particularly in Egypt, expoſed to *cold* and *wet*, ſeem to indicate, that even the moſt moderate ſweating is at beſt uſeleſs; but on the other hand, the unſucceſsful trials made by Dr. Price, of the cold bath, afford no encouragement to repeat ſuch applications to the ſurface. In ſome few caſes, where the diſeaſe occurs in the vigorous and robuſt, and is accompanied with highly inflammatory ſymptoms, bleeding might perhaps prove beneficial, if employed within a few hours from the attack; though in general very bad effects appear to have reſulted from this evacuation. Mild emetics are ſaid, in ſome caſes, to have proved beneficial, given at the very beginning of the diſeaſe."

This paragraph ſeems to contain the ſum of the information, which is to be found in the records of modern medicine on the ſubject. *Blood-letting*, in general, is to be deprecated in a diſeaſe, in which the inflammatory ſymptoms are ſeldom conſiderable, and the depreſſion of ſtrength uſually great and ſudden. And in like manner, all violent evacuations, either by *emetics* or *purgatives*, appear to be detrimental, eſpecially as violent vomiting and diarrhœa are apt to occur ſpontaneouſly, and are deemed very unfavourable ſymptoms. Dr. Ruſſell remarks, that "the neglect of purging at the beginning was not followed by the conſequences which might rationally have been expected," and, he adds, "I never ſaw any acute diſtemper, where coſtiveneſs was attended with ſo little inconveniency. Nevertheleſs, I think it rational, by gentle means, to clear the bowels at the beginning from any colluvies that might happen to be lodged there; for though that did not conſtantly prevent looſeneſs, or other ſymptoms produced by matter pent up, and rendered more putreſcent by the fever, yet I think it ſometimes had that effect; and the paſſage of the bowels often appeared to relieve the head, both in the augment and decline of the diſeaſe."

It appears to have been a very early and general opinion, as Dr. Bancroft remarks, among the phyſicians of this and other neighbouring countries, that thoſe who were attacked with the plague, and other contagious diſeaſes, had imbibed a *morbid poiſon*, and that it was neceſſary, above all things, to aſſiſt nature in expelling that poiſon from the body, and this principally by *ſweating*, which Morton called the king's highway. In "certain rules, directions, or advertiſements, for this time of peſtilential contagion, firſt publiſhed for the behoofe of the city of London, in the viſitation of 1603," and republiſhed upon the recurrence of the plague in 1625, *copious ſweatings* were directed to be excited by ſtrong ſudorifics, with warm beds and bed-clothes, "ſo ſoon as any of them (the poorer ſort of people) apprehend themſelves to be taken with the plague," and theſe were to be repeated every eight hours, and they were to "continue this courſe for four or five days;" and while they were ſweating, it was ordered that they were not to be ſuffered "to reſt or ſleep." The ſame modes of treatment were adopted in the "advice ſet downe by the College of Phyſicians, by his majeſties ſpeciall command," which was printed in 1630. Not only ſtrong ſudorifics were enjoined, but it was directed "that there be good fires kept in and about the *viſited* houſes, and their neighbours," and "to make fires rather in pannes, to remove about the chambers, than in chimneys, the better to correct the ayre of the houſes." In 1665, the College of Phyſicians were required by government to inſpect the rules of former times, and make ſuch alterations as they deemed proper; and among the directions which they then publiſhed, after mentioning bleeding, purging, and vomiting, they ſay "theſe three great remedies rarely have place in the plague, but are generally dangerous, and moſt of all purging, by any ſtrong medicines," but expreſs an opinion, that "the poiſon is beſt expelled by ſweating, provoked by *poſſet-ale*, and *London treacle*" mixed; and order the patient to "be put to bed to ſweat, well covered in a blanket, without his ſhirt, for twenty-four hours, every fifth hour renewing his cordial, but in half the quantity, between whiles refreſhing him with poſſet drink, oatmeal caudle, or thin broths, made jelly wine, or hartſhorn jelly;" and, if neceſſary, warm bricks, wetted with vinegar, and wrapped in flannel, were to be put to his feet, and care was to be taken, that he "ſleep not till the ſweat be over." *Bliſters* were at the ſame time to be applied "behind the ears, about the wriſts, near the arm-pits, on the inſides of the thighs, and near the groin, to *draw forth the venom*. The buboes were to be "always drawn forth, and ripened, and broke with all ſpeed."

Such was the univerſal practice employed in the plagues of the ſeventeenth century; and it is enough to have ſtated it to prove the miſchievous conſequences which it muſt have produced, to the ſatisfaction of every pathologiſt of the preſent day. The miliary fevers, of which the writers of thoſe times ſpeak ſo much, were the actual product of this violent excitement (ſee MILIARIA); and the ſmall-pox was rendered doubly fatal by the ſame treatment. That coolneſs of the bed and apartment, with the moſt liberal admiſſion of air, and the moſt complete reſt that can be obtained, ſhould be enforced under every form of fever, is now demonſtrated beyond the poſſibility of diſpute. And it is not leſs clearly aſcertained, with reſpect to the management of the buboes, or glandular ſwellings, that, although it may be proper to promote their ſuppuration by emollient cataplaſms, &c., where a natural diſpoſition to that iſſue is evident; yet that there can be no danger or impropriety in favouring their diſperſion or reſolution, by the uſual means, when a ſpontaneous tendency to ſuch a termination is obſerved. Dr. Bancroft juſtly ſays, "I know that the ſudden retroceſſion of buboes, previous to ſuppuration, and whilſt other ſymptoms indicating danger ſubſiſt unabated, is often followed by death. But this mortality is not in ſuch caſes produced by any change in the bubo itſelf, or by the retention of any matter which ought to be diſcharged, but by ſuch an extreme diminution of the living power, or other injurious effects of the diſeaſe, as is incompatible with the continuation of a ſuppurating proceſs, and alſo with the patient's recovery; and, therefore, this retroceſſion is to be conſidered not as the cauſe of death, but as an indication and conſequence of that condition of the patient, from which death neceſſarily reſulted; and on the other hand, when theſe glandular ſwellings riſe, and ſuppurate favourably, they indicate ſuch a ſtate of the living power and of the ſyſtem, as is likely to overcome the diſeaſe, without the ſuppoſed benefit of an evacuation of morbid poiſon by that ſuppuration. The ſame reaſoning appears applicable to carbuncles, though in their gangrenous ſtate, and when not ſurrounded by concentric inflamed rings, they require hot ſtimulant applications, and afterwards ſuch as will promote a ſuppuration, and a ſeparation of the carbonaceous cruſt." On Yellow Fever, &c. p. 617.

It may be added, that *mercurial* preparations were employed, and puſhed as far as they could be carried, during the plague at Marſeilles (according to M. Deidier) without any good effect. Orræus, Pugnet, and Sotira, likewiſe give their teſtimony to the ſame reſult of their own experience, even when carried to ſalivation. But where the diſeaſe is violent, it is obvious that ſufficient time cannot be given to affect the ſalivary glands, even if the advantage of doing ſo were clear; and when they have been affected, it is probable that this was rather the effect, than the cauſe, of the mild and protracted ſtate of the diſeaſe.

Frictions with oil were ſtrongly recommended by Mr. Baldwin for the cure of the plague; but the evidence in favour of their efficacy is very defective. Theſe frictions, Dr. Bancroft informs us, were tried extenſively by the French phyſicians in Egypt, and with very little, if any benefit, though in a few caſes they ſeemed to give temporary eaſe. Puguet indeed ſays, that they were not only uſeleſs, but cauſed anxiety and diſturbance to the ſick; that of fifteen patients to whom theſe frictions were applied, under the French phyſician Carrie, one recovered with difficulty, and all the reſt died; and that where they ſeemed to do good, the diſeaſe was always mild. With ſo much reaſon to doubt of their efficacy, there is a ſtrong objection to their uſe, ariſing from the very great danger of communicating the diſeaſe to the unfortunate perſon by whoſe *hands* they may be applied, and thus deſtroying many lives, without much probability of ſaving one. Bancroft, p. 623.

Prevention of the Plague.—The meaſures to be adopted for the prevention of the propagation of the plague are directed to two objects; namely, to the prevention of the introduction of the contagion into any town or country from thoſe places where it prevails; and to the prevention of its propagation among the population, if it have already been introduced.

It ſeems to be generally admitted, that the plague does not originate in this country; and, therefore, from its inſular ſituation, the infection can only be introduced through the medium of ſhips. Egypt, the Levant, and other parts of the Mediterranean, are ſeldom entirely free from the malady in the cool and temperate ſeaſons; and probably, therefore, never free from the lurking contagion which the congenial temperature annually brings into action. It is chiefly, therefore, through the medium of the commerce of the Mediterranean, that the importation of the contagion is to be apprehended; and to guard againſt this danger, the ſyſtem of *quarantine* is adopted by the government of this country. It will not be neceſſary here to enter into a full detail of this ſyſtem in all its parts, as it will be deſcribed under its proper head. (See Quarantine.) The objects of the ſyſtem are, in the firſt place, to detain the individuals who may poſſibly have the infection lurking about them, a ſufficient length of time from any communication with the people on ſhore, in order to aſcertain whether the diſeaſe ſhall make its appearance in them; but, in the next place, to perform a ſtill more important ſervice, by ſubjecting all goods, clothes, and merchandize, which may retain infection, to a proceſs of purification. It is well known, not only from numerous facts recorded in the hiſtory of almoſt all modern plagues, but from the teſtimony of the moſt experienced phyſicians in reſpect to malignant fevers in general, that theſe *fomites*, as they are called, or ſubſtances imbued with the contagion from the bodies of the ſick, may retain their infectious quality an indefinite length of time, and do in fact more readily communicate the diſeaſe, than the perſons of the infected. In addition, therefore, to the mere delay of the quarantine, the purification of the goods contained in the ſhips makes a principal part of that ſyſtem; and it is chiefly accompliſhed by the eſtabliſhment of lazarettoes and peſt-houſes, at the principal ports to which veſſels from the Mediterranean uſually come. The perſons, if any prove to have been infected, and ſhew ſymptoms of the plague, are immediately removed to theſe houſes, and ſeparated from the healthy; and the goods are there alſo opened out, and expoſed to the air, and fumigated with ſulphureous vapours, and thoſe of the mineral acids. (See Fumigation.) The moſt rigid adherence to the principle of ſeparation, eſtabliſhed by the quarantine laws, is enforced by the ſtatutes, and the ſyſtem appears to have anſwered the purpoſe of preventing the importation of peſtilential contagion, ſince it has been fully practiſed.

If, however, theſe meaſures ſhould fail to prevent the introduction of the plague into any large town, it then becomes expedient to deviſe the beſt means of preventing the ſpreading of the contagion among the people. This, indeed, is an object of difficult attainment. The firſt riſe and appearance of the plague is not always recognized, and therefore it has often made conſiderable progreſs before any public meaſures are called for. The great rule of reſiſting in the beginning ("principiis obſta") is of peculiar importance in ſuch a caſe; and it is much to be lamented, as Dr. Mead has remarked, that, in addition to this phyſical difficulty in the execution of the rule, the very ſteps which have commonly been taken by the police, with the view of arreſting the contagion, have unfortunately had a direct tendency to impede the operation of this maxim, and to accelerate the progreſs of the epidemic. Dr. Mead juſtly ſtates, that the directions of the magiſtrate, under ſuch circumſtances, ought to be ſuch as to encourage the families firſt infected to make their misfortune known, for the ſake of obtaining aſſiſtance, as much as if their houſe were on fire; whereas the meaſures uſually adopted on theſe occaſions have, in fact, been themſelves a ſevere puniſhment, and muſt have contributed to make the infected conceal the diſeaſe as long as poſſible.

When the plague firſt ſhewed itſelf in London in 1665, the orders iſſued by the lord mayor and aldermen, and ſanctioned by the College of Phyſicians, principally related to the ſtrict impriſonment of the ſick in their own houſes, by watchmen attending night and day at the doors to prevent communication; and this was to continue at leaſt a month after all the family was dead or recovered. Each infected houſe was ordered "to be marked with a red croſs of a foot long, in the middle of the door, evident to be ſeen, and with theſe uſual printed words, that is to ſay, *Lord have mercy upon us*, to be ſet cloſe over the ſame croſs, there to continue until lawful opening of the ſame houſe." (See Orders by the Lord Mayor and Aldermen, concerning the Infection of the Plague, 1665.) Independently of the miſery thus ſuffered by the families ſhut up, when comfort and aſſiſtance from friends is moſt required, and ſtrangers to every thing but the melancholy view of the progreſs which death makes among themſelves, the inefficacy of the plan to prevent the ſpread of contagion is obvious. The contagion muſt be accumulated and rendered more virulent by ſuch confinement; "the ſhutting up houſes in this manner," as Dr. Mead obſerves, "is only keeping ſo many ſeminaries of contagion, ſooner or later to be diſperſed abroad; for the waiting a month or longer from the death of the laſt patient, will avail no more than keeping a bale of infected goods unpacked; the poiſon will fly out, whenever the Pandora's box is opened." (Mead on the Plague, p. ii. chap. 2.) This plan, too, excited the univerſal apprehenſions of the people, leſt they ſhould be ſhut up, which, probably, like all other impreſſions of fear, increaſed their liability to the infection. It occaſioned the concealment of the diſeaſe as long as poſſible, which neceſſarily contributed to give it vigour, and to ſpread it; nor was it poſſible to maintain it rigidly; for many broke out of their confinement, by getting out at the windows, &c. or by bribing the watchmen at their doors, and ſometimes by aſſaulting them; and thus contributed to propagate the contagion. On the other hand, there are ſome ſtrong proofs recorded in the plagues of London in 1625 and 1636, of the diminution of the mortality which occurred after the ſick houſes were permitted to be open. See Mead, loc. cit.

On the actual occurrence, or on the apprehenſion of the occurrence, of the plague in any place, a council of health ſhould immediately be appointed, conſiſting of ſome of the principal officers of ſtate, ſome of the magiſtrates, and two or three phyſicians, &c.; and this council ſhould be entruſted with ſuch powers, as might enable them to enforce the execution of their orders with impartial juſtice, avoiding all unneceſſary hardſhips. Inſtead of ignorant old women, who have generally been appointed *ſearchers* in pariſhes to examine the cauſes of death, that office ſhould be committed to intelligent and active men, whoſe buſineſs it ſhould be to report to the council of health the firſt occurrence of extraordinary deaths in any diſtrict, ſo that the ſuſpected bodies ſhould be examined by ſkilful phyſicians. The plague having almoſt invariably appeared among the poor in the outſet, the meaſures to be adopted are principally applicable to that claſs of people. If, upon the report of the examiners and phyſicians, the plague is actually aſcertained to have occurred, the families ſhould be immediately removed, the ſick and the ſound to different receptacles out of town, in which every care ſhould be taken to purify the clothes and perſons of both, on admiſſion. The wealthy might be compelled to remove to their country houſes, following a ſimilar plan of ſeparation and purification. From what is now known reſpecting the nature of contagion, it is certain that if theſe lazarettoes were kept in a cleanly and well-ventilated ſtate, like the houſes of recovery for typhus, there would be much leſs danger in giving attendance upon the ſick, and the chance of recovery would be much augmented. It is well aſcertained by experiment, that contagion is very much weakened in its virulence by dilution with freſh air, and that, in this diluted ſtate, it may be breathed for a certain time with impunity. See Contagion, and House *of Recovery*.

There are many examples of the ſucceſs with which theſe plans of early ſeparation of the infected have been purſued. The magiſtrates of the city of Ferrara, in the year 1630, when all the ſurrounding country was infected with the plague, obſerving the ill conſequences which every where enſued from endeavours to conceal the diſeaſe, by keeping the ſick in their houſes, reſolved, whenever the occaſion ſhould occur, to adopt a different method. Accordingly as ſoon as they were informed that a perſon had died of the plague in their city, they immediately removed the whole family to which he belonged into a lazaretto, where they all, ſeven in number, died. But though the diſeaſe was thus malignant, it went no farther, being ſuppreſſed at once by this method. Within the ſpace of a year, the ſame circumſtance recurred ſeven or eight times, and the ſame proceeding put a ſtop to its progreſs. The example of this city was afterwards followed more than once in ſome other towns in the ſame territory, and with ſuch complete ſucceſs, that it was thought expedient, for the common good, to publiſh in the Memoirs of the people of Ferrara this declaration; "that the only remedy againſt the plague is to make the moſt early diſcovery of its occurrence that is poſſible, and thus to extinguiſh it in the very beginning." A very ſimilar ſucceſs was obtained by cardinal Gaſtaldi at Rome, in the plague of 1657. Being appointed commiſſary-general of health, with full powers, by the pope, he ordered all infected perſons to be removed upon the firſt notice, to a lazaretto in the iſland of the Tiber, and all who lived in the ſame houſe with them, to other hoſpitals juſt without the city, in order to be ſent to the iſland if they ſhould fall ſick. In two months he thus cleared the city of the plague, which had continued in it nearly two years; and it was particularly obſerved that, although previouſly, when the diſeaſe once got into a houſe, it ſeldom ceaſed without ſeizing the whole family, yet, under this management, ſcarcely five out of a hundred of the ſound perſons, thus removed, were infected. See Gaſtaldi, de avertenda Peſte, cap. 10.

When the ſick families are removed, their goods ſhould be deſtroyed, or buried, and the walls and floors ſcoured, lime-waſhed, fumigated, and well aired. The ſtreets and alleys ſhould be cleanſed with peculiar care, and waſhed daily if poſſible. It has generally been deemed adviſable, too, to take up all beggars and vagrants who have no fixed reſidence, and may become a great cauſe for diſſeminating the contagion; and to prohibit all public amuſements and aſſemblies of people, by which the diſeaſe might be communicated, through the promiſcuous intercourſe of ſuch meetings.

Upon the ſuppoſition, (which is doubtleſs erroneous,) that the atmoſphere is impregnated with contagion, or with ſome impurities which favour its propagation, the purification of the air has been an object of ſolicitude at all times, and *fire* has been recommended both by the ancients and moderns for this purpoſe. This opinion, however, ſeems to reſt upon no better foundation, than a tradition that Hippocrates put a ſtop to a plague in Greece by kindling large fires; a circumſtance which is no where mentioned in his works. It appears, indeed, that in after times theſe fires were made with juniper, cypreſs, reſin, myrrh, and other aromatic weeds and gums, and that a ſort of fumigation, and not the mere heat of fires, was the object of the practice. The experiment, when made in London, during the laſt plague, does not lead to any favourable inference reſpecting the operation of this practice; for Dr. Hodges has ſtated, that fires having been ordered in all the ſtreets for three days together, there died in one night immediately following no leſs than four thouſand perſons; whereas in any ſingle week before or after twice that number had never been carried off. (Loimologia, p. 24.) The ſame obſervation appears to be applicable to the firing of guns, which would likewiſe be productive of the additional evil of exciting conſtant alarm, and diſturbing the ſick.

It is certainly deſirable that the population ſhould be thinned as much as poſſible, at the firſt appearance of the plague, by the departure of as many people from the town into the country as can conveniently do ſo. Thoſe who are under the neceſſity of remaining, ſhould adopt as far as poſſible a ſyſtem of ſecluſion; for, however improper it may be to ſhut in the contagion, where it has already appeared, it muſt obviouſly be prudent to *ſhut it out*. Hence many perſons have effectually preſerved themſelves and their families, in thoſe countries where the plague often prevails, by ſhutting themſelves up, and avoiding all unneceſſary communication with the public, before any of them had received the infection. In large houſes, in which a full ventilation could be accompliſhed, the chance of eſcape under this ſyſtem of excluſion would be great; and even if any perſon ſhould be taken ſuddenly ill, an immediate ſeparation from the reſt of the family would probably preſerve them from the contagion. Dr. Ruſſell, during the plague at Aleppo, ſhut himſelf up in his houſe, and preſcribed to numerous patients who were brought to his window, which was a few feet above the ground, and by this plan eſcaped the infection entirely.

In houſes in which the diſeaſe has already appeared, cleanlineſs and a free admiſſion of air are the beſt preſervatives; indeed, the circumſtance of the comparative rarity of the diſeaſes among the higher claſſes of ſociety can only be explained upon this principle. Conſtant waſhing or mopping the apartments of the ſick alſo contribute materially, by the coolneſs produced, to benefit the ſick. The fumigations with aromatic herbs and gums, employed on thoſe occaſions, are not of any effectual uſe, and the very odours which they emit, rather conceal the preſence of offenſive vapours, than contribute to deſtroy them. The fumigations with the mineral acid vapours, obtained by decompoſing nitre or common ſea-ſalt, are, however, poſſeſſed of the power of deſtroying contagion. (See Fumigation.) The ſame fumigations, therefore, ſhould be applied to the linen, beds, furniture, &c., in preference to the mere ſmoking, or the uſe of aromatic fumes, which were recommended previouſly to the diſcovery of theſe more efficient methods. See an ample account of the ancient modes of fumigation in Dr. Ruſſell's Treatiſe on the Plague, book vi. ch. 6. p. 561—8.

The next means of prevention to be conſidered, are thoſe by which individuals may defend their perſons againſt the prevalent contagion. Theſe, however, lie within a much ſmaller compaſs than the public appear to ſuppoſe. There is certainly no direct antidote againſt the infection, which can be externally worn, or internally taken. It were ſuperfluous to deſcribe the ingredients of the little bags, balls, ointments, and amulets, employed as preventives of the diſeaſe; as they have no claims whatever to the title of antidotes, and are, for the moſt part, either the offspring of empirical craft, or mere innocent devices, to give confidence to thoſe who are under the neceſſity of approaching the ſick. In this laſt view, indeed, ſuch as do no harm may be admitted, in compliance with popular notions; but where ſuch reliance is placed in them as to remove more important caution, even theſe are to be deprecated.

As to the alleged internal preſervatives, with which the older medical books are copiouſly ſtored, they are in general compoſed of a complex farrago of herbs and gums, of very queſtionable properties of any kind. Theſe have been copied, with very little alteration, from the formulæ of dark and ignorant times, and conſiſt of a few medicated ales, diſtilled waters, and electuaries. It will be ſufficient to mention one of theſe compoſitions, calculated for the rich, which was preſerved among the reviſed directions of the College of Phyſicians in 1665, and was diſgraced by the following ingredients; oriental bezoar, pearl, hyacinth ſtone, unicorn's horn, and lignum aloes, the proportion of the laſt article being about three grains to four hundred and fifty of the other ingredients. In truth, unleſs individuals have a ſtrong prepoſſeſſion in favour of theſe uſeleſs expedients, and loſe all confidence without them, they may be fully diſpenſed with. The principal ſyſtem of prevention that can be of any avail, muſt conſiſt in maintaining that ſtate of health in which we are leaſt liable to ſuffer from the exciting cauſes of diſeaſe. We muſt neither weaken the body by evacuations, nor ſtimulate and excite plethora by high living. A temperate and regular courſe of life, and a temperate uſe of cuſtomary liquors, promiſe every advantage that can be expected from cordial and ſtomachic medicines; inanition, long faſting, immoderate watching, late hours, heated rooms, caſual debauches, exceſſive fatigues, ſudden changes in diet, ſhould be cautiouſly avoided; inaſmuch as whatever deſtroys the balance of moderate health, induces a prediſpoſition to diſeaſe, under which contagion, like other occaſional cauſes of diſorder, more readily operates upon the ſyſtem. Grief, terror, deſpondence, and other debilitating affections of the mind, have been univerſally held to be of moſt dangerous tendency in peſtilential times; while, on the contrary, a regular flow of ſpirits, cheerfulneſs, a temper not given to anticipate evils, and a lively hope of eſcaping infection, are conſidered as the beſt ſafeguards againſt contagion. Theſe, however, it is not in the power of medicine altogether to beſtow; but this conſideration affords the only apology for the uſe of the inert amulets before mentioned. The uſe of *tobacco* was conſidered by Diemerbroeck and others as conducive to repel the infection of the plague. But the experience of Dr. Ruſſell led him to doubt the correctneſs of this opinion; as thoſe who uſed tobacco copiouſly did not appear to be leſs liable to the diſeaſe than others. At Aleppo, indeed, the cuſtom of ſmoking is univerſal both among men and women of all ranks, and therefore the very fact of the frequent prevalence of the plague ſeems to afford a refutation of this opinion. The beſt preſervative is certainly to avoid a near approach to the ſick, and eſpecially to avoid the contact of the ſick and of their clothes. The remarkable fact, mentioned by Dr. Samoilowitz, that all the aſſiſtant ſurgeons in the hoſpitals at Moſcow, took the plague, while the phyſicians, who only walked among the ſick, but carefully avoided contact, generally eſcaped, affords a ſtrong proof of the greater facility with which actual contact communicates the infection.

Moral Conſequences of the Plague.—Having ſtated every thing which appears to be material in the phyſical hiſtory of the plague, we cannot altogether omit the conſideration of ſome of the moral evils, which have commonly been obſerved in the train of every ſevere peſtilence. So urgent are the phyſical diſtreſſes which peſtilence inflicts, and univerſal the interruption to the ordinary intercourſe of ſocial life which it occaſions; ſo neceſſary is it for individual ſafety to ſhun all communication with others, and ſo difficult, therefore, to obtain aſſiſtance when in need of it; that a ſyſtem of ſelfiſh principles becomes every where prevalent, and the ordinary moral rules of conduct are every where laid aſide; and vices, follies, and crimes, of every deſcription, contribute to augment the ſum of miſery, which peſtilence brings with it. The extreme uncertainty of the tenure of life, when every day may probably terminate it, ſeems to looſen the moral ties of the people, partly becauſe multitudes of thoſe who are the arbiters of individual character are deſtroyed, partly becauſe, in the general confuſion, the chance of eſcaping detection is much diminiſhed, and partly becauſe the probability of living to undergo puniſhment is exceedingly ſmall. The extreme and ſudden changes of fortune, too, which the death of whole families brings unexpectedly to many, unhinges the moral feelings, and leaves the indulgence of the paſſions to be purſued with little controul.

A ſtriking picture of the diſſolution of morals, during the prevalence of the peſtilence at Athens, has been drawn by Thucydides. After ſtating that, in conſequence of the dreadful mortality, the people, not knowing what to do, or whither to go, began to neglect all their duties ſacred and profane, he firſt obſerves, that the rites of burial were not performed at all, from the deſtruction of ſervants and domeſtics, or performed in the moſt irregular manner. Some, he ſays, would take poſſeſſion of the funeral piles erected by others, and anticipating their arrival, would lay the bodies of their friends upon them, and ſet them on fire; while others would depoſit their corpſe upon the burning pile containing one already partly conſumed, and retire. "But this malady," he proceeds, "was the ſource of much greater depravities to the city in other reſpects. For people now dared to do many things openly, which they were heretofore compelled by ſhame to conceal; and they calculated upon their ſudden change of fortune, ſeeing that many of the wealthy periſhed, while thoſe who formerly were deſtitute, became rich with their property. They, therefore, deemed it right to ſet about the immediate enjoyment of it, and gave up all mind to pleaſures, conſidering that they in turn might be deprived of the treaſures, and of life itſelf in a few days. Nor was any individual diſpoſed to undertake any labours for an honourable reward, becauſe he thought it uncertain whether he ſhould not die before he could obtain it. Whatever each perſon deemed agreeable or lucrative to himſelf, this he conſidered as expedient and honourable; and he did not allow himſelf to be reſtrained in the purſuit of it, either by the fear of God or of human laws. This indifference to all moral and religious duties, aroſe partly from the circumſtance, that the fulfilment or neglect of them appeared to be equally unavailing; for all equally periſhed; and partly from the general expectation that no one would ſurvive a ſufficient length of time to undergo trial and puniſhment. And many perſons, conſidering themſelves already doomed by fate to worſe puniſhment than the laws could inflict, determined to enjoy ſome of the pleaſures of life before the time of ſuffering arrived." Thucydides, lib. ii. § 53.

Very ſimilar accounts of the diſſolute ſtate of the public character, attendant on times of peſtilence, are related by other writers, who have witneſſed theſe calamities. In the intereſting deſcription of the plague at Florence in the year 1348, given by Boccaccio in the introduction to his Decamerone, many alluſions are made to this lawleſs condition of the city. After deſcribing the different views which ſome perſons adopted as to the mode of ſelf preſervation; he ſays, "others maintained free living to be a better preſervative, and would baulk no paſſion or appetite they wiſhed to gratify, drinking and revelling inceſſantly from tavern to tavern, or in private houſes, which were frequently found deſerted by the owners, and therefore common to every one; yet avoiding, with all this irregularity, to come near the infected. And ſuch at that time was the public diſtreſs, that the laws human and divine were no longer regarded; for the officers to put them in force being either dead, ſick, or in want of perſons to aſſiſt them, every one did juſt as he pleaſed." Again, he ſays, "I paſs over the little regard that citizens or relations ſhewed to each other; for their terror was ſuch, that a brother even fled from his brother, a wife from her huſband, and, what is more uncommon, a parent from its own child." From the deſertion of friends, and the ſcarcity of ſervants, who required enormous wages, multitudes died who might have been ſaved, and from mere neceſſity, he obſerves, many cuſtoms were introduced, different from what had before been known in the city. And he adds, it fared no better with the adjacent country; for, to omit the different caſtles about us, which preſented the ſame view, in miniature, with the city, you might ſee the poor diſtreſſed labourers, with their families, without either the interference of phyſicians or help of ſervants, languiſhing on the highways, in the fields, and in their own houſes, and dying rather like cattle than human creatures; and growing diſſolute in their manners like the citizens, and careleſs of every thing, as ſuppoſing every day to be their laſt, their thoughts were not ſo much employed how to improve, as to make uſe of their ſubſtance for their preſent ſupport, &c."

But while the dread of contagion and death have thus contributed to annihilate the beſt feelings of human nature, and to cut aſunder all the moral ties of ſociety, during the prevalence of peſtilence; other paſſions of a ſelfiſh kind were alſo called into action, which overcame this fear, and actually led the people to ruſh into the preſence of contagion, and thus to multiply the victims to its fatal malignity. Avarice was one of theſe miſleading propenſities. M. Bertrand, when deſcribing the effects of the plague at Marſeilles in 1720, remarks that "the avidity to take poſſeſſion of an unexpected inheritance was alſo to many the fatal cauſe of their own deſtruction. Called to the entire ſucceſſion of the wealth of a whole family, to whom perhaps they were very diſtantly related, and impatient to know the extent of their new acquiſitions, they entered, without precaution, into infected houſes, and ſearching indiſcriminately among the effects of the deceaſed, they often found what they ſought not, and paid with their lives the forfeit of their cupidity. Their fatal heritage then devolved to relations yet more remote, fortunate if they could profit by ſuch an example, and not fall equally martyrs to indecent and unreaſonable tranſports. It was not, however, always the legitimate heirs on whom the puniſhment of their avidity fell; it was often thoſe who found *in the effects they ſtole* the juſt forfeit of their crime. In vain had the commandant abſolutely prohibited the removal of any clothes or effects from one houſe to another; a blind and headſtrong rapacity deſpiſed alike theſe wiſe ordonnances and the perils of the contagion." See Bertrand's Hiſtorical Relation of the Plague at Marſeilles, tranſlated by Miſs Plumptre, chap. xix.

Avarice, however, was not the only paſſion which was excited in this extraordinary degree, and contributed to extend the infection. "Another abuſe of a very ſingular nature," ſays M. Bertrand, "occaſioned more than all this partial renewal of the malady. Will it be believed? ſcarcely had the contagion begun ſomewhat to diminiſh in its ravages, when the people, impatient to repair the mortality it had occaſioned, thought of nothing but re-peopling the city by new marriages; like mariners who have been in imminent peril of ſhipwreck, but are no ſooner arrived in port, than, forgetting the danger they have eſcaped, they ſeek, in new pleaſures, to drown the recollection of paſt troubles. Our temples, long ſhut up, were now only opened for the adminiſtration of this ſacrament. A ſpecies of phrenſy ſeemed to have ſeized on both ſexes, which led them to conclude the affair, of all others the moſt important in the world, in the ſpace of twenty-four hours, and to conſummate it almoſt at the ſame inſtant. Widows, whoſe cheeks were yet moiſt with the tears they had ſhed over a dead huſband; conſoled themſelves in the arms of a living one, who perhaps was in like manner ſnatched from them a few days after, and in a few days more they were wedded to a third." Some of the phyſicians imagined that this frantic paſſion was a conſequence of the malady; but M. Bertrand explains it more plauſibly upon the great change of circumſtances which many had undergone; he might alſo have added, the extreme uncertainty of the tenure of life, and the conſequent determination to make the moſt of its pleaſures, which has been noticed above. The numerous marriages, however, thus haſtily concluded, were the occaſion of ſpreading afreſh the fatal infection; ſo that the biſhop determined that no marriage ſhould be licenſed, unleſs the parties demanding it could produce certificates of health from the phyſicians, and as the ſickneſs abated, it became their principal occupation to receive the diſagreeable viſits of thoſe who were frantic to ruſh into the bonds of marriage.

But theſe were not the only moral evils attending the peſtilence, for every ſpecies of crime aggravated the ſufferings of the unfortunate city. "If the people had ſhewn no other ſigns of having forgotten their paſt misfortunes, than the joy which theſe new marriages occaſioned, there would have been no reaſon," ſays M. Bertrand, "to fear that a ceremony, honoured by the firſt miracle of our Saviour, authoriſed by the laws, and neceſſary to ſociety, would irritate the Lord anew againſt us, provided all was conducted in conformity with Chriſtian decency and rectitude. But what was likely to draw down upon us much greater judgments from his anger, were the thefts, the plunderings, and an infinity of other crimes, the horrors of which we dare not here retrace. For theſe their perpetrators promiſed themſelves impunity on the part of men from the troubles of the contagion, and abſolution on the part of heaven, by the favour it had ſhewn them, either in their having eſcaped the diſeaſe entirely, or recovered from it, when it proved mortal to ſo many thouſands of their fellow-citizens. While the arm of the Lord was yet extended over us, a general licence was ſeen to reign among the people, a depravity of morals frightful to think on. Some ſeized on houſes left vacant by the mortality; others forced open thoſe that were ſhut up, or guarded by perſons incapable of reſiſtance. They entered thoſe where, perhaps, there remained only one perſon languiſhing with the malady, forced open the cloſets and drawers, and took away whatever they found moſt precious, often carrying their infamy to the length of delivering themſelves from an importunate witneſs, who had otherwiſe but a few moments to live. Theſe enormous crimes, much more frequent in the height of the malady than in its decline, were generally committed either by thoſe who ſerved the ſick, who carried away the dead, or who attended at the hoſpitals. By the declarations which theſe people, from their ſituations, were able to wring from the dying, they were informed of the ſtate of their houſes; nay, it often happened, that by the ſame means they got poſſeſſion of their keys. This licence was yet greater in the country, where the diſtance of the baſtilles from each other, and the opportunity of going to them in the night, favoured theſe criminal expeditions." Loc. cit.

Theſe extracts preſent a picture of the moral evils which, in conjunction with the phyſical diſtreſſes attendant upon ſo ſevere and fatal a malady, render a ſeaſon of peſtilence the moſt formidable calamity that viſits mankind. If the reader is deſirous of a more ample detail of its horrors, he may peruſe the whole of M. Bertrand's volume; the introduction of Boccaccio, before quoted; the Traité de la Peſte, publiſhed by the phyſicians of Marſeilles; the Loimologia of Dr. Hodges; and particularly an intereſting Journal of the Plague Year, being obſervations or memorials of the moſt remarkable occurrences, as well public as private, which happened in London during the laſt great viſitation in 1665. This journal, indeed, has been ſaid to be the production of Daniel de Foe, and not, as its title page expreſſes, "written by a citizen, who continued all the while in London;" but it contains a true picture of the general conſequences of the peſtilence.

Plague-*Water*, *Aqua Epidemica*, is one of the compound waters of the ſhops, diſtilled from mint, roſemary, angelica roots, &c.

PLAIAR, in *Geography*, a town of European Turkey, in Romania; 6 miles S. of Gallipoli.

PLAID, Belted, in *Military Language*, the ancient garb of the Scots Highlanders, and ſtill worn by ſome of our Highland regiments. The belted plaid conſiſts of twelve yards of tartan, which are plaited, bound round the waiſt by a leathern belt, the upper part being attached to the left ſhoulder.

PLAIN, Planus, an epithet applied to various things, generally importing them to be ſmooth, even, level, or ſuperficial, or ſimple, obvious, or the like.

In theſe ſenſes, the words ſtand oppoſed to rough, ſolid, laboured, enriched, &c.

It is a maxim in heraldry, that the plainer the coat, the nearer to antiquity. Plain coats are ſuch as are leaſt encumbered with figures, or charges, and which have nothing in them but what is natural.

Plain, in *Heraldry*, is ſometimes uſed for the point of the ſhield, when coupled ſquare, a part remaining under the ſquare, of a different colour, or metal, from the ſhield.

This has been ſometimes uſed as a mark for baſtardy, and called *champaigne:* for when the legitimate deſcendants of baſtards have taken away the bar, fillet, or traverſe, borne by their fathers, they are to cut the point of the ſhield with a different colour, called *plain*.

Plain, uſed ſubſtantively, in *Perſpective*, *Mechanics*, *Aſtronomy*, *&c.* See Plane.

Plain *Angle*, in *Geometry*, is an angle contained under two lines or ſurfaces.

It is ſo called in contradiſtinction to a *ſolid* angle.

Plain *Figure*. See Plane.

Plain *Triangle*, is a triangle included under three right lines, or ſurfaces; in oppoſition to a *ſpherical*, and a *mixt* triangle.

Plain *Trigonometry* is the doctrine of plain triangles, their meaſures, proportions, &c.

Plain *Chant*, and Plain *Song*, in *Muſic*. See Chant, and Canto Fermo.

Plain *Counterpoint*, is rigidly compoſed of common chords of note againſt note, without diſcords, and in characters of the ſame length, as in calviniſtical and parochial pſalmody. But, provided long and ſhort ſyllables are diſtinguiſhed, as in the 104th pſalm, and the notes in vocal or inſtrumental muſic are ſtruck together, it may ſtill be called plain counterpoint. Very pleaſing airs, à 4, in the Greek church, are ſung in this manner, not only note againſt note, but ſyllable againſt ſyllable, which renders the words well accented, and very intelligible.

Plain *Deſcant*. See Descant.

Plain *Glaſs*, or *Mirror*, in *Optics*, is a glaſs or mirror whoſe ſurface is flat, or even. See the phenomena and laws of plain mirrors, under the article Mirror.

Plain *Scale* is a thin ruler, whereon are graduated the lines of chords, ſines, tangents, ſecants, leagues, rhumbs, &c. of ready uſe in moſt parts of the mathematics, chiefly in navigation.

See its deſcription and uſe under Scale.

Plain *Tyle*. See Tyle.

Plain *Chart*, in *Navigation*, is a ſea-chart, wherein the meridians and parallels are repreſented by parallel ſtraight lines; and where, of conſequence, the degrees of longitude are the ſame in all the parallels of latitude.

See the properties, conſtruction, &c. of this chart under Chart.

Plain *Sailing*, is the art of working the ſeveral caſes and varieties in a ſhip's motion on a plain chart.

Plain ſailing is founded on the ſuppoſition of the earth being a plane or flat; which, though notoriouſly falſe, yet, places being laid down accordingly, and a long voyage broken into many ſhort ones, the voyage may be tolerably performed by it, near the ſame meridian.

In plain ſailing it is ſuppoſed that by the rhumb line, meridian, and parallel of latitude, there always will be formed a right-angled triangle; and that ſo poſited, as that the perpendicular ſide may repreſent part of the meridian, or north and ſouth line, containing the difference of latitude; the baſe of the triangle repreſent the departure; and the hypothenuſe, the diſtance ſailed. The angle at the vertex is the courſe, and the angle at the baſe, the complement of the courſe; any two of which, with the right-angle, being given, the triangle may be protracted, and the other three parts found.

For the doctrine of plain ſailing, ſee Sailing.

Plain *Table*, in *Geometry*, *&c.* an inſtrument uſed in the ſurveying of land; whereby the draught, or plan, is taken on the ſpot, without any future protraction, or plotting.

The plain table, repreſented *Plate* VI. *Surveying*, *fig.* 1. conſiſts of a parallelogram of wood about fifteen inches long and twelve broad; round this goes a boxen jointed frame, by means of which a ſheet of paper is faſtened tight to the table, ſo that lines may be conveniently drawn upon it.

On each ſide of the frame, which may be put on either ſide upwards, towards the inward edge, are ſcales of inches ſubdivided, for the ready drawing of parallel lines. Beſide which, on one ſide are projected the 360 degrees of a circle, from a braſs centre in the middle of the table (each degree halved) with two numbers to every tenth degree, the one expreſſing the degree, the other its complement to 360, to ſave ſubtraction: on the other ſide are projected the 180 degrees of a ſemicircle, from a braſs centre in the middle of the table's length, and at $\frac{1}{4}$th of its breadth; each degree halved, and every tenth noted with two numbers, *viz.* the degree and its ſupplement, to 180°. To one ſide of the table is fitted a compaſs, for placing the inſtrument by; and the whole is fixed by a ſocket, upon a three-legged ſtaff for a ſtand, on which it is turned round, or faſtened by a ſcrew, as occaſion requires. Laſtly, to the table belongs an index, which is a ruler at leaſt ſixteen inches long, and two broad; uſually graduated with ſcales, &c. and having two ſights perpendicularly placed on its extremities; and a ſloped edge, called the fiducial edge.

PLAIN *Table*, *Uſe of the.*—To take an angle by the plain table; or to find the diſtance of two places acceſſible from the ſame third.

Suppoſe D A, D B, (*fig.* 2.) the ſides of the angle required: or A B the diſtance required. Place the inſtrument horizontally, as near the angle as poſſible; and aſſume a point in the paper on the table, *v. gr. c.* To this point apply the edge of the index, turning it about this and that way till through the ſights you ſee the point B: and, in this ſituation of the ruler, draw by its edge the line *c e* indefinitely.

After the ſame manner turn about the index on the ſame point till through the ſights you ſee the point A; and draw the right line *c d* indefinitely. Thus have you the quantity of the angle laid down.

Meaſure the lines D A, D B, with a chain; and from a ſcale ſet off the meaſures thus found on the reſpective lines; which ſuppoſe to reach from *c* to *b*, and from *c* to *a*. Thus will *c b* and *c a* be proportional to D B and D A. Transfer the diſtance *a b* to the ſame ſcale, and find its length; the length, thus found, will be the length, or diſtance of A B required.

2. *To find the diſtance of two places, one of which is inacceſſible, by the plain table.*—Suppoſe the diſtance required A B (*fig.* 3.), and A the acceſſible point. 1. Place the plain table in C; look through the ſights till you ſee A and B; and draw *a c* and *c b*. Meaſure the diſtance from your ſtation to A; and ſet it off from the ſcale upon *c a*. 2. Remove the table to A, where place it ſo as that the point *a* repreſenting A, and the index laid along the line *a c*, you ſee backwards the former ſtation C. [Note, in this fixing the inſtrument, lies the uſe of the compaſs; for the needle will hang over the ſame degree of the card in the firſt and the ſecond caſe; ſo that ſome ſet the inſtrument by the needle alone; others only uſe it to ſhorten the trouble, by bringing the inſtrument nearly to its due poſition by means of it; and then fixing for good by the back ſight]. 3. The inſtrument fixed, turn the ſights to B; and draw the line *a b*. 4. On the ſcale meaſure the interval *a b*; which will be the diſtance of A B required.

3. *To find the diſtance of two inacceſſible places by the plain table.*—Suppoſe the diſtance of A B (*fig.* 4.) required. 1. Chooſing two ſtations in C and D; in the firſt, C, place the plain table; and through the ſights look to D, B, and A, drawing, by the edge of the index, the lines *c d*, *c b*, *c a*. 2. Meaſure the diſtance of the ſtations C, D; and ſet this off from a ſcale on *c d*. 3. Removing the table from C, fix it in D; ſo as the point *d* hanging over the place D, and the index lying along the line *c d*, through the ſights you ſee the former ſtation C. The inſtrument thus fixed, direct the ſight to A and B, and draw the right lines *d a* and *d b*; laſtly, find the diſtance of *a b* on the ſcale, and this will be the diſtance of A B required. After the ſame manner may the diſtance of any number of places be found from two ſtations; and thus may a field, part of a country, &c. be ſurveyed.

4. *To take the plot of a field from one ſtation, whence all the angles may be ſeen with the plain table.*—Placing the inſtrument in the ſtation, aſſume a point in the paper, to repreſent the ſame, *v. gr.* O (*fig.* 5.); laying the edge of the index to this point, direct it to the ſeveral angles of the field, A, B, C, D, E, F, &c. and draw indefinite lines by its edge towards every angle; *viz.* O *a*, O *b*, O *c*, &c.; meaſure the diſtance of each angle from the ſtation, *viz.* O A, O B, O C, O D, &c. and from a ſcale ſet theſe off from O on their correſpondiug lines; the extremities hereof will give points, which, being connected by lines, will repreſent the field.

5. *To take the plot of a field, wood, or the like, by going round the ſame, with the plain table.*—Place the inſtrument horizontally at the firſt angle, *v. gr.* A: the needle being on the meridian of the card; aſſuming a point on the paper to repreſent it; to that point lay the index, directing it till through the ſights you ſee a mark in the angle B, and draw an indefinite line along it; meaſure the diſtance of A and B, and from a ſcale ſet it off on the line thus drawn; the extremity of this diſtance will repreſent the point B. Remove the inſtrument to B, where ſet it ſo as that the needle hang over the meridian of the card; and ſo as the index lying along the line laſt drawn, you ſee the former ſtation A through the ſights: here faſten it, lay the index to the point B, and turn it till through the ſights you ſee the next angle C; in this ſituation draw a line, as before, meaſure the diſtance B C, and ſet it off from a ſcale on the line. Remove the inſtrument to C, where fixing it by the needle, and the back ſight, as before, turn the index on the point C till you ſee the next angle D; draw the line, meaſure, and ſet off the diſtance C D, as before, and remove the plain table to E; where fix it, as before; look to the next angle F, draw the line, meaſure and ſet off the diſtance, &c.

In this manner having compaſſed the whole field, you will have its whole perimeter plotted on the table; which may be now caſt up, and its contents found, as in the article SURVEYING.

Manner af ſhifting paper on the plain table.—When in large parcels of grounds the plot is found to exceed the dimenſions of the plain table, and to run off from the paper, the ſheet muſt be taken off the table, and a freſh one put on: the way of managing which ſhifting is as follows: ſuppoſe H, K, M, Z, (*fig.* 6.) the limits of the plain table; ſo that having laid down the field from A to B, thence to C and D, you want room, the line D E running off the paper; draw as much of the line D E as the paper will well hold; *viz.* D O. And by means of the diviſions on the edge of the frame, draw the line P Q through O, parallel to the edge of the table H M; and through the point of interſection O, draw O N parallel to M Z. This done, take off the frame, remove the ſheet, and put a freſh one (*fig.* 7.) in its ſtead; drawing on it a line R S near the other edge parallel thereto. Then lay the firſt ſheet on the table, ſo that the line P Q lie exactly on the line R S, to the beſt advantage, as at O. Laſtly, draw as much of the line O D, on the freſh ſheet, as the table will hold; and from O continue the remainder of the line D to E. From E proceed with the work as before to F, G, and A.

Uſe of the plain table, as a theodolite, ſemicircle, or circumferentor.—The great inconveniency of the plain table is, that its paper renders its uſe impracticable in moiſt weather. Even the dew of the morning and evening is found to ſwell the paper conſiderably, and, of conſequence, to diſtort the work. To avoid this inconvenience, and render the inſtrument uſeful in all weathers; by leaving off the paper, and ſetting up a pin in the centre, it becomes a theodolite, a ſemicircle, or a circumferentor, and is applicable like them.

The plain table, ſtripped of its paper, becomes either a theodolite, or a ſemicircle, as that ſide of the frame, which has the projection of the degrees of a circle, or a ſemicircle, is turned upwards. If it be to ſerve for a theodolite, the index (the plain table turning on any point as a centre) is conſtantly to turn about the braſs centre-hole in the middle of the table.

If it be for a ſemicircle, it muſt turn on the other braſs centre-hole ; in both caſes it is done by means of a pin raiſed in the holes. When the plain table is to ſerve as a circumferentor, ſcrew the compaſs to the index, and both of them to the head of the ſtaff, with a braſs ſcrew-pin fitted for the purpoſe ; ſo that the ſtaff and table ſtanding fixed, the index, ſights, &c. may be turned about, and *vice verſâ*.

To take an angle by the plain table, conſidered as a theodolite.—Suppoſe the quantity of the angle E K G (*fig.* 8.) required. Place the inſtrument at K, the theodolite ſide of the frame upwards, laying the index on the diameter. Turn the whole inſtrument about, the index remaining on the diameter till through the ſights you ſpy E. Screw the inſtrument faſt there, and turn the index on its centre till through the ſights you ſpy G.

The degree here cut on the frame by the index, is the quantity of the angle ſought ; which may be laid down on paper by the rules of common protraction.

Thus you may proceed to do every thing with the plain table, as with the common theodolite.

To take an angle with a plain table, conſidered as a ſemicircle.—Proceed in the ſame manner with the inſtrument, conſidered as a ſemicircle, as when conſidered as a theodolite ; only laying the ſemicircular ſide upwards, and turning the index on the other centre-hole in the middle of the length, and at about one-fourth of the breadth of the table.

To take an angle with the plain table, conſidered as a circumferentor.—Suppoſe the former angle E K G required. Place the inſtrument at K, the fleur-de-lis towards you. Direct the ſights to E, and obſerve the degree cut by the ſouth end of the needle, which ſuppoſe 296. Turn the inſtrument about, the fleur-de-lis ſtill towards you, and direct the ſight to G, noting the degree cut by the other end of the needle, which ſuppoſe 182. Subtract the leſs from the greater, the remainder, 114°, is the quantity of the angle ſought. If the remainder chance to be more than 180°, then it muſt be again ſubtracted from 360. This ſecond remainder will be the angle required ; which may be protracted, &c. as under PROTRACTOR. Thus you may proceed to do every thing with the plain table, as with the common circumferentor.

PLAIN *Place*, in *Geometry*, *locus planus*, or *locus ad planum*, is a term which the ancient geometricians uſed for a geometrical locus, when it was a right line, or a circle, in oppoſition to a ſolid place, which was an ellipſis, parabola, or hyperbola.

Theſe plain loci the moderns diſtinguiſh into *loci ad rectum*, and *loci ad circulum*. See LOCUS.

PLAIN *Problem*, in *Mathematics*, is ſuch a one as cannot be ſolved geometrically, but by the interſection either of a right line and a circle, or of the circumferences of two circles.

Such is the problem following. Given the greateſt ſide, and the ſum of the other two ſides, of a right-angled triangle : to find the triangle. Such alſo is this, to deſcribe a trapezium that ſhall make a given area of four given lines.

Such problems can only have two ſolutions, becauſe a right line can only cut a circle, or one circle cut another in two points.

PLAIN *du Nord*, in *Geography*, a town on the N. coaſt of Hiſpaniola ; 13 miles E.S.E. of Port de Paix.

PLAINFIELD, a townſhip of America, formerly *St. Andrew's*, in Caledonia county, Vermont, 100 miles N.E. from Bennington ; containing 543 inhabitants.—Alſo, a townſhip of Hampſhire county, Maſſachuſetts, incorporated in 1785, and containing 977 inhabitants ; 122 miles W. of Boſton.—Alſo, a townſhip in Northampton county, Pennſylvania, containing 1439 inhabitants.—Alſo, a townſhip in the N.W. corner of Cheſhire county, New Hampſhire, on the E. bank of Connecticut river, which ſeparates it from Hartland in Vermont, incorporated in 1761, and containing 1463 inhabitants.—Alſo, a poſt-town in the S.E. part of Windham county, Connecticut, on the E. ſide of Quinabaug river, which divides it from Brooklyn and Canterbury. The ſoil is generally rich, and well cultivated, and well watered by the Quinabaug and Mooſup rivers, together with many brooks and rivulets. It has two congregational meeting-houſes, and an academy, with three handſome buildings appropriated to its uſe. The ſame was ſettled in 1689, and contains 1738 inhabitants ; 14 miles N.E. from Norwich.

PLAINT, PLAINTE, in *Law*, the propounding or exhibiting any action, real or perſonal, in writing.

Hence, the party making this plaint is called plaintiff.

PLAINTAIN *Garden River*, in *Geography*, a river at the E. end of the iſland of Jamaica, and N. by W. of Point Morant. It has at its mouth a kind of bay, and on it, within land, is the town of Bath.

PLAINTE, in the *Ancient Cuſtoms of France*, was a requeſt, or petition, preſented to the king, againſt the judges of the provinces, and afterwards againſt bailiffs and ſeneſchals for denying juſtice, or for rendering judgment contrary to the laws of the realm.

For in thoſe days there was no appeal from their deciſions ; but they all pronounced in the dernier reſort ; ſo that the plainte was not directed againſt the party, but againſt the judge ; who was cited to ſee his own ſentence declared null.

This was a kind of ſupplement to the way of appeals, which was then ſhut up. The plaintes, in the Capitulars of Charlemagne, are called *blaſphemiæ*.

PLAINTIFF, in *Law*, he that ſues or complains, in an aſſize, or in an action perſonal ; as in an action of debt, treſpaſs, deceit, detinue, and the like.

Plaintiff ſtands oppoſed to *defendant*.

PLAJOW, in *Geography*, a town of the iſland of Borneo ; 150 miles N. of Banjar-Maſſin.

PLAISANCE, a town of France, in the department of the Gers, and chief place of a canton, in the diſtrict of Mirande ; 22 miles W. of Auch. The place contains 1260, and the canton 8049 inhabitants, on a territory of 217½ kiliometres, in 20 communes.

PLAISANCE, a town on the middle of the neck of the north peninſula of the iſland of Hiſpaniola ; 12 leagues S.W. of Cape François.

PLAISANO, a town of Naples, in Calabria Ultra ; ſix miles N. of Oppido.

PLAISE, in *Ichthyology*, the Engliſh name for the fiſh, called by authors *plateſſa* and *paſſer lævis*, by ſome *quadratulus*, and the *pleuronectes plateſſa* of Linnæus.

It is a flat fiſh, of a duſky olive-colour, ſpotted with red on the back, and white on the belly.

The plaiſe are common on moſt of our coaſts ; the beſt and largeſt are taken off Rye, on the coaſt of Suſſex, and alſo off the Dutch coaſts. They ſpawn in the beginning of February.

PLAISTER, in *Building*. See PLASTER, MORTAR &c.

PLAISTER, *Caſting in*. See CASTING.

PLAISTER, in *Medicine*. See EMPLASTRUM, and PLASTER.

PLAISTERED WALLS. See WALL.

PLAISTOW, in *Geography*, a town of America, in Rockingham county, New Hampſhire, containing 424 inhabitants.

Plaistow, a village in the pariſh of Weſt-Ham, Eſſex. See West-Ham.

PLAITING, in *Rigging*, denotes braided cordage, made by rope-yarn, &c. twiſted together, and then laid one over the other alternately; or the end of a rope opened, and the ſtrands placed together in the ſame manner.

PLAK, in *Geography*, a town of Hungary; five miles S. of Caſchau.

PLAN, a repreſentation of ſomething drawn on a plane. Such are maps, charts, and ichnographies.

Plan, in *Architecture*, is particularly uſed for a draught of a building; ſuch as it appears, or is intended to appear on the ground; ſhewing the extent, diviſion, and diſtribution of its area into apartments, rooms, paſſages, &c.

The plan is the firſt device or ſketch the architect makes; it is alſo called the *ground plot*, *platform*, and *ichnography*, of the building.

Plan, *Geometrical*, is that in which the ſolid and vacant parts are repreſented in their natural proportion.

Plan, *Raiſed*, is that where the elevation, or upright, is ſhewn, upon the geometrical plan, ſo as to hide the diſtribution. See Elevation.

Plan, *Perſpective*, is that conducted and exhibited by degradations, or diminutions, according to the rules of perſpective.

To render plans intelligible, it is uſual to diſtinguiſh the maſſives with a black waſh. The projectures on the ground are drawn in full lines, and thoſe ſuppoſed over them in dotted lines. The augmentations or alterations to be made are diſtinguiſhed by a colour different from what is already built; and the tints of each plan are made lighter as the ſtories are raiſed.

In large buildings it is uſual to have three ſeveral plans for the firſt three ſtories.

Plan *of a Baſtion*, in the *Military Art*, is the ſame with the face of the baſtion.

Plan, in *Ship Building*, the ſection of a ſhip, as deſigned upon paper, previouſly to the actual building of which, three are the chief, *viz.* the plan of elevation or ſheer-plan, the horizontal or half-breadth-plan, the plan of projection or body-plan; theſe three compoſe the *ſheer-draught*. But it muſt be obſerved, that the extreme length, breadth, and height muſt be determined; by which the three plans aforeſaid may be delineated. Theſe may be called the outlines, and the ſeveral parts contained within them may be delineated ſo as to anſwer the intended purpoſe; and likewiſe have a diſtinct view of the whole deſign, ſo that any inconveniencies attending ſuch a diſpoſition may be eaſily remedied, and the true dimenſions of every particular may then be had upon the draught.

The delineating a ſhip upon a plan is called drawing, and the repreſentation is called a draught. See Ship-building.

Plan, in *Geography*, a town of Bohemia, in the circle of Pilſen; 66 miles W.S.W. of Prague. N. lat. 49° 52′. E. long. 12° 47′.

Plan, *El*, a town of Spain, in Aragon; 15 miles N. of Ainſa.

Plan *Ober*, a town of Bohemia, in the circle of Bechin; 12 miles W.S.W. of Crumau.

PLANA, a town of Sweden, in Weſt Gothland; 30 miles E.N.E. of Uddevalla.

Plana, *La*, a town of Spain, in Valencia; 22 miles E. of Segorbe.

Plana, or *Tabarca*, a ſmall iſland in the Mediterranean, near the coaſt of Valencia, S.E. of cape St. Pola. N. lat. 37° 11′. W. long. 0° 34′.

PLANARIA, in *Ancient Geography*, an iſland ſituated on the coaſt of Italy, in the Ligurian ſea, 60 miles from that of Corſica. Pliny.

Planaria, in *Vermeology*, a genus of worms of the order Inteſtina. The generic character is; body gelatinous, flattiſh, with a double ventral pore; the mouth is terminal. There are forty-nine ſpecies, divided into four ſections, diſtinguiſhed as to the number of their eyes or their being without eyes. The animals comprehended under this genus nearly reſemble leeches, and like them live in freſh waters.

A. *Without Eyes.*

Species.

Stagnalis. Ovate, brown, the fore-part pale. It inhabits the ſtagnant waters; the body is opaque, a little pointed on the fore-part, pellucid, with two milk-white ſpots; the eggs are numerous, whitiſh, placed at the ſides.

Nigra. Oblong, black, and truncate on the fore-part. It inhabits rivers.

Brunnea. Oblong, reddiſh-brown, with a longitudinal black line.

Ciliata. Body long, depreſſed, and ciliate. It is found in ſtagnant waters, under duck-weed: it is a very curious creature; the body is grey, appearing as if compoſed of granulations, with moveable briſtles; the organ on the fore-part rotatory.

Gulo. Body long, pellucid, and truncate before. This alſo is found in ſtagnant waters, under duck-weed; reſembles the laſt, but is without the fringe, the margin all round is teſſellate, with extremely fine ſtriæ; it ſwallows the ſeveral ſpecies of the Cyclidium which inhabit the ſame waters, and after a time diſcharges them again. See Cyclidium.

Punctata. Body long, round, and green. Found early in the ſpring in wet meadows. The body is obtuſe before, a little pointed behind, ſprinkled with ſmall black dots, and containing five red ſpherical pellucid eggs.

Flaccida. Body long, reddiſh-brown, with tranſverſe white lines, and a lateral one. It is found among heaps of ſhells in the bays of Norway; when at reſt it rolls itſelf up ſpirally, and then gradually dilates itſelf.

Rosea. Body long, red. Found in the bays of Norway,

Angulata. Body long, reddiſh-brown, with two white angles on the fore-part. Found in the ſandy bottoms of the ocean.

Rubra. Body oblong, depreſſed, and of pale red. It inhabits the deeps of the Greenland ſhores. The body is marked with fine tranſverſe lines above.

Viridis. Body oblong, above convex, with tranſverſe white ſtreaks. Found among the roots of marine fuci.

Operculata. Body ſubovate, grey, and furniſhed beneath with a lid which conceals the exſertile tube. Inhabits, though rarely, the ſandy ſhores, particularly among fuci, in the bays of Norway. In appearance it ſeems to reſemble a coffee berry, and moves by bending in its margin, and by means of its marginal folds fixes itſelf to and aſcends other bodies.

Subulata. Body long, pointed on the fore-part, and truncate behind. It is found in great plenty among marine confervæ in Greenland, and the muddy bottoms of holes in rocks which conſtantly retain water, and proceeds with a ſerpentine kind of motion; but if the proboſcis be touched it contracts itſelf ſuddenly into a minute cube.

QUADRANGULARIS. Body pale, ovate, very ſharp-pointed before, and winged with ſmall curled longitudinal membranes. It is found in ditches, among duck-weed; is very ſoft, pellucid, of a changeable form, and moves like a ſlug, leaving a ſlime on the bodies it paſſes over; when it meets another animal it draws itſelf in like a ſnail.

BICORNIS. Body oval, lanceolate, obtuſe at each end, grey cinereous, dotted with black, with two very ſhort divergent tubes on the fore-part. It is a native of thoſe waters in Belgium that are covered with duck-weed: when irritated it fixes itſelf to other bodies, like the leech, by means of its tubes.

GRISEA. Body grey, dilated, elongated and pointed on the fore-part; the hind part is abbreviated and pointed. It inhabits the waters of lakes, among confervæ.

FULVA. Depreſſed, broadiſh, and pointed at each end, with a long black ſpot down the middle.

VIRIDATA. Oblong, round, green, and ſomewhat pointed at each end. It inhabits wet meadows in the autumn.

B. *With a ſingle Eye.*

GLAUCA. The body of this is a little elongated, and cinereous, with a white iris. It is about a line long, pointed before and broadiſh behind, with ſometimes a double black line in the middle of the back and meeting at the ends. A native of the waters.

LINEATA. Body long, above convex and cinereous, with a longitudinal pale line. This ſpecies is found on the ſhores of the Baltic; is about a line and a half long; beneath it is of a pale colour, with a brown patch in the middle, tapering before and dilated behind.

RUTILANS. Linear, with a black eye, and tapering to a point before. This is found in the Baltic, among fuci.

C. *With two Eyes.*

* FUSCA. Black-brown, with a ſemi-pellucid whitiſh ſpot above the tail. It is found in ſlow ſtreams upon and about aquatic plants. When at reſt the body is circular, and ſeldom above a line in length; when in motion it is linear, and nearly half an inch long; its motion is uniform, ſmooth, by gliding along the ſtream.

* LACTEA. Body depreſſed, oblong, whitiſh, and truncate on the fore-part. It is found in ponds and rivulets, but only in the ſummer ſeaſon, and among aquatic plants. When in motion it is about an inch long: the body is marked with a white ſpot in the middle, the purple viſcera elegantly branching round it; the margin is white and very tranſparent.

TORVA. Depreſſed, oblong, cinereous, or black and whitiſh beneath; the iris is white, it is ſomething more than half an inch long.

CRENATA. Depreſſed, ovate-oblong, pale, with a crenulate margin. A native of Denmark.

TENTACULATA. Depreſſed, oblong, cinereous, and tubular on the fore-part. Inhabits ſtagnant waters, and three-quarters of an inch long.

HELLUO. Body ovate, round, green. It inhabits wet meadows, and is not a quarter of an inch long.

OBSCURA. Ovate-oblong, white, and obtuſe at both ends. It is found in ſtagnant waters, and is about a line long, and ſub-pellucid.

ROSTRATA. Oblong, hyaline; elongated at the extremity; the eyes are red. It inhabits marſhes; about a line long; whitiſh, but with a purpliſh maſs in the middle.

ATOMATA. Flat, membranaceous, white, with ſcattered rufous ſpecks above. It is a native of the bays of Norway, and reſembles the DORIS *oblevata;* which ſee.

CORNUTA. Flat, rather oblong, with a tentaculum or feeler from each ſide of the head. It inhabits the bays of Norway.

RADIATA. Oblong, rufous, with a white roſe-like ſpot on the back. It inhabits wet woods, and reſembles the Vorticella radiata.

STRIGATA. Oblong, pale, with three longitudinal lines. It inhabits wet marſhes: the body is marked with rufous ſtreaks.

GROSSA. Cylindrical, white with black eyes, and pointed at both ends. It is found among aquatic plants; it varies in ſize; the body is pellucid, with from five to more than thirty large ſpherical eggs.

LINEARIS. Long, roundiſh, and pale yellow. It inhabits wet hollows of woods, about a line and a half long, and ten times as narrow; the margin is pellucid and white.

TERRESTRIS. Linear; above convex, cinereous; beneath white. It is found in moiſt clumps among moſs; it contracts and expands itſelf like a leech, and moves like a ſnail; body opaque and viſcous.

TETRAGONA. Pale yellow, with four quadrangular lamellæ. It inhabits clear ſtagnant waters.

CAPITATA. Oblong, cinereous, with a diſtinct head. Found in the Baltic.

CAUDATA. Body rounded before, and tapering into a tail behind. Inhabits the ſhores of Greenland, among ſea-wrack.

AURICULATA. Oblong, truncate and emarginate before, and acute behind. Found in the ſea-water in Norway. It is a very minute worm, ſcarcely viſible to the naked eye.

FILARIS. Linear, with a filiform contractile tail. Found on the MADREPORA *prolifera*, which ſee; it is about an inch long and a line broad.

LINGUA. Pellucid, brown-cinereous, and very obtuſe at both ends. Found in fiſh-ponds in the autumn.

GESSERENSIS. Body long, green, and rufous behind the head. This is a native of Denmark, on the Fucus furcellatus.

E. *With four Eyes.*

MARMORATA. Oblong, blueiſh-grey or pale. Found in wet ditches, about half a line long; inteſtines glomerate, white, with a large round yellow ſpot in the middle.

CANDIDA. Body long, whitiſh, with a clear white line down the middle. It inhabits the ſhores of Greenland, under ſtones, and is about two or three inches long.

TRUNCATA. Pale reddiſh, broadly truncate before, and rather ſharp behind.

F. *Eyes numerous.*

TREMELLARIS. Flat, membranaceous, pale yellow, with a ſinuate margin. It is found in the Baltic, and reſembles a Tremella, and is nine inches long. The body of this worm is greyiſh above; the diſk is yellowiſh, with a pinnate line, in the middle, and behind this two white lunules; beneath it is whitiſh, with three milk-white ſpots.

PLANCHES, in *Geography*, a town of France, in the department of the Jura, and chief place of a canton, in the diſtrict of Poligny; 16 miles S.E. of Poligny. The place contains 333, and the canton 4218 inhabitants, on a territory of 117½ kiliometres, in 10 communes.

PLANCHIER, or PLANCERE, in *Architecture*, the under part of the corona, or drip; making the ſuperior part of the corniche, between two cymatiums.

PLANCKEN, in *Geography*, a town of Pruſſia, in Natangen; 10 miles S.W. of Brandenburg.

PLANCOET, a town of France, in the department of the Northern Coaſts, and chief place of a canton, in the diſtrict of Dinan; 8 miles N. W. of Dinan. The place contains 635, and the canton 13,522 inhabitants, on a territory of 202½ kiliometres, in 12 communes.

PLANCY, a town of France, in the department of the Aube; 8 miles W. of Arcis-ſur-Aube.

PLANE, Planum, in *Geometry*, denotes a plain figure, or a ſurface lying evenly between its bounding lines.

Wolfius defines plane, a ſurface, from every point of whoſe perimeter a right line may be drawn to every other point in the ſame.

As the right line is the ſhorteſt extent from one point to another, ſo is a plane the ſhorteſt extenſion between one line and another.

Planes, *Oblique*. See Oblique.

Planes, *Parallel*. See Parallel.

Planes are frequently uſed in *Aſtronomy*, &c. for imaginary ſurfaces, ſuppoſed to cut, and paſs through, ſolid bodies, and on this foundation it is, that the whole doctrine of conic ſections, and of the ſphere, turns.

When a plane cuts a cone parallel to one of its ſides, it makes a *parabola;* when it cuts the cone parallel to its baſe, it makes a *circle*. See each reſpectively.

The ſphere is wholly explained by planes, imagined to cut the celeſtial luminaries, and to fill the areas or circumferences of the orbits; and they are differently inclined to each other; and by us the inhabitants of the earth, the plane of whoſe orbit is the plane of the ecliptic, their inclination is eſtimated with regard to this plane. See Planets.

Plane, in *Mechanics*. A *horizontal* plane is a plane level or parallel to the horizon.

The determining how far any given plane, &c. deviates from a horizontal one, makes the whole buſineſs of *levelling;* which ſee.

Plane, *Inclined*, is a plane which makes an oblique angle with a horizontal plane.

A machine has been contrived for meaſuring the acceleration of a ball down an inclined plane, and comparing it with that found in bodies falling at liberty. See its deſcription in Mem. de l'Acad. Roy. de Scienc. 1699, p. 343.

The doctrine of the motion of bodies on inclined planes makes a very conſiderable article in mechanics; the general principle of it has been already illuſtrated under Mechanical *Powers*, and the ſubſtance of it is as follows:

Laws of Deſcent of Bodies on inclined Planes.—I. If a body be placed on an inclined plane, its relative gravity will be to its abſolute gravity as the height of the plane, *e. gr.* A B (*Plate* XXXV. *Mechan. fig.* 1.) to its length A C. For, the conſtruction being as in the figure, it is evident that the abſolute gravity, tending in a direction perpendicular to the horizon, is to the relative gravity in the direction of the plane, as D F : F G or D E, *i. e.* becauſe the triangles D E F and B A C are equiangular, :: C A : A B.

Hence, 1. Since the ball D only gravitates on the inclined plane with its relative gravity, the weight L, applied in a direction parallel to the length of the plane, will retain or ſuſpend it, provided its weight be to that of the ball, as the altitude of the plane B A is to its length A C.

2. If the length of the plane C A be taken for the whole ſine or radius, A B will be the ſine of the angle of inclination A C B. The abſolute gravity of the body, therefore, is to its reſpective gravity applied to the inclined plane; and, therefore, alſo the weight D to the weight L acting according to the direction D A, which ſuſtains it, as the whole ſine is to the ſine of the angle of inclination.

3. Hence the reſpective gravities of the ſame body on different inclined planes, are to each other as the ſines of the angles of inclination.

4. The greater, therefore, the reſpective gravity is, the greater is the angle of inclination.

5. As, therefore, in a vertical plane, where the inclination is greateſt, *viz.* perpendicular; the reſpective gravity degenerates into abſolute; ſo in a horizontal plane, where there is no inclination, the reſpective gravity vaniſhes: and hence it appears, that the inclination of the plane may be ſo ſmall, that the greateſt weight may be ſuſtained on it by the ſmalleſt power.

II. To find the ſine of the angle of inclination of a plane, on which a given power will be able to ſuſtain a given weight. Say, as the weight is to the given power, ſo is the whole ſine to the ſine of the angle of inclination of the plane. Thus, ſuppoſe a weight of 1000 be to be ſuſtained by a power of 50, the angle of inclination will be found 2° 52′.

III. If the weight L deſcend according to the perpendicular direction A B, and raiſe up the weight D in a direction parallel to the inclined plane, the height of the aſcent of D will be to that of the deſcent of L, as the ſine of the angle of inclination C to the whole ſine.

Hence, 1. The height of the deſcent C D of the weight L, is to the height of aſcent D H of the weight D, reciprocally as the weight D to the equivalent weight L.

2. Since then $CD \times L = DH \times D$, and the actions of the equiponderating bodies D and L are equal; the moments of the weights D and L are in a ratio compounded of their maſſes, and the altitudes through which they aſcend or deſcend in a plane either inclined or perpendicular.

3. The powers that raiſe weights through altitudes reciprocally proportional to them, are equal. This Des Cartes aſſumes as a principle whereby to demonſtrate the power of machines.

Hence we ſee why a loaded waggon is drawn with more difficulty up an inclined than on an horizontal plane: as being preſſed with a part of the weight which is to the whole weight in a ratio of the altitude of the plane, to its length.

IV. Weights E and F, *fig.* 2, equiponderating upon inclined planes A C and C B of the ſame height C D, are to each other as the lengths of the planes A C and C B.

S. Stevinus gives a very pretty demonſtration of this theorem, which, for its eaſineſs and ingenuity, we ſhall here add. Put a chain, whoſe parts do all exactly weigh in proportion to their length, over a triangle G I H (*fig.* 3.); it is evident the parts G K and K H do balance each other. If then I H did not balance G I, the preponderating part will prevail; and there would ariſe a perpetual motion of the chain about G I H: but this being abſurd, it follows that the parts of the chain I H and G I, and conſequently all other bodies which are as the lengths of the planes I H and I G, will balance each other.

V. A heavy body deſcends on an inclined plane, with a motion uniformly accelerated.

Hence, 1. The ſpaces of deſcent are in a duplicate ratio of the times, and likewiſe of the velocities; and therefore in equal times they increaſe according to the unequal numbers, 1, 3, 5, 7, 9, &c.

2. The ſpace paſſed over by a heavy body deſcending on an inclined plane is ſubduple of that which it would paſs over in the ſame time, with the velocity it has acquired at the end of its fall.

3. Heavy bodies, therefore, deſcend by the ſame laws on inclined planes as in perpendicular planes. Hence it was, that Galileo, to find the laws of perpendicular deſcent, made his experiments on inclined planes, becauſe the motions are ſlower in the latter than the former; as in the following theorem.

VI. The velocity of a heavy body deſcending on an inclined plane, at the end of any given time, is to the velocity which it would acquire in falling perpendicularly in the ſame time, as the height of the inclined plane is to its length.

VII. The ſpace paſſed over by a heavy body on an inclined plane A D (*fig.* 4.), is to the ſpace A B it would paſs over in the ſame time in a perpendicular plane, as its velocity on the inclined plane is to its velocity in the perpendicular deſcent, at the end of any given time.

Hence, 1. The ſpace paſſed over on the inclined plane is to the ſpace it would deſcend in the ſame time in the perpendicular plane, as the altitude of the plane A B to its length A C; and, therefore, as the ſine of the angle of inclination C, to the whole ſine.

2. If, then, from the right angle B, a perpendicular be let fall to A C; A C : A B :: A B : A D. So that in the ſame time wherein the body would fall perpendicularly from A to B; in an inclined plane it will deſcend from A to D.

3. The ſpace, therefore, of perpendicular deſcent being given in the altitude of the plane A B; by letting fall a perpendicular from B to A C, we have the ſpace A D to be paſſed over in the ſame time on the inclined plane.

4. In like manner, the ſpace A D, paſſed over on the inclined plane, being given, we have the ſpace A B through which it would deſcend perpendicularly in the ſame time, by raiſing a perpendicular at D meeting the altitude of the plane in B.

5. Hence in the circle C D E F, *fig.* 5, the body will deſcend through all the planes A D, A E, A F, A C, in the ſame time; *viz.* in that time wherein it would fall through the diameter A B, ſuppoſing that perpendicular to the horizontal plane L M: becauſe all the angles D, E, F, C, in the ſemicircle, are right angles.

VIII. The ſpace A D, (*fig.* 4.) paſſed over an inclined plane A C being given, to determine the ſpace which would be paſſed over in any other inclined plane in the ſame time.

From the point D erect a perpendicular D B, meeting the altitude A B in B; then will A B be the ſpace through which the body would fall perpendicularly in that time. Wherefore, if from B a perpendicular B E be let fall to the plane A F; A E will be the ſpace in the inclined plane which the body will paſs over, in the ſame time wherein it falls perpendicularly from A to B; and conſequently A D will be the ſpace in the other inclined plane A C, which it paſſes through in the ſame time.

Hence, ſince A B is to A D as the whole ſine to the ſine of the angle of inclination C; and A B is to A E as the whole ſine to the ſine of the angle of inclination F; the ſpaces A D and A E, which the body will paſs over in the ſame time on different inclined planes, are as the ſines of the angles of inclination C and F, and reciprocally as the reſpective gravities on the ſame planes. And, conſequently, they are alſo reciprocally as the lengths of planes equally high, A C and A F. Whence the problem may be reſolved various ways by calculation.

IX. The velocities acquired in the ſame time on different inclined planes, are as the ſpaces paſſed over in the ſame time.

For A D, A B, and A E, are the ſpaces paſſed over in the ſame time; and ſince A B : A C :: the velocity acquired in paſſing over A D to the velocity acquired in paſſing over A B; A C : A F :: the velocity acquired in paſſing over A E to the velocity acquired in paſſing over A B; A B : A C :: A D : A B; and A B : A F :: A E : A B; the velocity acquired in paſſing over A D is to the velocity acquired in A B :: A D : A B, and the velocity acquired through A E to the velocity through A B :: A E : A B; therefore the velocities acquired in the ſame time in paſſing over A D and A E will be as the ſpaces of A D and A E paſſed through in the ſame time.

Hence, alſo, they are as the ſines of the angles of inclination C and F; reciprocally as the reſpective gravities on the ſame planes; and reciprocally as the lengths of equally high planes A C and A F.

X. A body deſcending on an inclined plane A C, when it arrives at the horizontal line C B, has acquired the ſame velocity which it would have acquired in a perpendicular deſcent A B, to the ſame horizontal line C B.

For A D is the ſpace paſſed over in the ſame time with A B; and, therefore, the celerity acquired in paſſing through A B is to that acquired through A D as A C to A B: but the celerity through A C is to that acquired through A D :: $\sqrt{AC} : \sqrt{AD}$; and ſince A C : A B :: A B : A D, A C : A D :: $AC^2 : AB^2$, and $\sqrt{AC} : \sqrt{AD}$ :: A C : A B: conſequently the celerity acquired through A C is to that acquired through A D as A C is to A B: therefore the celerity acquired through A C is equal to that acquired through A B.

Hence 1. A heavy body deſcending through different inclined planes A C, A G, A F, hath acquired the ſame velocity when it arrives at the ſame horizontal line B F.

Hence alſo, 2. A body, continuing its deſcent through ſeveral contiguous inclined planes, acquires the ſame velocity which it would acquire in deſcending perpendicularly to the ſame horizontal plane.

XI. The time of deſcent along an inclined plane A C, is to the time of perpendicular deſcent through A B, as the length of the plane A C, to its altitude A B: but the times of deſcent through different inclined planes equally high, A C and A G, are as the lengths of the planes.

For the time through A C is equal to the time in which A C would be deſcribed uniformly with half the celerity acquired in C; and the time through A B is equal to that in which A B would be deſcribed uniformly with half the celerity acquired in B; but theſe celerities are equal; conſequently the times are as A C and A B. In the ſame manner it might be ſhewn, that the times of deſcent through A C and A G, are as A C and A G.

XII. If the diameter of a circle A B (*fig.* 5.) be perpendicular to the horizontal line L M; a body will deſcend from any point of the periphery D, E, or C, to B, along an inclined plane D B, E B, and C B, in the ſame time in which it will deſcend through the diameter A B.

For, letting fall the perpendicular C G, the time in which G B is deſcribed is to the time in which B C is deſcribed as B G : B C; but the time in which B C is deſcribed is to the time in which A B is deſcribed in the ſubduplicate ratio of B G to A B; *i. e.* becauſe B G : B C :: B C : A B, in the ratio of B G to B C: conſequently, the time of deſcent through G B has the ſame ratio to the time of deſcent through B C and the diameter A B; therefore the time in which B C is deſcribed is equal to the time in which A B is deſcribed, &c. Hence,

XIII. The deſcents of bodies through a ſemicycloid D E F (*fig.* 6.), and through any arc thereof D G, are always iſochronal, or performed in the ſame time ; on which principle is founded the doctrine of pendulums vibrating in a cycloid. See Cycloid and Pendulum.

The inclined plane is a mechanical power, often applied with advantage to practical purpoſes, and forms a very uſeful part of machinery in the elevation of great weights. It is ſuppoſed that in all the edifices of remote antiquity, where great maſſes of ſtone were employed, as in the pyramids of Egypt, and the druidical temples of this country, theſe vaſt blocks were elevated on inclined planes of earth, or of ſcaffolding, with the aſſiſtance alſo of levers and rollers. Inclined planes are frequently uſed for drawing boats out of one canal into another : and ſometimes the local circumſtances are ſuch, that this may be done with great convenience, merely by allowing a loaded boat to deſcend, and to turn the axis which raiſes an empty one. An example of this may be ſeen, on a large ſcale, in the duke of Bridgewater's canal. This canal is extended, above ground, for forty miles on one level ; an underground navigation, twelve miles long, joins it at Worſley, leading to the coal-mines under Walkden moor. At a height of $35\frac{1}{2}$ yards above this, is another ſubterraneous portion, nearly ſix miles in length. The connection between theſe levels is formed by an inclined plane : the boats are let down loaded, and proceed three miles along the tunnel into the open canal. The inclined plane is fixed in a ſtratum of ſtone, which fortunately has the moſt eligible inclination of 1 in 4, and is 33 yards in thickneſs, affording the moſt advantageous means of fixing every part of the machinery with perfect ſecurity. The whole length of the plane is 151 yards, beſides a lock of 18 yards at the upper end.

Inclined planes are uſed in many places for raiſing and lowering coal-wagons, ſo that one is brought up by the force of that which deſcends. Inclined planes are alſo univerſally employed for facilitating the aſcent of heights, by men or by animals ; they may be either uniform, as roads, or the general inclination of the ſurface may be ſuperſeded by the formation of ſeparate ſteps or ſtairs. The inclination of the ſurface may be governed by the proportion of the ſtrength of the animal to its weight, the force required to ſupport any weight on a plane being to the whole weight as the height of the plane to its length , and if the plane be a little leſs inclined than the exact equilibrium would require, the animal will be able to acquire a ſufficient velocity at firſt to carry it eaſily up the aſcent with a motion nearly equable. The ſtrength of a labourer may be advantageouſly employed in aſcending a given height by a flight of ſteps, and placing himſelf on a ſtage which may raiſe a weight by its deſcent ; but it appears that the force of other animals is leſs calculated for exertions of this kind.

Planes, *Laws of Aſcent of Bodies on inclined.*—I. If a body aſcend in a medium void of reſiſtance, in any direction, whether perpendicular, or along an inclined plane ; its motion will be uniformly retarded.

Hence, 1. A body aſcending either perpendicularly or obliquely, in ſuch a medium, paſſes over a ſpace which is ſubduple of that it would paſs over in the ſame time on an horizontal plane, with an uniform celerity equal to that it has at the beginning of its motion.

2. Such ſpaces, therefore, performed in equal times, decreaſe in a retrograde order, as the uneven numbers 7, 5, 3, 1 ; and therefore the aſcent is ſo much impeded ; and conſequently, when the impreſſed force is exhauſted, the body will deſcend again by the force of gravity.

3. They are, therefore, inverſely as the ſpaces deſcribed in the ſame times by a body deſcending through the ſame altitude. For, ſuppoſe the time divided into four parts ; in the firſt moment, the body A deſcends through the ſpace 1, and B aſcends through 7 ; in the ſecond, A deſcends through 3, B aſcends through 5, &c.

4. Hence a body, riſing with an impreſſed force, aſcends to that altitude, from which it muſt fall to acquire that velocity in falling with which it aſcended.

5. Hence, by falling, it acquires a force to riſe again to the height from which it fell.

II. The time in which a body aſcends to a given altitude, being given ; to determine the ſpace paſſed over each moment.

Suppoſe the ſame body to deſcend from the ſame altitude in the ſame time ; and find the ſpaces paſſed over each moment.

Theſe, taken inverſely, are the ſame with the ſpaces of aſcent required.

Suppoſe, *v. gr.* a body projected perpendicularly, to aſcend through a ſpace of 240 feet in four ſeconds ; and the ſpaces of aſcent performed in the ſeveral times required ; if now the body had deſcended, the deſcent in the firſt minute had been 15 feet, in the ſecond 45, in the third 75, in the fourth 105, &c. The deſcent therefore will be in the firſt moment 105, in the ſecond 75, &c.

III. If a body deſcend either perpendicularly through A D (*fig.* 6.), or in any other ſurface F E D, and with the velocity it has there acquired, again aſcend along another ſurface D C, at points equally high, *e. gr.* at G, H, and Q, it will have the ſame force, and the ſame velocity.

Hence, if a body deſcend along any ſurface F E D, and again deſcend along another ſimilar and equal ſurface D G C, it is the ſame as if it paſſed over the ſeveral parts of the ſame line twice.

Whence, the times of aſcent and deſcent through equal ſpaces are equal.

On this principle are founded the conſtruction and uſe of pendulums.

Plane *of Gravity*, or *gravitation*, is a plane ſuppoſed to paſs through the centre of gravity of the body, and in the direction of its tendency ; that is, perpendicular to the horizon.

Plane *of Reflection*, in *Catoptrics*, is a plane which paſſes through the point of reflection ; and is perpendicular to the plane of the glaſs, or reflecting body.

Plane *of Refraction* is a plane drawn through the incident and refracted ray.

Plane *of the Horopter*, in *Optics*, is a plane that paſſes through the horopter A B (*Plate* VI. *Optics*, *fig.* 3.) and is perpendicular to a plane paſſing through the two optic axes I C and C H. See Horopter.

Plane *of the Projection*, in the *Stereographic Projection of the Sphere*, is the ſame with the *perſpective plane ;* which ſee.

Plane *of a Dial*, or *Dial-plane*, the ſurface whereon a dial is drawn. See Dial.

We have horizontal, vertical, inclining, declining, reclining, deinclining, direct, oblique, &c. dial-planes. See Decliner, Recliner, Direct, &c.

Plane, *Declination and Inclination of a.* See Declination and Inclination.

For the method of finding both, ſee Declinator.

Plane *Glaſs*, *Mirror*, *Figure*, *Number*, *Problem*, &c. See Plain *Glaſs*, *Mirror*, *Number*, *Figure*, *Problem*, &c.

Plane, *Geometrical*, in *Perſpective*, is a plane parallel to the horizon, whereon the object to be delineated is ſuppoſed to be placed.

This plane is uſually at right angles with the perſpective plane. See Perspective.

Plane, *Horizontal*, is a plane paſſing through the ſpectator's eye, parallel to the horizon, cutting the perſpective plane, when it is perpendicular to the geometrical one, at right angles.

Plane, *Objective*, is any plane ſituate in the horizontal plane, whoſe repreſentation in perſpective is required.

Plane, *Perſpective*, is a plain pellucid ſurface, ordinarily perpendicular to the horizon, and placed between the ſpectator's eye and the object he views; through which the optic rays, emitted from the ſeveral points of the object, are ſuppoſed to paſs to the eye, and in their paſſage to leave marks that repreſent them on the ſaid plane.

Some call it the *table*, or *picture*, becauſe the draught or perſpective, of the object, is ſuppoſed to be thereon; others the *ſection*, from its cutting the viſual rays; and others the *glaſs*, from its ſuppoſed tranſparency. See Perspective.

Plane, *Vertical*, a plane paſſing through the ſpectator's eye, perpendicular to the geometrical plane, and uſually at right angles to the perſpective plane. See Perspective.

Plane, a tool uſed by artificers who work in wood, to produce ſtraight, flat, and even ſurfaces upon that material. Almoſt all trades which fabricate articles of wood, employ planes at times; but as joiners make a greater uſe of theſe tools than any others, they are uſually conſidered as joiners' and carpenters' tools. Planes have been, of late years, uſed by ſome artiſts to produce flat ſurfaces in metals. A plane operates to cut off a thin chip or ſhaving from the wood on which it is applied, by the ſharp edge of a ſteel cutter or broad chiſſel, called, very improperly, the plane *iron*: this is fixed in a hole made through a wooden block, called the plane *ſtock*, and the edge of the iron projects a very ſmall quantity through the lower ſide of the ſtock, called the *face* of the plane; the ſurface of which face is made a perfectly true plane. The iron is fixed in an inclined poſition in the hole through the ſtock, by means of a *wedge* driven in before it, to jamb it faſt in the hole, which being wider than the thickneſs of the iron, leaves an aperture before the iron, called the *mouth* of the plane: this is very narrow where it opens in the lower ſide or face, but grows wider as it riſes up through the ſtock; the wedge is alſo cut forked, to allow more room for the ſhavings which the plane iron cuts to paſs up before it through the mouth. When a plane of this kind is applied with its face upon the ſurface of a piece of wood, and preſſed down upon it whilſt it is moved forwards, the edge of the iron penetrates the wood to the depth which it projects through the face, and removes a ſhaving of that thickneſs and the whole breadth of the edge of the iron, the ſhaving turning up before the iron paſſes through the mouth, and eſcaping. The inclination of the iron makes it cut eaſily; and if the iron is *ſet fine*, that is, if the edge projects but very little beyond the face, it will remove very thin ſhavings, and produce a flat and ſmooth ſurface: on the other hand, if it is *ſet rank*, that is, with a conſiderable projection, it will cut away very faſt, producing a flat though rough ſurface, and quickly reducing the wood to its intended thickneſs: if the wood has an irregular ſurface, it ſoon reduces it to a plane, becauſe the face, being flat, will not ſuffer the edge of the iron to deſcend into the hollow places, but removing all the eminences it paſſes over till they are reduced to one level.

This is a general deſcription of ſeveral kinds of planes, which are all known by different names, from their different dimenſions and purpoſes. Joiners uſe the *jack plane*, the *long plane*, *trying plane*, *ſhooting plane* or *jointer*, and the *ſmoothing plane*; all which they denominate *bench planes*, becauſe the wood they are uſed upon is generally laid on the work-bench. They have alſo the *ſtraight block* for ſtraightening ſhort edges, *rebating planes* for forming rebates; others, for the ſame uſe, are called the *moving filliſter*, *ſaſh filliſter*, and *ſide-rebating plane*. The *plough* is a narrow plane, provided with apparatus to guide it, in moving ſtraight, to plow a groove or trench at any required diſtance from the edge of a board or other piece of wood, and to any depth or width. The *dado grooving plane* is alſo for forming grooves.

There are ſeveral other tools, which, having an iron fitted into a ſtock, are called planes, becauſe they cut in the ſame manner, though, in ſtrictneſs, they are not planes, for they do not make plane ſurfaces; theſe are *moulding planes*, with faces and cutting edges curved, to produce all the varieties of ornamental mouldings, and which are known by the names of *ſnipe's-bills*; *ſide ſnipe's-bills*, *beads*, *hollows* and *rounds*, *ovolos* and *ogees*. The varieties and different ſizes of theſe form a vaſt number, with which every complete joiner is furniſhed. It is impoſſible to deſcribe the terms applied to theſe tools without figures, as they are arbitrary, though generally known among workmen. The faces of all theſe planes are ſtraight in the direction of their length, but a ſection acroſs the face is the impreſſion or reverſe of the moulding they are intended to make, and the edge of the iron is curved to correſpond with this curve when in its place, but will in reality be a very different figure, becauſe it is inclined to the face of the plane at an angle of about forty-five degrees. Another diſtinction between theſe and the bench planes is, that their mouths do not open ſo as to diſcharge the ſhaving through the ſtock at the top thereof, but the wedge completely fills the hole, and the ſhaving paſſes out ſideways through a hole for that purpoſe; in ſome, theſe apertures are on the right, and in others on the left ſide; in the firſt caſe the ſhaving is ſaid by the workmen to be thrown on the bench, that is, upon the right ſide of the plane; but when the orifice of diſcharge is on the left, and conſequently the ſhaving thrown upon the left, then the plane is ſaid to throw the ſhaving off the bench. The *compaſs plane* is uſed by coach makers, cabinet makers, &c.; it is made with a convex face, formed to an arc of a circle in the direction of its length, and it therefore forms the concave ſurface of a cylinder. The *forkſtaff plane* is ſtraight in the direction of its length, but its face is made concave in its breadth, to the arc of a ſmall cylinder; the edge of the iron is of courſe curved in the ſame manner, and it planes cylindrical ſurfaces. Coopers alſo employ long and heavy planes to form the edges of the ſtaves of barrels; theſe are mounted in an inclined poſition on legs like a ſtool, with their faces upwards, and the ſtave is drawn backwards and forwards upon them.

Planes are ſo neceſſary for all kinds of work, that any who intend to work in wood, ſhould underſtand the ſtructure and the manner of uſing them. The *jack plane* is uſed for taking off the rough and prominent parts from the ſurface of the wood, and reducing it nearly to the intended thickneſs, in coarſe ſhavings or ſlices. The ſtock of this plane is about ſeventeen inches in length, three inches high, and three and a half inches broad; all the ſides are ſtraight and at right angles to each other: the mouth is cut through the ſolid of the ſtock to receive the iron, and hold it at ſuch an elevation, as to make an angle of forty-five degrees with the face of the plane; the iron is a thin metal plate, one ſide conſiſting of iron the other of ſteel; the lower end of the iron is ground to an acute angle off the iron ſide, forming a ſloping part called the baſil of the iron, ſo as to bring the ſteel ſide to a ſharp edge: the wedge which fixes the iron in its place, is let into two grooves of the ſame form, on the ſides of the opening or mouth: two ſides of the wedge are parallel, and it is forked or cut away in the middle, leaving the ſides like two prongs, to fill the lower part of theſe grooves; this allows the ſhaving to paſs up without obſtruction before the wedge: for the mouth or opening through the ſtock muſt be uninterrupted from the face to the top, and muſt be no wider on the face of the plane, than is ſufficient for the thickeſt ſhaving to paſs with eaſe; and as the ſhaving is diſcharged at the upper ſide of the plane, the opening through it muſt expand or increaſe from the face to the top, ſo as to prevent the ſhavings from ſticking therein. A handle, called the *tote*, is fixed to the upper ſide of the ſtock, immediately behind the iron; it is formed to the ſhape of the hand, and direction of the motion, ſo as to produce the moſt power in puſhing the plane forward.

A workman in uſing the jack plane, lays the piece of wood on the *bench* parallel to its ſides, with the farther end lodged againſt the *bench-hook;* then laying the fore-part of the plane upon the hind end of the wood, with the right hand he takes the handle, and preſſing with his left upon the fore end, thruſts the plane forward in the direction of the fibre of the wood and length of the plane, until he has extended the ſtroke the whole length of his arm, the ſhaving being diſcharged at the orifice; he then draws back the plane, and repeats the operation in the next adjacent rough part, proceeding in this manner until he has removed the rough parts throughout the whole breadth. He then ſteps forwards the diſtance of the length he has planed, and operates upon another length in the ſame manner, proceeding this way by ſteps, until the whole length is gone over and rough planed. To do this is very eaſy; but a workman will not make good progreſs nor do clean work, unleſs he has firſt adjuſted his tool properly for the work. The methods of doing this are nearly the ſame for all planes. The firſt care is to obtain a ſharp cutting edge to the iron; if it requires grinding on the grindſtone, the carpenter places his two thumbs under the iron, and the fingers of both hands above, laying the baſil ſide to the grindſtone, and holding it to the angle he intends it ſhall make with the ſteel ſide of it, keeping it ſteady while the ſtone revolves; and preſſing the iron to the ſtone with his fingers; in order to prevent the ſtone from wearing the edge of the iron into irregularities, he moves it alternately from edge to edge of the ſtone, with ſo much preſſure on the different parts as will reduce it to the required bevel, and make the edge ſtraight.

The baſil being brought to a proper angle, and the edge to a regular and ſlight curvature, the roughneſs occaſioned by the gritty particles of the ſtone are taken away by rubbing its edge on a ſmooth flat hone or Turkey ſtone, ſprinkled with olive oil on its ſurface. As the baſil is generally ground, to give a more acute angle than the edge of the iron would ſtand, for the quicker diſpatch of wetting it, the face of the iron is inclined nearer to the perpendicular, while it is rubbed backwards and forwards with the ſame inclination throughout. Every time the iron becomes dull or blunt by uſe, the ſharpening is produced by grinding on the rubber-ſtone, or flat grindſtone, or on a Turkey ſtone; but in repeating this, after the edge gets thick, it requires ſo much time to bring it up to an edge, that recourſe muſt be had to the grindſtone. The iron being thus ſharpened, muſt be fixed in the plane by its wedge: the projection of the cutting-edge muſt be juſt ſo much beyond the face of the plane, as that the workman may be able to work it freely in the act of planing, and muſt be regulated by the ſtuff to be wrought; whether it is hard or ſoft, croſs-grained or curling; ſo that a man may be able to perform the moſt work, or reduce the ſubſtance moſt in a given time. If the ſtuff is good and clean-grained, it is evident that a conſiderable projection may be allowed, as a thicker ſhaving may be taken: the extreme ends of the edge of the iron muſt never enter the wood, as this not only retards the progreſs of working, but choaks and prevents the regular diſcharge of the ſhavings at the orifice of the plane. The projection of the cutting-edge is called *iron*, and the plane is ſaid to have more or leſs iron, as the projection is greater; when there is too much iron he knocks with a hammer on the fore end of the top of the ſtock, and the blows will looſen the wedge, and raiſe the iron in a certain degree, and the head of the wedge muſt be knocked down to fix it again.

When he has occaſion to take out the iron to ſharpen it, he ſtrikes the fore end of the top of the ſtock ſmartly with the hammer, which looſens the wedge and the iron.

All the other bench planes are adjuſted in the ſame manner, and indeed do not differ, except in dimenſions, as we ſhall explain, from the jack plane. Of late years, a great improvement has been introduced in the irons of planes, to cauſe them to cut ſmooth; theſe are called double ironed: they were at firſt only uſed in the fineſt ſhooting planes, but the advantages have been found ſo great, particularly in planing bad wood, that they have become general for all ſorts of planes. The double iron conſiſts of a ſecond iron, with a reverſed baſil ſcrewed againſt the front ſide of the iron, ſo that its edge lies againſt the iron at a very ſmall diſtance from, and parallel to, the cutting edge; and applying cloſely to the ſteel ſide of the iron, it forms an inclined plane, which turns the ſhaving over immediately after it is ſeparated or cut up by the edge, and thus it prevents the iron from ſplitting the ſhaving deeper down than it will afterwards cut, and therefore leaving a rough or torn ſurface. This ſecond iron is called the cover of the iron; and the baſil of its edge, inſtead of being ground flat, as that of the iron, is rounding: the ſcrew, which binds the cover upon the iron, paſſes through a ſlit in the cover, and thus admits of its edge being adjuſted at any required diſtance from the cutting edges of the iron, and this diſtance depends altogether on the nature of the wood the plane is to be worked upon. If the ſtuff is clean-grained, the edge of the cover may be ſet at a conſiderable diſtance, becauſe the difficulty of puſhing the plane forwards becomes greater, as the edge of the cover is nearer the edge of the iron, and the contrary when more remote: this is occaſioned by the edge of the cover turning the ſhaving over immediately it is cut up.

The *trying plane* is uſually twenty-two inches long, three-quarters broad on the face, and three in height; it does not differ from the jack plane, except in having a double handle, adapted for greater force: in uſe, it ſucceeds the operation of the jack plane, to ſtraighten the wood, and remove the ridges left by the former; it is ſet with leſs iron, and cuts a finer ſhaving: the mouth is alſo much narrower. When it is uſed upon a long piece of work, the workman takes every ſhaving the whole length, by ſtepping forwards, inſtead of ſtopping at arm's length, as with the jack plane. The ſhaving of this plane, though finer, is ſo much broader than the jack, that it requires as much force to puſh it forwards.

The *long plane* is ſet very fine for finiſhing work which is to be very ſtraight; it is twenty-ſix inches long, three and a half broad, and three inches in height.

The *ſhooting plane*, or *jointer*, is the longeſt, and moſt correct plane uſed; it is employed after all the others, chiefly in ſhooting the ſtraight edges of boards which are to be jointed together; it is generally made two feet and a half long, three inches and a quarter broad, and three and a half high; it is uſed like the others, but with great care to move it ſteadily from one end of the work to the other, without preſſing it down, as that might ſpring the plane, or the work, and cauſe the iron to cut when the work was ſomething hollow, whereas the object is to make a perfectly ſtraight edge. The face of this plane muſt be kept quite true, and therefore it is a great object to make it of a fine piece of clean-grained, hard beech, well ſeaſoned, that it may not warp, or vary, by the weather.

The *ſmoothing plane* is very ſhort, without any handle, and its ſides are curved, ſo that it very much reſembles a coffin; it is ſeven inches and a half long, three broad at the mouth, and two inches and three quarters in height; it is uſed for finiſhing work when put together, and to give the greateſt degree of ſmoothneſs to the wood, for which purpoſe it is ſet with as fine an edge as poſſible.

Rebating planes are uſed for cutting out rebates; theſe are a kind of ſemi-grooves upon the edge of a board, or other piece of wood, formed by cutting down or reducing a ſmall part of the breadth of the board to half, more or leſs, of the general thickneſs: by this means, if a rebate is cut on the upper ſide of one board, and the lower ſide of another, the two may be made to overlap each other, without making them any thicker at the joint. Rebates are alſo uſed for ornamenting mouldings, and many other purpoſes in joiners' work. The planes for cutting them are of different kinds, ſome having the cutting edge at the ſide of the iron and of the ſtock, others at the bottom edge of the iron and the face of the ſtock, and others cutting in both theſe directions; the former, being uſed to ſmooth the ſide of the rebate, are therefore called ſide-rebating planes; whilſt the others are uſed for ſmoothing the bottom. There is alſo a third ſort, called *filliſters*, uſed for ſinking, or cutting away the edge of the piece of wood to form the rebate, leaving it for the others to ſmooth the ſurfaces when cut. The rebate planes are about nine inches and a half long, and of various widths upon the face, from half an inch to an inch and three quarters; in all caſes they have the mouth and the edge of the iron coming out at one edge of the face, and the ſide of the iron alſo expoſed at one of the upright ſides of the ſtock, whether it is formed with a cutting edge there or not: this expoſed ſide is either on the right or left, and they are named accordingly. In all caſes they throw the ſhaving out on the ſide, inſtead of at the top of the ſtock. The cutting edges and mouths are generally ſituated obliquely acroſs the face, inſtead of being at right angles to the length of the plane, as in others.

The *moving filliſter* is a rebating plane, which has a ruler of wood, called the *fence*, fixed upon its face by ſcrews in the direction of its length, and exactly parallel to the edge of the face; it therefore covers part of the length of the cutting edge, and can be fixed at any required diſtance from the edge, to leave more or leſs of the cutting edge expoſed, and this quantity will be the breadth of the rebate it will cut; becauſe when it is uſed, the edge of the fence is applied againſt the edge of the piece to be rebated, and thus gauges the breadth its iron ſhall cut away. The cutting edge of this plane is not ſituated at right angles to the length of the ſtock, but has an obliquity of about forty-five degrees, the expoſed ſide of the iron being more forwards than the other. By this obliquity, when the plane is worked, it has a tendency or drift to run farther into the breadth of the wood, but as the fence, ſliding againſt the edge, prevents this, the drift always keeps the fence in contact with the edge, without the attention of the workmen; it alſo cauſes the iron to cut the bottom of the rebate ſmoother, particularly in a tranſverſe direction to the fibres, or where the ſtuff is croſs-grained, than could otherwiſe be done, when the ſteel face of the iron is perpendicular to the vertical ſides of the plane. The principal uſe is, however, to contribute, with the form of the cavity, to throw the ſhaving into a cylindrical form, and thereby making it iſſue from one ſide of the plane. The iron is what is called ſhouldered, that is, the lower part or ſhoulder where the edge is, has double the width of the upper part, which is received into the mortiſe, and jambed faſt by the wedge. It is the edge of this wide part only which is expoſed at the ſide of the ſtock. Beſides this principal iron, there is another ſmall iron, called the tooth, which precedes the other, to ſcratch or cut a deep crack at the width of the rebate, thus making the ſhavings which the iron cuts up from the bottom ſeparate ſideways from the reſt of the wood. This tooth is inſerted in a vertical mortiſe through the ſtock, between the fore end of the ſtock and the iron. The lower end of this little iron is ground with a baſil on the inſide, ſo as to bring the bottom of the narrow ſide of the iron to a very convex edge; it is faſtened by a wedge paſſing down before it in the mortiſe in the ſtock. The uſe of this tooth is principally for cutting the wood tranſverſely when wrought acroſs the fibres, and by this means it not only cuts the vertical ſide of the rebate quite ſmooth, but prevents the iron from ragging or tearing the ſtuff. The iron between the fence and the edge of the face of the plane, muſt project the whole breadth of the uncovered part of the face, otherwiſe the wood of the plane will bear it up, and prevent the plane ſinking as it cuts away the rebate, and the edge of the tooth or little iron ſhould ſtand out a little farther on the ſide of the plane than the iron. The depth of the rebate which this plane will cut, is regulated by a ſtop fixed on the outſide of the plane, at the intended height above the level of the face: then, when the plane has penetrated or ſunk the intended depth of the rebate, the ſtop comes to bear upon the ſolid of the wood beyond the rebate, and bears it off from cutting any longer. The ſtop is a piece of braſs, which moves in a vertical groove made in the ſide of the ſtock, between the iron and the fore end of the plane; in this it is moved up and down by a ſcrew, which is inſerted in a vertical perforation from the top of the plane to the groove, and paſſing through a part projecting from the ſtop into the groove: the upper part of the ſcrew is formed to a thumb-nut, to turn it round by, and it is ſo confined by proper collars, that it can neither move up nor down; but being turned, the inclination of the threads will riſe or fall according to the direction in which the thumb-ſcrew is turned, and cauſe the ſtop to move up and down in the groove on the ſide of the plane, thus regulating it at pleaſure to the depth to which the rebate is required to be ſunk.

In grinding and fixing the iron of this plane, it is neceſſary that the cutting edge of the iron ſhould ſtand equally prominent in all parts out of the face, otherwiſe the plane cannot make ſhavings of an equal thickneſs; and, conſequently, inſtead of keeping the vertical poſition, will, as it proceeds, become deeper on the ſide on which the ſhavings are thickeſt, and then the part cut away will not be regular, for the bottom of the rebate will not be parallel to the upper ſurface of the wood, and the ſide which ought to have been vertical, will be a kind of a ragged curved ſurface, formed by as many gradations or ſteps in the depth as the number of ſhavings.

The *ſaſh filliſter* differs in ſeveral particulars from the moving

ing filliſter: the breadth of the iron is ſomething more than the whole breadth of the ſole, ſo that the extremities of the cutting edge are in a ſmall degree without the vertical ſides of the ſtock: the fence is adapted to be moved to a conſiderable diſtance, not being fixed, as in the moving filliſter, by ſcrews upon the face, but ſuſtained by two bars fixed faſt to it, which paſs through the two vertical ſides of the ſtock, at right angles to the ſides, fitting tight in the two holes through which they paſs; theſe bars are made rounding upon the upper ſide and flat on the lower ſide: at the point where they are united to the fence, they have thicker parts, or ſhoulders, projecting downwards, becauſe it is neceſſary to have the fence fixed on a lower level than the face of the plane: the ends of the bars are ferruled, to prevent ſplitting when the ends are ſtruck with a mallet, in order to move them in the holes through the ſtock, and this brings the fence either nearer or more remote from the ſtock, as may be wanted; and to fix it faſt, when ſo adjuſted, two ſmall tapering pieces of wood, called keys, are inſerted into two ſmall wedge-like mortiſes, cut at the ſides of the mortiſes in which the bars paſs through the ſtem; theſe wedges being drawn in, they will ſtick faſt, and preſs againſt the bars, keeping them faſt at all points, and thereby regulate the diſtance of the fence from the vertical ſide of the ſtock. This plane is generally employed to rebate narrow pieces of wood, ſuch as ſaſh frames; and the fence is applied againſt the oppoſite edge of the wood to that on which the rebate is to be formed.

The *plough* is a plane with a very narrow face, made of iron, fixed beneath a wooden ſtock, and projecting down from the wood of the ſtock, the edge of the iron being the full width, or rather more, than the face; it is guided by a fence with two bars, like the filliſter above deſcribed, to make or plough out a groove of the width of the iron, and at any required diſtance from the edge of the wood; it has alſo a ſimilar ſtop to regulate the depth it cuts to.

Plane for planing ſurfaces of Metal.—This tool has been brought into uſe within theſe few years paſt, to the great improvement of the work of thoſe artiſts who employ it. Theſe are chiefly the mathematical inſtrument-makers who are in the conſtant habit of having to make ſtraight rulers in braſs, and prepare work requiring very flat ſurfaces, ſuch as the limbs of ſextants, &c.; but all trades which work in braſs and iron, would find their advantage in employing the plane. The ſtock of this plane is uſually made of caſt-iron, in form of a hollow box, the bottom, ſides, and ends being all caſt in one piece; it is uſually 12 inches in length, $1\frac{3}{4}$ in height, and $1\frac{1}{2}$ in breadth acroſs the face; the iron is ſituated at about four inches from the fore end, not inclined, as in other planes, but held in a perpendicular direction, with its lower or cutting edge paſſing through the mouth, and projecting the leaſt poſſible quantity beneath the ſurface of the face, but leaving only ſo ſmall a ſpace before the edge for a mouth, as will but juſt admit a piece of thick paper; the iron is held againſt a braſs frame fixed acroſs in the hollow of the box or plane, and containing within it a ſcrew, on which a nut or ſlider is fitted, to riſe and fall when the ſcrew is turned round by a milled head upon the upper end of it; the nut or ſlider has a projecting pin, which enters into a round hole made through the iron; and in this caſe, by turning the ſcrew, the iron is raiſed or depreſſed, to cauſe the edge to protrude more or leſs beyond the face; to ſupport this frame behind, a block of wood is fitted into the hollow of the ſtock, to fill up all the cavity, and it projects ſo much above as to form the handle for the plane.

In the front end of the ſtock a ſcrew is tapped through its thickneſs, and acts againſt a piece of wood, which it preſſes up againſt the iron, and thus holds it faſt againſt the braſs frame, in the ſame manner as the wedge of a common plane; this piece of wood is formed forked and hollowed where it applies to the iron, to allow room for the chips to come up from the mouth. The workmen who uſe this plane call it *ſtriping*, inſtead of planing, braſs or other metal.

The metal plane is uſed in the ſame manner as a carpenter's jack plane, but as the ſhaving it cuts, or rather ſcrapes off, muſt be exceedingly thin, the greateſt nicety is neceſſary in adjuſting the projection of the iron beyond the face; and for this reaſon the ſcrew is eſſential.

The work is to be ſupported upon a firm bench, which is beſt made of caſt-iron, and the ſurface of it made perfectly flat, which is done by grinding the face of the plane againſt it with emery, till both are true. The front face of the iron is quite flat, and perpendicular to the face; the edge is formed at the bottom of this ſurface by grinding a bevel from the back at an angle of about 45 degrees; the edge is then made fine by a Turkey ſtone. The iron muſt be exceedingly hard and of the very beſt ſteel, and then the plane will cut ſoft ſteel, bell-metal, or *caſt-iron*, as well as braſs, to very good purpoſe. When the work is rough, it is difficult for a man to work the plane, if ſet coarſe for expedition, they therefore uſe, in ſuch caſe, an iron which is cut with flutes on the front ſide, and then the edge will be divided into ſeparate teeth, which ſcrape and cut away with leſs reſiſtance than a complete edge. Meſſrs. Holtzapfell and Deyerlien of Cockſpur-ſtreet, make theſe planes for metal of exceedingly hard caſt-iron, and very true faces, which do not therefore become ſcratched or injured by wear. It ſhould have been mentioned before, that joiners, cabinet-makers, &c. in planing thin or valuable woods for veneering, &c. ſometimes uſe fluted irons, having teeth in their edge; and a plane thus mounted is called a *toothing plane;* theſe irons apply to the ſtocks of different planes.

Plane, among *Fowlers*. To plane, is to fly or hover, as a kite or other bird does, without moving its wings.

Plane, in *Geography*, a town of America, in Stark county, and ſtate of Ohio, containing 527 inhabitants.

Plane-*Tree*, in *Botany*. See Plantanus.

Plane-*Tree*, *Baſtard* or *Falſe*. See Maple.

Plane-*Tree*, in *Planting*, the common name of an elegant tall growing tree of the timber kind, of which there are two ſpecies, as the Aſiatic, or oriental, and occidental, or American; the firſt of which riſes to a very great height, and in its native ſoil grows to a prodigious ſize; the ſtem is covered with a ſmooth bark, which falls off annually. The bark of the young branches is of a dark brown, inclining to a purple. The leaves are large and palmated, being deeply cut into five ſegments: their upper ſides are of a deep green, and the under ſides pale. The flowers are very minute: they come out at the ſame time as the leaves, which is in June. This, Mr. Marſhall ſays, is very late, and is, no doubt, a blemiſh to the beauty of this neverthleſs highly ornamental tree. The ancients were very partial to this tree; which is not to be wondered at, when the extenſive canopy it forms is conſidered, the impenetrable ſhade given by the number and ſize of the leaves, and conſequently the grateful coolneſs it muſt afford in a ſultry climate. This, as well as the American ſort, has been conſidered as a foreſt or timber tree; and their wood may rank with that of the ſycamore, which bears a conſiderable reſemblance to them, and which, in the north of England, is often improperly called the plane-tree.

With regard to the ſecond ſort, or American plane, it grows to a great ſize; the ſtem not only ſwells to an immenſe thickneſs but, riſing erect, ſhoots up perfectly ſtraight and cylindrical to an amazing height. The bark is ſmooth, and, like that of the Aſiatic or former ſort, falls off annually. The leaves are broad, with long footſtalks, and are cut into angles at their edges, but not divided nearly ſo deep as thoſe of the other kind. The upper ſide is of a light green, the under ſide paler. The flowers are ſmall, and come out with the leaves about the ſame time as thoſe of the Oriental plane. Mr. Marſhall thinks that, on the whole, this tree is peculiarly refreſhing to the eye, and truly ornamental.

And in addition to theſe ſpecies, there are two varieties of the firſt ſort, as the maple-leaved plane, and the Spaniſh plane, the firſt of which differs from the other ſorts, in having its leaves not ſo deeply cut as thoſe of the Eaſtern plane, but much more deeply than thoſe of the occidental. The footſtalks of the leaves are much larger than thoſe of either of them, and the upper ſurface of the leaves is rougher. They might, of courſe, be taken for different ſpecies, if it was not well known that they are produced from the ſame ſeeds. The Spaniſh plane has larger leaves than either of the other ſorts. They are divided in a ſimilar manner to thoſe of the maple-leaved plane. Some of them are cut into five, and others into three lobes: theſe are ſharply indented on their edges, and are of a light green. It is by ſome called the middle plane, from its leaves being ſhaped between thoſe of the firſt two ſorts.

The firſt of theſe ſorts may be raiſed from ſeeds, where they can be procured; but in other caſes recourſe muſt be had to layers. And the ground proper for raiſing them in, is ſuch as is moiſt and ſhady, well dug, and raked until the mould is fine; then in the autumn, ſoon after the ſeeds are ripe, they ſhould be ſcattered over the ſurface, and be raked in the ſame manner as turnip ſeed. In the ſpring, many of the young plants will appear, but it muſt not be expected that the general crop will come up until the ſecond year; the ſpring after which they may be taken out of the ſeed-bed, and planted in a nurſery-ground in rows one yard aſunder, and at one foot and a half diſtance in the rows. Here they ſhould remain, with the uſual care of digging between the rows, and keeping them clean, till they are of ſufficient ſize to be planted out in plantations or other places, either as timber or ornamental trees. In the layering method a ſufficient number of trees muſt be planted out for ſtools, on a ſpot of earth double dug. After they have ſtood one year, they ſhould be cut down, in order to make them throw out young wood for layering. The autumn following, theſe ſhould be laid in the ground, with a little nick at the joint; and by the ſame time twelve months they will be trees of a yard high, with a good root, ready to be planted out in the nurſery, where they may be managed as the ſeedlings; and as the ſtools will have ſhot up freſh young ſhoots for a ſecond operation, this management may be continued as the planter may think fit.

But the American plane is moſtly raiſed by cuttings; which, if they be taken from ſtrong young wood, and planted early in the autumn, in a moiſt good mould, will hardly fail of ſucceeding. They are generally planted thick, and then removed into the nurſery-ground, as the layers of the other ſort: but if a large piece of ground was ready, Mr. Marſhall thinks theſe might be placed at ſuch a diſtance as not to approach too cloſe before they were of a ſufficient ſize to be planted out to ſtand; and this would ſave the expence and trouble of a removal. The Oriental plane-tree will alſo grow from cuttings, but not ſo certainly as this; and whoever has not the convenience of proper ground for the cuttings, muſt have recourſe to layers, which, indeed, for either ſort is the moſt effectual and certain method of proceeding.

Theſe ſorts of trees delight in a moiſt ſituation, eſpecially the occidental ſort. Where the land is inclined to be dry, the others are to be preferred. But in moiſt places, by the ſides of rivulets, ponds, &c. the occidental makes ſuch ſurpriſing progreſs, that it might be ranked among the aquatics. The bright colour of the plane-trees gives variety to groves and maſſes of wood; in groups and ſingle trees they are ſingularly elegant; as may be ſeen in many parks and other places. In ſuch ſituations and ſoils they may likewiſe be planted as timber trees with great advantage, as the wood is uſeful for a variety of purpoſes.

And the proper ſeaſon for planting out this ſort of trees is in the early ſpring, as about March; but they may be ſet out in the autumn, where the ſoil is not of too wet a nature, with perfect ſucceſs, though the other is always to be preferred if poſſible.

PLANERA, in *Botany*, ſo named by profeſſor Gmelin of Gottingen, the very incompetent editor of the Linnæan Syſtema Naturæ, at leaſt as far as the vegetable kingdom is concerned. He appears to have deſigned to commemorate James Planer, who publiſhed an Index of the plants about Erfurt, where he was profeſſor of medicine. Gmelin took his ideas of the genus from Walter's Flora Caroliniana, 230, it being one of thoſe which that writer had deſcribed as new, but which he had declined naming. Michaux has adopted *Planera*, Fl. Boreal-Amer. v. 2. 247, as has Mr. Purſh in his Fl. Amer. Septentr. v. 1. 115. Both remark its very near affinity to *Ulmus*. Indeed Michaux's deſcription hardly indicates any difference, except the flowers being polygamous, which is of no generic importance whatever. Michaux defines two ſpecies; *P. Gmelini*, a native of North America, *Anonymos aquatica* of Walter; and *P. Richardi*, a native of the country near the Caſpian ſea. This latter has long been known in the gardens of France and England, by the name of the Siberian Elm, or *Ulmus polygama*. *Ulmus nemoralis* of both editions of Hort. Kew. always appeared to us the ſame thing, but Mr. Purſh has the latter as a native American *Ulmus*, though Michaux has not any ſpecies under that name, nor does he give his *Planera Richardi* as an American plant. Pallas has figured the Caſpian tree, under the appellation of *Rhamnus carpinifolius*, Fl. Roſſ. v. 1. t. 60, but he had not ſeen the ripe fruit. Whatever this Caſpian plant may be, the *Abelicea cretica* of Pona, Cluſ. Hiſt. v. 2. 302, is certainly another ſpecies of the ſame genus, as has been ſhewn by the writer of the preſent article, in a paper on the ſubject of that little known plant, printed in Tr. of the Linn. Soc. v. 9 [illegible] 6. Whether the genus in queſtion be diſtinct from *Ulmus*, appears very doubtful; but if it ſhould ſo prove, the name of *Planera* muſt give way to *Abelicea*, as a Greek name, publiſhed long ſince, and of good authority. See Ulmus, where poſſibly we may be able to throw ſome further light on this ſubject.

PLANET, Planeta, *πλανητης*, *wanderer*, in oppoſition to a *ſtar*, which remains fixed, in *Aſtronomy*, a celeſtial body revolving round the ſun as a centre, and continually changing its poſition with reſpect to the other ſtars.

The planets are uſually diſtinguiſhed into *primary* and *ſecondary*.

Planets, *Primary*, called alſo ſimply, and by way of eminence, *planets*, are thoſe which move round the ſun as their proper centre. Such are the Georgian, Georgium Sidus or Herſchel, Saturn, Jupiter, Veſta, Juno, Pallas, Ceres, Mars, the Earth, Venus, and Mercury.

Planets, *Secondary*, are ſuch as move round ſome primary planet as their reſpective centre, in the ſame manner as the primary planets do round the ſun. Georgium Sidus, Saturn, Jupiter, and the Earth, are each attended with ſecondary planets; the Georgian with ſix, Jupiter with four, and Saturn with ſeven, called the *ſatellites* of thoſe planets. The Earth has one ſecondary planet, called the *Moon;* which ſee.

The motion of the primary planets is very ſimple and uniform, as being compounded only of a projectile motion, forward in a right line, which is a tangent to the orbit; and a gravitation towards the ſun at the centre. (See Gravity.) Beſides, as they are at ſuch vaſt diſtances from one another, the effects of their mutual gravitation are in a conſiderable degree, though not altogether, inſenſible; for the action of Jupiter on Saturn, *e. gr.* is found to be $\frac{1}{211}$ of the action of the ſun upon Saturn, by comparing the matter of Jupiter with that of the ſun, and the ſquare of the diſtance of the ſun from Saturn, with the ſquare of the diſtance of Jupiter from Saturn; ſo that the elliptic orbit of Saturn will be found to be more juſt, if we ſuppoſe its focus not to be in the centre of the ſun, but in the centre of gravity of the ſun and Jupiter, or rather, in the centre of gravity of the ſun, and of all the planets below Saturn. In the ſame manner, the elliptic orbit of any other planet will be found more accurate, by ſuppoſing its focus to be in the centre of gravity of the ſun, and of all the planets that are below it. But the matter is far otherwiſe in reſpect of the ſecondary planets; for every one of theſe, though it chiefly gravitate towards its reſpective primary one, as towards its centre, yet at equal diſtances from the ſun, it is alſo attracted towards him with an equally accelerated gravity, as the primary one is toward him; but at a greater diſtance with leſs, and at a nearer diſtance with greater: from which double tendency towards the ſun, and towards their own primary planets, the motion of the ſatellites, or ſecondary planets, comes to be very much compounded, and affected with many inequalities: as, for inſtance,

1. The ſatellite ſhall be continually accelerated in its motion, from the time of its quadrature with the ſun to the next following conjunction or oppoſition; but contrarywiſe from the ſyzygies to the quadratures, it ſhall be retarded; and therefore it will always move ſwifter in or near the ſyzygies, and ſlower near the quadratures. From whence will follow that,

2. The orbits of theſe ſecondary planets will be of a figure more circular in the quadratures than in the ſyzygies, where the ſwiftneſs of the motion will make the figure of the orbit more rectilinear, and therefore the ſatellite will run farther from its primary planet at the quadratures than at the ſyzygies; ſo that the orbit will be a little elliptical, having the primary planet for its centre, and the longer diameter will coincide with the line of the quadratures, and the ſhorter with that of the ſyzygies. Which irregularities will ariſe, if the ſun's power of diſturbing the motion of the ſatellite be excluded, and the orbit be concentric with that of the primary planets: for if the orbit be excentrical, it may happen that the ſatellite ſhall be farther off from the primary one in the ſyzygies, and ſo move ſlower than it does at the quadratures; and when this is the caſe, that the ſatellite's orbit is not a circle concentric to the primary orbit, but an ellipſis, in one of whoſe foci the primary planet is placed, then the motion of the ſatellite will be ſo diſturbed by the ſun, that, as it proceeds in its orbit, the apſides of the orbit will be moved ſometimes *in conſequentia*, and ſometimes *in antecedentia* (whereas the nodes and apſides of the primary planets may be conſidered as at reſt.)

3. When the plane of the ſatellite's orbit is inclined to the plane of the primary orbit, the line of the nodes of the ſecondary orbit will be moved *in antecedentia*, with an angular motion, and an unequal velocity; for it will recede moſt ſwiftly when the nodes are in quadrature to the ſun; after which it will move ſlower; and at the time of the nodes being in the ſyzygies, it will be perfectly at reſt.

4. The inclination alſo of the plane of the ſecondary orbit, to the primary one, will be continually varying, and will be greateſt when the nodes are in the ſyzygies with the ſun, and leſs, *cæteris paribus*, when they are in the quadratures; and from the time of the nodes being in the ſyzygies to the quadratures, it will be always decreaſing, and from the time of their being in the quadratures to the ſyzygies, it will be always increaſing; and all theſe irregularities, whether in any excentric or concentric orbit, will always be ſomething greater, when the ſatellite is in conjunction with the ſun, than when he is in oppoſition to him. See Moon and Satellites.

The primary planets are in number eleven, (including the earth) ten of which are again diſtinguiſhed into the *ſuperior* and *inferior*.

Planets, *Superior*, are thoſe farther from the ſun than our earth is. Such are Mars, Veſta, Juno, Pallas, Ceres, Jupiter, Saturn, and the Georgian.

Planets, *Inferior*, are thoſe nearer the ſun than our earth, and ſituate between the earth and ſun. Such are Venus and Mercury. See the order, poſition, &c. of the planets, under *Copernican* System.

The planets are repreſented by the ſame characters as the chemiſts uſe to repreſent their metals by, on account of ſome ſuppoſed analogy between thoſe celeſtial and ſubterraneous bodies.

The Georgian is repreſented by the character ♅, and performs its ſidereal revolution in about 84 years.

According to La Place, the firſt five ſatellites of this planet may be retained in their orbit by the action of its equator, and the ſixth by the action of the interior ſatellites; and hence he concludes, that this planet revolves about an axis very little inclined to the ecliptic, and that the time of its diurnal rotation cannot be much leſs than that of Jupiter or Saturn. When the Earth is in its perihelion, and the Georgium Sidus in its aphelion, the latter becomes ſtationary, when his elongation or diſtance from the ſun is $8^s\ 17^\circ\ 37'$, and his retrogradations continue $151^d\ 12^h$. When the Earth is in its aphelion, and the Georgium Sidus in its perihelion, it becomes ſtationary at an elongation of $8^s\ 16^\circ\ 27'$, and the retrogradations continue $149^d\ 18^h$. The following table contains the moſt correct elements of the orbit of the Georgium Sidus, and other particulars relating to this planet.

Tropical revolution - -	$30589^d\ 8^h\ 27'$
Mean diſtance from the Sun, that of the Earth being 100000 - -	1908352
Denſity, that of water being 1 -	$0\frac{99}{100}$
Quantity of matter, that of the Earth being 1	16.84
Diameter in Engliſh miles - -	35112
Inclination of its orbit in 1780 -	$46'\ 20''$
Place of aphelion in 1800 -	$11^s\ 16^\circ\ 30'\ 31''$
Secular motion of aphelion -	0 1 29 2
Excentricity of its orbit, the mean diſtance being 100000 -	90804
Longitude for 1784 - -	$3^s\ 14^\circ\ 43'\ 18''$
Greateſt equation of the centre -	0 5 27 16

Longitude of aſcending node in 1788	$2^{s}\ 12^{\circ}\ 47'\ 0''$
Secular motion of the node - -	1 44 35
Greateſt aberration - -	25

See GEORGIUM SIDUS, and *Planetary* NUMBERS.

The planet Ceres, firſt diſcovered by Piazzi, January 6, 1801, and afterwards by Dr. Olbers of Bremen, Jan. 1, 1807, nearly in the place where it was expected to appear from the calculations of baron Zach, is of a ruddy colour, and ſeems to be about the ſize of a ſtar of the eighth magnitude; apparently ſurrounded by a denſe atmoſphere, and plainly exhibiting a diſc, when examined with a magnifying power of about 200. Its revolution round the ſun is performed in four years, ſeven months, and ten days; at a mean diſtance of nearly 260 millions of Engliſh miles. The excentricity of its orbit is ſomewhat greater than that of Mercury, aud its inclination to the ecliptic exceeds that of all the old planets. According to Dr. Herſchel, its diameter does not exceed 160 miles, whereas Mr. Schroeter makes it 1624 miles. The following table comprehends all the particulars that are known concerning it.

Tropical revolution, La Lande -	$4^{y}\ 7^{m}\ 10^{d}$
Do. from Maſkelyne's Table, -	$1681^{d}\ 12^{h}\ 9'$
Annual motion - - - -	$2^{s}\ 18^{\circ}\ 14'\ 0''$
Mean longitude, January 1, 1804 -	10 11 59 0
Place of aſcending node, from Maſkelyne's Table, in 1802 -	2 20 58 40
Do. in 1804, according to La Lande	2 21 6 0
Place of aphelion in 1802 -	4 25 57 15
Do. according to La Lande, Jan. 1, 1804	4 4 26 44
Excentricity, the mean diſtance being 1, according to Maſkelyne -	0.08141
Do. according to La Lande -	0.079
Inclination of orbit - -	$10^{\circ}\ 37'\ 0''$
Greateſt equation of centre, Maſkelyne	9 20 8
————————, La Lande	9 3 0
Mean diſtance from the Sun, that of the Sun from the Earth being 1, La Lande	- 2.77
Do. from Maſkelyne's Table -	2.735
Mean diſtance in Engliſh miles -	260.000.000
Diameter in Engliſh miles, Herſchel -	163
————————, Schroeter	1624
Apparent mean diameter, as ſeen from the Earth - -	- $1''$

See CERES, and *Planetary* NUMBERS.

For an account of the planet Pallas, ſee PALLAS, and *Planetary* NUMBERS.

Juno, a planet diſcovered, as we have ſaid under JUNO, in 1804, is of a reddiſh colour, and free from that nebuloſity which ſurrounds Pallas. Its diameter is leſs, and its diſtance greater than thoſe of the other new planets. It is diſtinguiſhed from all the other planets by the great excentricity of its orbit; and the effect of this is ſo extremely ſenſible, that it paſſes over that half of its orbit, which is biſected by its perihelion, in half the time that it employs in deſcribing the other half, which is farther from the ſun. From the ſame cauſe, its greateſt diſtance from the ſun is double the leaſt diſtance, the difference between the two diſtances being about 127 millions of miles. The following elements were calculated by Burckhardt.

Revolution - -	$5^{y}\ 182^{d}$
According to others (ſee *Planetary* NUMBERS) in - - - - -	$1590^{d}\ 1\ 35'$
Mean longitude, 31ſt December, 1804, noon, - -	$1^{s}\ 12^{\circ}\ 17'\ 23''$
Place of aſcending node - -	5 21 6 0
Place of perihelion in 1805 -	1 29 49 33
Excentricity, the mean diſtance being 100.000 - -	25096
Inclination of orbit - -	$21^{\circ}\ 0'\ 0''$
Mean diſtance from the Sun in Engliſh miles - -	275.000.000
Diameter in Engliſh miles, according to Schroeter	1425
Apparent mean diameter, as ſeen from the Earth, according to Schroeter	$3''.057$

See JUNO.

Dr. Olbers, who had diſtinguiſhed himſelf by the diſcovery of two of the new planets, conceived, that theſe ſmall celeſtial bodies were merely the fragments of a larger planet, which had been burſt aſunder by ſome internal convulſion, and that ſeveral more might be diſcovered between the orbits of Mars and Jupiter. He therefore concluded, that though the orbits of all theſe fragments might be differently inclined to the ecliptic, yet, as they muſt have all diverged from the ſame point, they ought to have two common points of reunion, or two nodes in oppoſite regions of the heavens, through which all the planetary fragments muſt ſooner or later paſs. One of theſe nodes Dr. Olbers found to be in Virgo, and the other in the Whale, and it was actually in the latter of theſe regions that Mr. Harding diſcovered the planet Juno. With the intention therefore of detecting other fragments of the ſuppoſed planet, Dr. Olbers examined, thrice every year, all the little ſtars in the oppoſite conſtellations of the Virgin and the Whale, till his labours were crowned with ſucceſs on the 29th of March, 1807, by the diſcovery of a new planet in the conſtellation Virgo, to which he gave the name of Veſta. This planet was obſerved at Blackheath the 26th of April, 1807, by S. Groombridge, eſq., an ingenious and active aſtronomer; and purſuing his obſervations with perſevering attention and induſtry, he at length, *viz.* on the 8th of September, 1808, obſerved the ecliptic oppoſition of this planet at $7^{h}\ 30'$ in longitude $11^{s}\ 15^{\circ}\ 54'\ 26''$.

The planet Veſta is of the fifth or ſixth magnitude, and may be ſeen in a clear evening by the naked eye. Its light is more intenſe, pure, and white than any of the other three. It is not ſurrounded with any nebuloſity, and has no viſible diſc. (Phil. Tranſ. 1807, part ii. p. 265. 260.) The orbit of Veſta cuts the orbit of Pallas, but not in the ſame place where it is cut by that of Ceres. According to the obſervations of Schroeter, the apparent diameter of Veſta is only 0.488 of a ſecond, one half of what he found to be the apparent diameter of the fourth ſatellite of Saturn; and yet it is very remarkable, that its light is ſo intenſe, that Mr. Schroeter ſaw it ſeveral times with his naked eye. Phil. Tranſ. 1807, part ii. p. 245.

M. Burckhardt is of opinion, that Le Monnier had obſerved this planet as a fixed ſtar, ſince a ſmall ſtar, ſituated in the ſame place, and obſerved by that aſtronomer, has ſince diſappeared.

The following are the elements of the orbit of Veſta, computed by Mr. Groombridge, from his own obſervations.

Revolution - - -	$3.^{y}182$
According to others (ſee *Planetary* NUMBERS) in - - - - .	$1335^{d}\ 0^{h}\ 23'$
Place of aphelion - -	$6^{s}\ 3^{\circ}\ 0'\ 0''$
Place of aſcending node -	3 14 38 0
Inclination of orbit - -	7 8 20
Mean diſtance - - -	2.163
Excentricity in parts of the Earth's radius	0.0953

The following elements are given by Burckhardt, in the Connoiſſance de Temps for 1809, from the moſt recent obſervations on the continent.

Place

Place of aſcending node	3^s	13°	1′	0″
Place of perihelion	8	9	42	53
Inclination of orbit		7	8	46
Mean diſtance				2.373000
Excentricity				0.093221

We ſhall ſubjoin to the account above given of the four new planets, called by Dr. Herſchel *aſteroids* (which ſee), ſome obſervations concerning their origin. From a variety of conſiderations it has been concluded, agreeably to the opinion ſuggeſted by Dr. Olbers, that theſe four planets are the fragments of a large celeſtial body, which once exiſted between Mars and Jupiter. On the ſuppoſition that they are independent planets, their diminutive ſize, the great excentricity and inclination of their orbits, and their numerous interſections, when projected on the plane of the ecliptic, are phenomena abſolutely inexplicable on every principle of ſcience, and completely ſubverſive of that harmony and order, which, before the diſcovery of theſe bodies, pervaded the planetary ſyſtem. But if we admit the hypotheſis, that theſe planets are the remains of a larger body, which circulated round the ſun, nearly in the orbit of the greateſt fragment, the ſyſtem reſumes its order, and we diſcover a regular progreſſion in the diſtances of the planets, and a general harmony in the form and poſition of their orbits. Thus does the ingenious Dr. Brewſter introduce his general reaſoning on this ſubject. He then proceeds to obſerve, that the elements of the new planets furniſh us with ſeveral direct arguments, drawn from the excentricity and inclination of their orbits, and from the poſition of their perihelia and nodes, and all concurring to ſhew, that the four new planets have diverged from one point of ſpace, and have, therefore, been originally combined in a larger body. When the original planet burſt in pieces, by ſome internal force capable of overcoming the mutual attraction of the fragments, the larger fragment muſt obviouſly receive the leaſt impetus from the exploſive force, and circulate in an orbit deviating leſs than any other of the fragments from the original path of the large planet; while the leſſer fragments, being thrown off with greater velocity, would revolve in orbits more excentric, and more inclined to the ecliptic. Applying this remark to the caſe before us, the excentricity of Ceres and Veſta is nearly one-twelfth of their mean diſtance, that of Ceres being rather the greateſt; and the excentricity of Pallas and Juno is one-fourth of their mean diſtance, that of Pallas being a little greater than that of Juno. From the theory it might be expected, that Pallas and Juno would be conſiderably ſmaller than Ceres and Veſta, and that Ceres ſhould be the larger fragment, and have an orbit more analogous in excentricity and inclination than any of the ſmaller fragments to the other planets of the ſyſtem. As far as the diameters of the new planets have been meaſured, the theory is very ſtrikingly confirmed by obſervation. According to Dr. Herſchel, the diameter of Ceres is 163 miles, while that of Pallas is only 80. The obſervations of Schroeter make Juno conſiderably leſs than Ceres; and though the diameter of Veſta has not been accurately aſcertained, yet the intenſity of its light, and the circumſtance of its being diſtinctly viſible to the naked eye, are ſtrong proofs that it exceeds in magnitude both Pallas and Juno. The ſtriking reſemblance between the two leſſer fragments, Pallas and Juno, in their magnitudes, and in the extreme excentricity of their orbits, would lead us to anticipate ſimilar reſemblances in the poſition of their nodes, in the place of their perihelia, and in the inclination of their orbits; while the elements of Ceres and Veſta ſhould exhibit ſimilar coincidences. Now, the inclination of Ceres is 10°, and that of Veſta 7°; while the inclination of Juno is 21°, and that of Pallas 34°; the two greater fragments having nearly the ſame inclination, and keeping near the ecliptic, while the leſſer fragments diverge from the original path, and riſe to a great height above the ecliptic, and far above the orbits of all the other planets in the ſyſtem. If it ſhall be found, from obſervation, that Veſta is one of the ſmaller fragments, we may then account for its poſition with regard to Ceres, and for the ſmall inclination and excentricity of its orbit, by ſuppoſing the planets Ceres, Pallas, and Juno, to have diverged in the ſame plane, and nearly at right angles to the ecliptic, while Veſta diverged from the direction of the original planet, in a plane parallel with the ecliptic. This opinion is ſtrongly confirmed by the fact, that the orbit of Veſta is nearer to the ſun than either of the orbits of the other three fragments. The ſame coincidence is apparent in the poſition of the nodes. The orbits of Pallas and Juno cut the ecliptic in the ſame point, and the nodes of Ceres and Veſta are not far diſtant. If all the fragments of the original planet had, after the exploſion, been attracted to the larger fragment, it is obvious that they would all move in the ſame orbit, and conſequently have the ſame perihelion. If the fragments received a ſlight degree of divergency from the exploſive force, and moved in ſeparate orbits, the points of their perihelion would not coincide, and their ſeparation would increaſe with the divergency of the fragments. But, ſince all the fragments partook of the motion of the primitive planet, the angle of divergency could never be very great; and, therefore, we ſhould expect that all the perihelia of the new planets would be in the ſame quarter of the heavens. This theoretical deduction is moſt wonderfully confirmed by obſervation. Theſe ſingular reſemblances, as our author cloſes his reaſoning on this ſubject, in the motions of the greater fragments, and in thoſe of the leſſer fragments, and the ſtriking coincidences between theory and obſervation in the excentricity of their orbits, in their inclination to the ecliptic, in the poſition of their nodes, and in the places of their perihelia, are phenomena which could not poſſibly reſult from chance, and which concur to prove, with an evidence amounting almoſt to demonſtration, that the four new planets have diverged from one common node, and have therefore compoſed a ſingle planet. Our author proceeds to account for the origin of meteoric ſtones, which he conſiders as phenomena that might accompany this great convulſion. Ferguſon's Aſtronomy, by Dr. Brewſter, vol. ii. See BALLS *of Fire*, FALLING *Stones*, and GEORGIUM SIDUS.

Saturn is repreſented by the character ♄. This planet, on account of its great diſtance, appears to the eye with a feeble light. It performs its revolution round the ſun in about thirty years. See SATURN.

Jupiter, marked ♃, is a bright refulgent ſtar, finiſhing its courſe round the ſun in about twelve years. See JUPITER.

Veſta has no character aſſigned it. See VESTA.

Juno is repreſented by the character ⚵. See JUNO.

Pallas is exhibited under the character ⚴. See PALLAS.

Ceres is marked by ⚳. See CERES.

Mars, characterized ♂, is a ruddy fiery-coloured planet, finiſhing its courſe in about two years. See MARS.

The Earth, marked ⊕, performs its revolution in one year. See EARTH.

Venus, ♀, is the brighteſt of all the planets, conſtantly attending the ſun, and never diſtant from him above 48 degrees. It finiſhes its courſe in about ſeven months.

When it goes before the ſun, it is called *Phoſphorus* and *Lucifer;* and when it follows him, *Heſperus.*

Mercury, ☿, a little bright planet, the ſun's conſtant companion, from whoſe ſide it never departs above 28 degrees, and by that means is uſually hid in his ſplendour.

It performs its courſe in about three months. See Mercury.

From theſe definitions, a perſon may eaſily diſtinguiſh all the planets. For, if after ſun-ſet he ſees a planet nearer the eaſt than the weſt, he may conclude it is neither Mercury nor Venus; and may determine whether it is Saturn, Jupiter, or Mars, by the colour and light: by which alſo he may diſtinguiſh between Mercury and Venus.

Planets, *Nature of the.* From the ſeveral phaſes and appearances of the planets, they are found to be all like the moon, which we have ſhewn to be like our earth; whence it follows, that the planets are alſo dark, opaque, ſpherical, &c. bodies, like our earth.

This may be ſhewn almoſt to a demonſtration.

The phaſes of Mercury are eaſily diſtinguiſhed to be like thoſe of Venus; but no ſpots have yet been diſcovered, by which we can aſcertain whether it has any rotation. Although Dr. Herſchel affirms, in conſequence of his obſervations of this planet, that it appears equally luminous in every part of its body, and that its diſc is always well defined, without any ſpot or ragged edge, Mr. Schroeter thinks that he has diſcovered not only ſpots, but mountains in Mercury. He meaſured two of theſe mountains, the higheſt of which was 8900 toiſes, or $10\frac{3}{4}$ miles, or more than double the height of Chimboraco in the Andes; and the other was little more than 1000 toiſes high. From the variations in the daily appearance of Mercury's horns, this aſtronomer infers that the period of its daily rotation was $24^h\ 5'\ 28''$. Theſe obſervations remain to be confirmed.

Venus, obſerved with a teleſcope, is rarely found full, but with variable phaſes like thoſe of the moon; her illuminated part ſtill turned towards the ſun, *viz.* towards the eaſt when ſhe is the morning-ſtar, and towards the weſt when the evening-ſtar.

The phaſes of Venus were firſt diſcovered in 1611 by Galileo, who ſent an account of the diſcovery to William de Medici, in order to have it communicated to Kepler. He tranſmitted it in this cypher, "Hæc immaturæ a me fruſtra leguntur, 0.7;" which, duly arranged, is "Cynthiæ figuras æmulatur mater amorum," *i. e.* Venus emulates the phaſes of the moon. Afterwards he wrote a letter to him, giving an account of the diſcovery, and explaining the cypher. In 1666, M. Caſſini, at a time when Venus was dichotomized, diſcovered a bright ſpot upon it at the ſtraight edge, like ſome of the bright ſpots upon the moon's ſurface; and by obſerving its motion, which was upon the edge, he found the ſidereal time of rotation to be $23^h\ 16'$. In the year 1726, Bianchini made ſome obſervations upon the ſpots of Venus, and aſſerted that the time of rotation was $24\frac{1}{3}$ days; that the north pole anſwered to the 20th degree of Aquarius, and was elevated from 15° to 20° above its orbit; and that the axis continued parallel to itſelf. M. Caſſini, the ſon, vindicated his father's obſervations, and took occaſion, from the interruption of Bianchini's obſervations, to ſhew that ſhe might eaſily miſtake different ſpots for the ſame; and he concludes, that if we ſuppoſe the time of rotation to be $23^h\ 20'$, it agrees equally with their obſervations; but if we take it to be $24\frac{1}{3}$ days, it will not at all agree with his father's obſervations. M. Schroeter has endeavoured to ſhew that Venus has an atmoſphere, from obſerving that the illuminated limb, when horned, exceeds a ſemicircle; and this he ſuppoſes to ariſe from the refraction of the ſun's rays through the atmoſphere of Venus at the cuſps, by which they appear prolonged. The cuſps appeared ſometimes to run 15° 19′ into the dark hemiſphere; from which he computes, that the height of the atmoſphere, for refracting ſuch a quantity of light, muſt be 15,156 Paris feet; but this muſt depend on the nature and denſity of the atmoſphere, of which we are ignorant. (See Phil. Tranſ. for 1792.) He makes the time of rotation to be $23^h\ 21'$; and concludes, from his obſervations, that there are conſiderable mountains upon this planet.

He found that, like thoſe of Mercury and of the moon, thoſe of the ſouthern hemiſphere were the higheſt; their perpendicular heights being nearly as the diameters of their reſpective planets. M. Schroeter meaſured the height of four mountains in Venus, and obtained the following reſults; *viz.*

		Toiſes.	Miles.
1ſt Higheſt	-	18900	22.05
2d Higheſt	-	15750	18.97
3d Higheſt	-	9500	11.44
4th Higheſt	-	9000	10.84

This planet has generally been conſidered as about 220 miles leſs in diameter than the earth; but from the meaſurements of Dr. Herſchel, whoſe accuracy cannot be queſtioned, it is inferred that when reduced to the mean diſtance of the earth, her apparent mean diameter is $18''.79$, that of the earth being $17''.2$, that is, 8648 Engliſh miles, the diameter of the earth being 7912. Phil. Tranſ. for 1795. See Venus.

M. de la Hire, in 1700, with a teleſcope of ſixteen feet, diſcovered mountains in Venus, larger than thoſe of the moon.

Dr. Herſchel agrees with M. Schroeter in ſuppoſing that Venus has a conſiderable atmoſphere; but he has not made any obſervations by which he can determine either the time of rotation, or the poſition of the axis. See Phil. Tranſ. for 1793.

Gaſſendus firſt, and after him others, have obſerved Mercury on the face of the ſun, acroſs which he appeared to paſs like a black round ſpot. Horrox, in 1639, alſo obſerved Venus in the ſun, where ſhe made the ſame appearance. Two tranſits have been ſince obſerved, and thoſe of Mercury are more frequent. See Parallax and Transit.

Galileo diſcovered the phaſes of Mars; after which ſome Italians, in 1636, had an imperfect view of a ſpot. But in 1666 Dr. Hooke and M. Caſſini diſcovered ſome well defined ſpots, obſerved likewiſe by Campani; and Caſſini determined the time of the rotation to be $24^h\ 40'$. Soon after, M. Maraldi obſerved ſome ſpots, and determined the time of rotation to be $24^h\ 39'$. He alſo obſerved a very bright part near the ſouthern pole, apparently like a polar zone; this, he ſays, has been obſerved for 60 years; it is not of equal brightneſs; more than half of it being brighter than the reſt; and that part which is leaſt bright is ſubject to great changes, and ſometimes diſappears. Something of the ſame kind has been obſerved about the north pole. The rotation is according to the order of the ſigns. Dr. Herſchel makes the time of a ſidereal revolution to be $24^h\ 39'\ 21''.67$, without the probability of a greater error than $2''.34$. He propoſes to find the time of a ſidereal rotation, in order to diſcover, by future obſervations, whether there is any alteration in the time of the revolution of the earth, or of the planets, about their axes; for a change of either would be thus diſcovered. He choſe Mars, becauſe its ſpots are permanent. (See Phil. Tranſ. for 1781.) From farther obſervations upon Mars, which he publiſhed in Phil. Tranſ. for 1784, he makes its axis to be inclined to the ecliptic 59° 42′, and 61° 18′ to its orbit; and the north pole to be directed to 17° 47′ of Piſces upon the ecliptic, and 19° 28′ on its orbit. He makes the ratio of the diameters of Mars to be as 16 to 15. Dr. Maſkelyne has carefully obſerved Mars at the time of oppoſition, but could not perceive any difference in its diameters. Dr. Herſchel obſerves, that Mars has a conſiderable atmoſphere, the denſity of which occaſions the redneſs of its light. La Place has computed the denſity of this planet to be $\frac{3}{4}$ths that of the earth. See Mars.

Jupiter is obſerved to have belts, and alſo ſpots, by which the time of its rotation can be more accurately aſcertained.

tained. Theſe belts were firſt obſerved by two Jeſuits, Zuppi and Bartoli. They were afterwards examined in 1633 by Fontana, Rheita, Riccioli, Grimaldi and Campani. M. Caſſini found the time of rotation to be $9^{h}\ 56''$, from a remarkable ſpot which he obſerved in 1665. In October, 1691, he obſerved two bright ſpots, almoſt as broad as the belts; and at the end of the month he ſaw two more, and found them to revolve in $9^{h}\ 51'$; he alſo obſerved ſome other ſpots near Jupiter's equator, which revolved in $9^{h}\ 50'$; and, in general, he found that the nearer the ſpots were to the equator, the quicker they revolved. It is, therefore, probable, that the ſpots are not upon Jupiter's ſurface, but in its atmoſphere; and for this reaſon alſo, that ſeveral ſpots, which appeared round at firſt, grew oblong by degrees, in a direction parallel to the belts, and divided themſelves into two or three ſpots. M. Maraldi, from a great many obſervations of the ſpot obſerved by Caſſini in 1665, found the time of rotation to be $9^{h}\ 56'$: and concluded that the ſpots had a dependence upon the contiguous belt, as the ſpot had never appeared without the belt, though the belt had been ſeen without the ſpot. It continued to appear and diſappear, until the year 1694, and was not ſeen any more until the year 1708; hence he concluded, that the ſpot was ſome effuſion from the belt upon a fixed place of Jupiter's body: for it always appeared in the ſame place. Dr. Herſchel found the time of rotation of different ſpots to vary; and that the time of rotation of the ſame ſpots diminiſhed, for the ſpot obſerved in 1788 revolved as follows. From February the 25th to March the 2d, in $9^{h}\ 55'\ 20''$; from March the 2d to the 14th, in $9^{h}\ 54'\ 58''$; from April the 7th to the 12th, in $9^{h}\ 51'\ 35''$. Alſo, from a ſpot obſerved in 1779, its rotation was, from April the 14th to the 19th, in $9^{h}\ 51'\ 45''$; from April the 19th to the 23d., in $9^{h}\ 50'\ 48''$. This, he obſerves, is agreeable to the theory of equinoctial winds, as it may be ſome time before the ſpot can acquire the velocity of the wind; and if Jupiter's ſpots ſhould be obſerved in different parts of its revolution to be accelerated and retarded, it would amount almoſt to a demonſtration of its monſoons, and their periodical changes. M. Schroeter makes the time of rotation $9^{h}\ 55'\ 36''.6$; and he obſerved the ſame variations with thoſe of Dr. Herſchel. The rotation is according to the order of the ſigns. This planet is obſerved to be flat at its poles. Dr. Pound meaſured the polar and equatorial diameters, and found them to be as 12 to 13. Mr. Short made them as 13 to 14. Dr. Bradley made them as 12.5 to 13.5. Sir Iſaac Newton makes the ratio $9\frac{1}{3}$ to $10\frac{1}{2}$ by theory. The belts of Jupiter are generally parallel to its equator, which is very nearly parallel to the ecliptic: they are ſubject to great variations, in reſpect both to their number and figure: ſometimes eight have been ſeen at once, and at other times only one: ſometimes they continue for three months without any variation, and ſometimes a new belt has been formed in an hour or two. From their being ſubject to ſuch changes, it is very probable that they do not adhere to the body of Jupiter, but exiſt in its atmoſphere. Others, however, imagine that they are of a more permanent nature, and that they indicate great phyſical revolutions, which are perpetually agitating and changing the ſurface of the planet. It is ſuggeſted by Dr. Brewſter (Ferguſon's Aſtronomy, vol. ii.) that the ſpot firſt obſerved by Caſſini, already mentioned, could not poſſibly be occaſioned by any atmoſpherical variations; and that its diſappearance for five years, between 1708 and 1713, affords a preſumptive, though not a deciſive argument, that it aroſe from ſome changes in the body of the planet. He inclines to think, that from the frequent appearance of this ſpot, it is permanent upon the body of Jupiter, and that its diſappearance is owing to the interpoſition of clouds in the atmoſphere of the planet. He farther intimates, that the clouds of Jupiter, partaking of the great velocity of its diurnal motion, are formed into ſtrata parallel with the equator; that the body of Jupiter reflects leſs light than the clouds; and that the belts are nothing more than the body of the planet ſeen through the parallel interſtices which lie between the different ſtrata of clouds. The permanent ſpot of Caſſini will, of courſe, only be ſeen when it is immediately below one of theſe interſtices, and will therefore always appear as if it accompanied one of the belts. See JUPITER and SATELLITES.

Saturn was ſuſpected by Caſſini and Fatio, in 1683, to have a revolution about its axis, for they one day ſaw a bright ſtreak, which diſappeared the next, when another came into view near the edge of its diſc: theſe ſtreaks are called "belts." In 1719, when the ring diſappeared, Caſſini ſaw its ſhadow upon the body of the planet, and a belt on each ſide parallel to the ſhadow. When the ring was viſible, he perceived the curvature of the belts was ſuch as agreed with the elevation of the eye above the plane of the ring. He conſidered them as ſimilar to our clouds floating in the air; and having a curvature ſimilar to the exterior circumference of the ring, he concluded that they ought to be nearly at the ſame diſtance from the planet, and that conſequently the atmoſphere of Saturn extended to the ring. Huygens obſerved five belts, which were nearly parallel to the equator. Dr. Herſchel found that the arrangement of the belts always followed the direction of the ring: thus, as the ring opened, the belts began to ſhew an incurvature anſwering to it. And during his obſervations on June the 19th, 20th, and 21ſt, in the year 1780, he ſaw the ſame ſpot in three different ſituations. He conjectured, therefore, that Saturn revolved about an axis perpendicular to the plane of its ring. Another argument in ſupport of this is, that the planet is an oblate ſpheroid, having the diameter in the direction of the ring to the diameter perpendicular to it, as about 11 to 10, according to Dr. Herſchel; the meaſures were taken with a wire micrometer, prefixed to his 20-feet reflector. The truth of his conjecture he has now verified, having determined that Saturn revolves about its axis in $10^{h}\ 16'\ 0''.44$. (See Phil. Tranſ. for 1794.) La Place had formerly found that the interior ring ought to perform its revolution in ten hours. (Mem. Acad. 1787.) The rotation is according to the order of the ſigns.

In 1789 Dr. Herſchel meaſured the diameter of this planet, and found that the equatorial diameter was $22''.8$, and the polar diameter $20''.6$; which gives the proportion nearly of 10 to 11. But from more recent obſervations, he inferred that the polar is to the equatorial diameter as 32 to 35, or as 11 to 12 nearly. Until the year 1805 Dr. Herſchel had always regarded Saturn as an accurate ſpheroid, but in April of that year he was ſtruck with a very ſingular appearance exhibited by the planet. The flattening at the poles did not ſeem to begin till a very high latitude; ſo that the real figure of the planet reſembled a ſquare, or rather a parallelogram, with the four corners rounded off deeply, but not ſo much as to bring it to a ſpheroid. (See Phil. Tranſ. for 1805.) The following are the proportional dimenſions of Saturn's diſc.

Diameter of the greateſt curvature -	36
Equatorial diameter - -	35
Polar diameter - - -	32
Latitude of the longeſt diameter -	43° 20′

See RING and SATURN.

The Georgian planet is at ſo great a diſtance, that aſtronomers with their beſt teleſcopes, have not been able to diſcover whether or not it has any revolution about its axis. Since the Sun (ſee SUN), Moon (ſee MOON), Saturn, Jupiter, Mars, the Earth, and Venus, are found to revolve on their axes, *i. e.* to have a diurnal rotation, we may argue from analogy that Mercury and the Georgian have the ſame; although the proximity of the former to the ſun, and the great diſtance of the latter prevent any ſpots from being obſerved in them, by which that rotation might be demonſtrated.

Moreover, in the year 1609, were firſt obſerved the little ſtars or moons, moving about Jupiter, by Sim. Marius; and in 1610 the ſame were obſerved by Galileo: theſe are now frequently obſerved to diſappear in a clear ſky, when Jupiter happens to be diametrically interpoſed between them and the ſun. Whence it appears that they are void of light, at ſuch time when the ſun's rays, intercepted by Jupiter, cannot be propagated to them in right lines; and hence alſo that, like the moon, they are opaque bodies illuminated by the ſun; and hence again, ſince Jupiter does not illuminate his ſatellites when placed behind him, he himſelf, in that part turned from the ſun, may be argued to be void of light.

When Jupiter's moons are diametrically interpoſed between Jupiter and the ſun, there is ſeen a round ſpot on Jupiter's diſk, which is ſometimes larger than the ſatellite itſelf. Whence it appears, that the ſatellites are opaque bodies, illuminated by the ſun; that they project a ſhadow from the ſun; and that the round ſpots, ſeen in Jupiter, are the ſhadows of the ſatellites.

Whence, alſo, the interſection of that ſhadow being found to be a circle, the ſhadow muſt be conical; and therefore the figure of the ſatellites, at leaſt as to ſenſe, is ſpherical.

The earth being between Jupiter and the ſun; if, at the ſame time, any one of the ſatellites happen to be between Jupiter and the ſun, it is loſt in Jupiter's light; though ſometimes appearing like a black ſpot. This phenomenon has been frequently obſerved by Caſſini and Maraldi who have likewiſe noted very conſiderable alterations in the apparent magnitudes of the ſatellites; for which no reaſon could be given from the diſtance of Jupiter, the ſun, or the earth: *e. gr.* that the fourth, which is uſually ſeen the ſmalleſt, is ſometimes the largeſt; and the third, which is uſually the largeſt, appears ſometimes the ſmalleſt. Hence, as the ſatellites are illuminated by the ſun, even when immerged in Jupiter's light, yet do appear obſcure, there muſt be ſome alteration in their atmoſpheres, to prevent the ſun's rays being equally reflected from every part of their ſurface; which muſt likewiſe be the cauſe why their ſhadow is ſometimes larger than themſelves. See SATELLITES.

Now, to ſum up the evidence reſulting from the preceding detail of obſervations: 1. Since in Venus, Mercury, and Mars, only that part of the diſc illuminated by the ſun, is found to ſhine; and, again, Venus, and Mercury, when between the earth and the ſun, appear like dark ſpots, or maculæ, on the ſun's diſc, it is evident, that Mars, Jupiter, and Mercury, are opaque bodies, illuminated with the borrowed light of the ſun. And the ſame appears of Jupiter, from its being void of light in that part to which the ſhadow of the ſatellites reaches, as well as in that part turned from the ſun; and that his ſatellites are opaque, and reflect the ſun's light, is alſo abundantly ſhewn. Wherefore, ſince Saturn, with his ring and ſatellites, do only yield a faint light, fainter conſiderably than that of the fixed ſtars, though theſe be vaſtly more remote, and than that of the reſt of the planets, it is paſt doubt, that he too, with his attendants, are opaque bodies.

Since the ſun's light is not tranſmitted through Mercury and Venus, when placed againſt him, it is plain they are denſe opaque bodies; which is likewiſe evident in Jupiter, from his hiding the ſatellites in his ſhadow; and therefore, by analogy, the ſame may be concluded of Saturn.

From the variable ſpots in Venus, Mars, and Jupiter, ſome have concluded that thoſe planets have a changeable atmoſphere; which changeable atmoſphere may, by a like argument, be inferred of the ſatellites of Jupiter; and therefore, by ſimilitude, the ſame may be concluded of the other planets.

In like manner, from the mountains obſerved in Venus, the ſame may be ſuppoſed in the other planets.

Since then Saturn, Jupiter, the ſatellites of both, Mars, Venus, and Mercury, are opaque bodies, ſhining with the ſun's borrowed light, and are furniſhed with mountains, and encompaſſed, as ſome have ſuppoſed, with a changeable atmoſphere, they have, of conſequence, waters, ſeas, &c. as well as dry land, and they are bodies, therefore, like the earth. Q. E. D.

And hence nothing hinders but that the planets may alſo be concluded to be inhabited. Huygens, in his Coſmotheoros, argues very plauſibly for the exiſtence of planetary inhabitants, from the ſimilitude of the planets with our earth: thoſe, like this, being opaque, denſe, uneven, round, heavy, illuminated, and warmed by the ſun, having night and day, ſummer and winter, &c.

Wolfius deduces ſomething relating to this purpoſe from arguments of another kind. Thus, *e. gr.* it is ſcarcely to be doubted, that the inhabitants of Jupiter are much larger than thoſe of the earth, and, in effect, of the giant kind. For it is ſhewn in optics, that the pupil of the eye dilates in a ſtrong light, and contracts in a weak one: wherefore, ſince in Jupiter the ſun's meridian light is much feebler than on the earth, on account of Jupiter's greater diſtance from the ſun, the pupil will need to be much more dilatable in the inhabitants of Jupiter than in thoſe of the earth. But the pupil is obſerved to have a conſtant proportion to the ball of the eye, and the eye to the reſt of the body; ſo that in animals, the larger the pupil the larger the eye, and the larger the body.

To aſcertain the ſize of theſe jovial inhabitants, it may be obſerved, that the diſtance of Jupiter from the ſun is to the earth's diſtance from the ſame, as 28 to 5; the intenſity of the ſun's light in Jupiter is to its intenſity on the earth, in a duplicate ratio of 5 to 28; but it is found by experience, that the pupil dilates in a ratio greater than that in which the intenſity of light decreaſes; otherwiſe a body at a great diſtance might be ſeen as clearly as a nearer; the diameter, therefore, of the pupil in its greateſt dilatation, in the earth, is to its diameter in the like ſtate in Jupiter, in a ratio greater than that of the duplicate of 5 to 28. If then we put it as 10 to 28, or as 5 to 14: ſince the ordinary ſtature of the inhabitants of the earth is computed at 5 Engliſh feet 4 inches and $\frac{3}{10}$ths, (which Wolfius tells us was his own height,) the ordinary ſtature of Jupiter's inhabitants will be found about 14 feet $\frac{2}{3}$ds, which is very nearly the ſize of the giant Og, mentioned by Moſes, whoſe iron bed was nine cubits long, and its breadth four. But arguments of this kind being more whimſical than ſolid, are needleſs, in order to juſtify the ſimilarity of the other planets to our earth, and a conjecture, that they are deſtined by the Creator for the ſame purpoſe.

For an account of the relative and real magnitudes, the proportional and actual diſtances, annual and diurnal revolutions, &c. of the planets, both primary and ſecondary, ſee SUN, *Solar* SYSTEM, MOON, SATELLITES, each planet under its proper name, and the references in the ſequel of this article.

The quantities of matter in the Sun, Jupiter, Saturn, and the Earth, as determined by the Newtonian theory of gravity, are to each other as the numbers 1, $\frac{1}{1067}$, $\frac{1}{3021}$, $\frac{1}{169282}$; and their denſities as the numbers 100, 94$\frac{1}{2}$, 67, and 400; and their attractive powers at their ſurfaces as the numbers 10,000, 943, 529, 435, reſpectively. For a more correct ſtatement, ſee DENSITY.

For the places and motion of the aphelia of the planets, and the method of determining them, ſee APHELION.

For the diameters of the ſun and planets, as ſeen from the earth, and the diameters of the planets, as ſeen from the ſun, ſee DIAMETER.

For the relative mean diſtances of the planets from the ſun, ſee DISTANCE.

The greateſt equations of the planets are as follow: Mercury, 23° 40′ 0″; Venus, 0° 47′ 20″; the Earth, 1° 55′ 36″.5; Mars, 10° 40′ 40″; Jupiter, 5° 30′ 38″.3; Saturn, 6° 26′ 42″; the Georgian, 5° 27′ 16″. See EQUATION.

The following table exhibits the relation of the denſities, diameters, quantities of matter, and gravity on the ſurfaces of the ſun and planets, reſpectively.

Planets.	Denſities.	Diameters.	Quantities of Matter.	Gravity on Surfaces.
Sun	0.25226	109.8	333928	27.7
Mercury	2.5833	0.4	0.16536	1.0333
Venus	1.024	0.9543	0.88993	0.9771
Earth	1	1	1	1
Mars	0.6563	0.5109	0.08752	0.3355
Jupiter	0.20093	11.59	312.101	2.3287
Saturn	0.10349	9.812	97.762	1.0154
Georgian	0.21805	4.258	16.837	0.9285
Moon	0.6149	0.2727	0.01245	0.1677

The intenſities of light and heat which the planets receive from the ſun, vary inverſely as the ſquares of their diſtances from the ſun: and the apparent diameter of a body is inverſely as its diſtance; and therefore aſſuming the mean diameter of the ſun = 32′, we ſhall have his apparent diameter at the ſeveral planets as follows.

The following table exhibits the relative intenſities of light and heat at the different planets, and the apparent diameter of the Sun ſeen from them.

Planets.	Intenſities of Light and Heat.	Apparent Diameter of the Sun.
Mercury	6.25	80′
Venus	2.04	45.7
Earth	1	32
Mars	0.44375	21.33
Jupiter	0.036875	6.15
Saturn	0.01106	3.37
Georgian	0.00276	1.64

The orbits of the planets are all ellipſes; one of whoſe foci is in the ſun. This Kepler firſt found from Tycho's obſervations; before him, all aſtronomers took the planetary orbits for excentric circles. The manner in which he proceeded was as follows.

Let S (*Plate* XIX. *Aſtronomy*, *fig.* 3.) be the ſun, M Mars, D, E, two places of the earth when Mars is in the ſame point M of its orbit. When the earth was at D, he obſerved the difference between the longitudes of the ſun and Mars, or the angle M D S; in like manner, he obſerved the angle M E S. Now the places D, E, of the earth in its orbit being known, the diſtances D S, E S, and the angle D S E, will be known; hence, in the triangle D S E, we know D S, S E, and the angle D S E, to find D E, and the angles S D E, S E D; hence we know the angles M D E, M E D, and D E, to find M D; and laſtly, in the triangle M D S, we know M D, D S, and the angle M D S, to find M S, the diſtance of Mars from the ſun. He alſo found the angle M S D, the difference of the heliocentric longitudes of Mars and the earth. By this method, Kepler, from obſervations made on Mars when in aphelion and perihelion (for he had determined the poſition of the line of the apſides, by a method independent of the form of the orbit), determined the former diſtance from the ſun to be 166780, and the latter 138500, the mean diſtance of the earth from the ſun being 100000; hence, the mean diſtance of Mars was 152640, and the excentricity of its orbit 14140. He then determined, in like manner, three other diſtances, and found them to be 147750, 163100, 166255. He next calculated the ſame three diſtances, upon ſuppoſition that the orbit was a circle, and found them to be 148539, 163883, 166605; the errors therefore of the circular hypotheſis were 789, 783, 350. But he had too good an opinion of Tycho's obſervations, (upon which he founded all theſe calculations,) to ſuppoſe that theſe differences might ariſe from their inaccuracy; and as the diſtance between the aphelion and perihelion was too great, upon ſuppoſition that the orbit was a circle, he knew that the form of the orbit muſt be an oval: "Itaque planè hoc eſt: Orbita planetæ non eſt circulus, ſed ingrediens ad latera utraque paulatim, iterumque ad circuli amplitudinem in perigæo exiens, cujuſmodi figuram itineris ovalem appellitant," p. 213. And as, of all ovals, the ellipſe appeared to be the moſt ſimple, he firſt ſuppoſed the orbit to be an ellipſe, and placed the ſun in one of the foci; and upon calculating the above obſerved diſtances, he found they agreed together. He did the ſame for other points of the orbit, and found that they all agreed: and thus he pronounced the orbit of Mars to be an ellipſe, having the ſun in one of its foci. Having determined this for the orbit of Mars, he conjectured the ſame to be true for all the other planets, and upon trial he found it to be ſo. Hence, he concluded, "that the ſix primary planets revolve about the ſun in ellipſes, having the ſun in one of the foci."

The relative mean diſtances of the planets from the ſun are as follow: Mercury, 38710; Venus, 72333; Earth, 100000; Mars, 152369; Jupiter, 520279; Saturn, 954072; Georgian, 1918352.

Having thus diſcovered the relative mean diſtances of the planets from the ſun, and knowing their periodic times, he next endeavoured to find if there was any relation between them, having had a ſtrong paſſion for finding analogies in nature. On March 8, 1618, he began to compare the powers of theſe quantities, and at that time he took the ſquares of the periodic times, and compared them with the cubes of the mean diſtances, but, from ſome error in the calculation, they did not agree. But on May 15, having made the laſt calculations again, he diſcovered his error, and found an exact agreement between them. Thus he diſcovered that famous law, "That the ſquares of the periodic times of all the planets are as the cubes of their mean diſtances from the ſun." Sir I. Newton afterwards proved that this is a neceſſary conſequence of the motion of a body in an ellipſe, revolving about the focus. Prin. Phil. lib. i. ſec. 2. pr. 15.

Kepler alſo diſcovered, from obſervation, that the velocities of the planets, when in their apſides, are inverſely as their diſtances from the ſun; whence it followed, that they deſcribe in theſe points equal areas about the ſun in equal times. And although he could not prove, from obſervation, that the ſame was true in every point of the orbit, yet he had no doubt but that it was ſo. He therefore applied this principle to find the equation of the orbit, and finding that his calculations agreed with obſervations, he concluded that it was true in general, "That the planets deſcribe about the ſun equal areas in equal times." This diſcovery was, perhaps, the foundation of the "Principia," as it might probably ſuggeſt to ſir I. Newton the idea, that the propoſition was true in general, which he afterwards proved it to be. Theſe important diſcoveries are the foundation of all aſtronomy. Vince's Elem. of Aſtronomy.

The planes of the planetary orbits do all interſect in the ſun; and the line in which the plane of each orbit cuts that of the earth, is called the *line of the nodes;* and the two points in which the orbits themſelves touch that plane, *the nodes*. For the longitude of the nodes of the planets, ſee NODE.

The motion of the nodes is found by comparing their places at two different times; whence that of Mercury in 100 years is found to be 1° 12′ 10″; that of Venus, 0° 51′ 40″; that of Mars, 0° 46′ 40″; that of Jupiter, 0° 59′ 30″; that of Saturn, 0° 55′ 30″. This motion is in reſpect to the equinox. The Georgian planet has not been diſcovered long enough to admit of determining the motion of its nodes by obſervation. M. de la Grange has found the annual motion to be 12″.5 by theory; but if we take the denſity of Venus according to M. de la Lande, it will be 20″ 40‴, which he uſes in his table.

The diſtance between the centre of the ſun and the centre of each object, is called the *excentricity of the planet*. For the excentricities of the planets, ſee EXCENTRICITY.

The angle at which each plane cuts that of the ecliptic, is called the *inclination of the plane*.

The inclinations of the orbits of the planets are as follow: that of Mercury, 7° 0′ 0″; that of Venus, 3° 23′ 35″; that of Mars, 1° 51′ 0″; that of Jupiter, 1° 18′ 56″; that of Saturn, 2° 29′ 50″; and that of the Georgian, 46′ 20″. (See NODE.) For the elements of the orbits of Ceres, Pallas, Juno, and Veſta; ſee the preceding part of this article. See alſo *Planetary* NUMBERS.

PLANETS, *Motion of the*. That the planets do all revolve round the ſun as their centre, and not round the earth, is evident from a thouſand phenomena. 1. The orbit in which Venus, *e. gr.* moves, does certainly encompaſs the ſun; and therefore, in deſcribing that orbit, the planet muſt turn round the ſun.

That her orbit includes the ſun, appears hence, that ſhe is ſometimes above the ſun, ſometimes below it, ſometimes beyond it, and ſometimes on this ſide; all which are evident from the circumſtances of her phaſes.

That ſhe does not move round the earth, is no leſs apparent, from her being ever obſerved in the ſame quarter with the ſun, never receding from him above 48°. She never, therefore, comes to be in oppoſition to the ſun; no, not to be in a quartile aſpect, or to have a quarter of the heavens between them; both which, like the earth, ſhe muſt frequently have, did ſhe attend and move round the earth.

2. That Mercury revolves round the ſun, appears in like manner from his phaſes, which reſemble thoſe of Venus and the moon; and from its neighbourhood to the ſun, from whom Mercury never recedes ſo far as Venus does.

3. That the orbit of Mars includes the ſun, is evident from that planet's being found both in conjunction and oppoſition with the ſun; and in both caſes ſhining with a full face. Indeed, from the ſame circumſtances it appears, that the orbit of Mars encompaſſes the earth; but then it follows, likewiſe, from Mars's diameter appearing ſeven times as big when in oppoſition as when in conjunction, that he is ſeven times nearer the earth in the former than in the latter poſition. The earth, therefore, is far from being the centre of Mars's motion; but Mars is ever nearly at the ſame diſtance from the ſun. Again, Mars viewed from the earth moves very irregularly; is ſometimes ſeen to proceed ſlower, ſometimes faſter; ſometimes he ſtands ſtill, and ſometimes he goes backward, (the reaſon of which ſee under the article OPTICAL *Inequality*); but viewed from the ſun, he will ever appear to move with the ſame conſtant uniform tenor; whence it is evident he reſpects the ſun, not the earth, as the centre of his motion.

4. The ſame appearances whence Mars is ſhewn to revolve round the ſun as a centre, are likewiſe obſerved in Jupiter and Saturn; whence the ſame concluſion may be made of them.

Laſtly, that the earth revolves round the ſun, as a centre, is evident from her place, which we have obſerved to be between the orbits of Mars and Venus; and from the phenomena of the ſuperior planets viewed from it. If the earth ſtood ſtill, we ſhould never ſee thoſe planets either ſtationary or retrograde; the earth therefore moves, but it is ſtill found between the orbits of Mars and Venus, which encompaſs the ſun; therefore the earth alſo encompaſſes the ſun.

To this aſtronomical demonſtration may be added a phyſical demonſtration of the earth's motion from ſir Iſaac Newton. It appears from abundant obſervation, that either the earth turns round the ſun, or the ſun round the earth, ſo as to deſcribe equal areas in equal times; but he demonſtrates, that bodies revolving about one another according to ſuch law, do of neceſſity gravitate towards each other. Whence, if the ſun gravitate to the earth, action and re-action being ſtill equal, the earth will likewiſe gravitate towards the ſun. But he proves, farther, that two bodies gravitating towards each other, without directly approaching one another in right lines, muſt both of them turn round the common centre of gravity of both. The ſun and earth, therefore, do both revolve round one common centre; but the earth being but a point in compariſon with the ſun, the common centre of gravity of the two will be within the ſun's body, and not far from its centre. The earth, therefore, revolves round a point within the body of the ſun, and therefore round the ſun. See the arguments for the earth's motion under EARTH.

To account for the motion of the planets about the ſun, there needs nothing but to ſuppoſe an uniform projectile motion, in ſtraight lines, at firſt given them; and a power of attraction or gravitation, ſuch as we obſerve in all the great bodies in our ſyſtem. For a body A (*Plate* XIX. *Aſtronomy*, *fig.* 4.) proceeding uniformly along the line A B, will, by the intervention of the attracting body C, be every moment diverted out of its rectilinear, and bent into a curvilinear path, according to the laws of central forces.

If, then, the projectile motion be perpendicular to a line, C A, drawn from the attracting body C, and its velocity be ſo proportioned to the force of attraction of A, as that the centripetal and centrifugal forces are equal, *i. e.* that the conatus to fall to the central body C, in a right line, A C; and that to proceed in the direction of the tangent, A B, balance each other; the body will revolve in a circular orbit, A, β, γ, δ, &c.

It is not improbable, that at the beginning this was the ſtate of things; and that the velocities impreſſed on the ſeveral planets were ſo combined with their reſpective maſſes and diſtances from the ſun at which they were to roll, as that their momenta ſhould counterbalance the ſun's attractive force, and be preciſely counterbalanced thereby; whence the primitive orbits muſt have been perfect circles, from which they do not even now deviate very far. See EXCENTRICITY.

If the planet's projectile motion be not perfectly adjuſted to the ſun's attraction, the orbit deſcribed will be an ellipſis. If it be too ſwift, the orbit will be greater than a circle, and the nearer focus coincide with the central body; if too ſlow, the orbit will be leſs than a circle, and the farther focus coincide with the central body.

Indeed the form of the planetary orbits does not only depend on the adjuſtment of the firſt projectile velocity with the ſun's attraction, but alſo on the direction in which that motion was originally impreſſed. If that direction were according to the tangent A B, as above ſuppoſed, and the central forces exactly balanced, the orbit would be circular; but if that direction were oblique, in any manner, whether aſcending to, or deſcending from the ſun, the orbit of the planet, notwithſtanding any adjuſtment of its velocity to the attraction, would be an ellipſis.

The motions of the planets in their elliptic orbits are not equable, becauſe the ſun is not in their centre, but in their focus. Hence they move, ſometimes faſter, and ſometimes ſlower, as they are nearer or farther from the ſun; but yet theſe irregularities are all certain, and follow according to an immutable law.

Thus, ſuppoſe the ellipſis B E P, &c. (*Plate* XIX. *Aſtronomy*, *fig.* 5.) the orbit of a planet, and the focus S, the ſun's place; A P, the axis of the ellipſis, is called the *line of the apſides;* the point A, the *higher apſis* or *aphelion;* P, the *lower apſis* or *perihelion;* S C, the excentricity; and E S, the mean diſtance of the planet from the ſun.

Now the motion of the planet in its perihelion is ſwifteſt, and in its aphelion, ſloweſt; at E the motion as well as the diſtance is mean, *i. e.* it is ſuch as would deſcribe the whole orbit in the ſame time it is really deſcribed in.

The law by which the motion is regulated in every point of the orbit, is, that a line, or radius, drawn from the centre of the ſun to the centre of the planet, and thus carried along with an angular motion, does always deſcribe an elliptic area proportional to the time. Suppoſe, *e. gr.* the planet in A, and thence, in a certain time, to proceed to B; the ſpace or area the radius S A deſcribes, is the triangle A S B: when at length the planet arrives at P, if from the centre of the ſun S there be drawn S D, in ſuch manner, as that the elliptic area P S D is equal to that of A S B; the planet will here move through the arc P D, in the ſame time in which it moved through the arc A B; which arcs are unequal, and nearly in a reciprocal proportion to their diſtance from the ſun. For from the equalities of the areas it follows, that the arc P D muſt exceed A B as much as S A exceeds S P.

This law was firſt demonſtrated by Kepler, from obſervation; and is ſince accounted for by ſir I. Newton from phyſical principles; and to this all aſtronomers now ſubſcribe, as of all others that which beſt ſolves the planetary phenomena. See CENTRIPETAL *Force* and GRAVITATION.

From the equal deſcription of areas about the ſun in equal times, it appears that the planets move with unequal angular velocities about the ſun. Let A P Q (*Plate* XIX. *Aſtronomy*, *fig.* 6.) be an eclipſe deſcribed about the ſun S in the focus, the indefinitely ſmall area, P S p, deſcribed in a given time, will be conſtant; draw P r perpendicular to S p; and as the area S P p is conſtant for the ſame time, P r varies as $\frac{1}{S\,p}$; but the angle p S P varies as $\frac{P\,r}{S\,p}$, and, therefore, it varies as $\frac{1}{S\,p^2}$; that is, in the *ſame* orbit the angular velocity of a planet varies inverſely as the ſquare of its diſtance from the ſun. For *different* planets, the areas deſcribed in the ſame time are not equal, and therefore P r varies as $\frac{\text{area } S\,P\,p}{S\,p}$, conſequently, the angle p S P varies as $\frac{\text{area } S\,P\,p}{S\,p^2}$; that is, the angular velocities of *different* planets are as the areas deſcribed in the ſame time directly, and the ſquares of their diſtances from the ſun inverſely. Hence we obtain a ſolution of the problem, uſually called "Kepler's problem," in the manner ſtated under the article ANOMALY. For the method of finding the equation of the centre, ſee EQUATION; and for the excentricity, ſee EXCENTRICITY.

Computation of a Planet's Motion and Place.—As to the periods and velocities of the planets, or the time in which they perform their courſes, they are found to have a wonderful harmony with their diſtances from the ſun, and with one another. The nearer each planet is to the ſun, the quicker ſtill is its motion, and its period the ſhorter. The great law they here all immutably obſerve is, that the ſquares of their periodical times are as the cubes of their diſtances from the centres of their orbits.

The knowledge of this law we alſo owe to the ſagacity of Kepler, who found it to obtain in all the primary planets; as aſtronomers have ſince found it alſo to do in the ſecondary ones.

Kepler deduced this law merely from obſervation, and compariſon of the ſeveral diſtances of the planets with their periods: the glory of inveſtigating it from phyſical principles is due to ſir Iſaac Newton, who has demonſtrated, that, in the preſent ſtate of things, ſuch a law was inevitable.

A planet's motion, or diſtance from its apogee, is called the *mean anomaly* of the planet; and is meaſured by the arc or area it deſcribes in the time. When the planet arrives at the middle of its orbit, or the point G, the diſtance or time is called the *true anomaly.* (See ANOMALY.) When the planet's motion is reckoned from the firſt point of Aries, it is called its *motion in longitude;* which is either mean, *viz.* ſuch as the planet would have, were it to move uniformly in a circle; or true, which is that with which the planet actually deſcribes its orbit, and meaſured by the arc of the ecliptic it deſcribes.

Hence may the planet's place in its orbit for any given time after it has left the aphelion be found. For ſuppoſe the area of the ellipſis ſo divided by the line S G, that the whole elliptic area may have the ſame proportion to the area A S G as the whole periodical time in which the planet deſcribes its orbit has to the time given: in this caſe G will be the planet's place in its orbit.

The mean motions of the planets might be eaſily determined from their conjunctions and oppoſitions, if we knew the places of the aphelia, and the excentricities of their orbits; for then we might find the equation of the orbit, and reduce the true to the mean place; and the mean places being determined at two points of time, give the mean motion correſponding to the interval between the times. But the place of the aphelion is beſt found from the mean motion. To determine, therefore, the mean motion, independently of the place of the aphelion, we muſt ſeek for ſuch oppoſitions or conjunctions as fall very nearly in the ſame point of the heavens; for then the planet being very nearly in the ſame point of its orbit, the equation will be very nearly the ſame at each obſervation; and therefore the compariſon between the true places will be nearly a compariſon of their mean places. If the equation ſhould differ much in the two obſervations, it muſt be conſidered. By comparing the modern obſervations, we ſhall be able to obtain nearly the time of a revolution; and then, by comparing the modern with the ancient obſervations, the mean motion may be very accurately determined; for any error, by dividing it amongſt a great number of revolutions, will become very ſmall in reſpect to one revolution. Profeſſor Vince has illuſtrated this method by an example in the planet Saturn, taken from M. Caſſini, (Elem. d'Aſtron. p. 362.) and accompanied with the proper explanations. (See his Elem. of Aſtron.) The mean annual motion of this planet is there deduced to be 12° 13′ 35″ 14‴, and the mean daily motion to be 2′ 0″ 35‴. Dr. Halley makes the annual motion to be 12° 13′ 21″. M. de Place makes it 12° 13′ 36″.8. As the revolution thus determined is that in reſpect to the longitude of the planet, it muſt be a tropical revolution. Hence, to get the ſidereal revolution, we muſt ſay, 2′ 0″ 35‴ : 24′ 42″ 20‴ (the preceſſion in the time of a tropical revolution) :: 1 day : $12^d\ 7^h\ 1'\ 57''$, which added to $29^y\ 162^d\ 4^h\ 27'$, gives $29^y\ 174^d\ 11^h\ 28'\ 57''$, the length of a ſidereal year of Saturn. By this method we may find the periodic times of all the ſuperior planets. The periodic times of the inferior are found from their conjunctions.

The periodic times of the primary planets, copied by profeſſor Vince in his "Elements," p. 113, from La Lande, are as follow: Mercury, $87^d\ 23^h\ 15'\ 43''.6$; Venus, $224^d\ 16^h\ 49'\ 10''.6$; Mars, $1^y\ 321^d\ 23^h\ 30'\ 35''.6$; Jupiter, $11^y\ 315^d\ 14^h\ 27'\ 10''.8$; Saturn, $29^y\ 174^d\ 1^h\ 51'\ 11''.2$; the Georgian, $83^y\ 150^d\ 18^h$. The latter is unqueſtionably erroneous, though copied by many writers, without ſufficient attention, from La Lande; as we have ſhewn in our article *Planetary* NUMBERS. It ſhould have been $84^y\ 28^d\ 16^h\ 55'$. From the tropical period aſſigned in the article juſt cited, we deduce the ſidereal period, thus: As $365^d.242$: 50.3 (preceſ.) :: 30589.352 (trop. per.) : 4212″.5 the preceſſion in Georgian's whole tropical period: then

$$\frac{4212''.5 \text{ whole preceſ.}}{42''.4 \text{ daily motion}} = 99^d\ 8^h\ 28' \text{ to be added to the}$$

tropical period for the ſidereal: conſequently

$$\begin{array}{rrrrl} & 30589^d & 8^h & 27' & \text{tropical period} \\ + & 99 & 8 & 28 & \text{ariſing from preceſſion} \\ \hline & 30688 & 16 & 55 & = \text{the ſidereal period: and} \end{array}$$

$$\frac{30688.705}{365} = 84^y\ 28^d\ 14^h\ 55', \text{ the period in years of}$$

365 days, hours and minutes.

N. B. The daily motion of the Georgian in the ecliptic is above taken from La Lande's tables at 42″.4; but more exactly it is 42″.367, &c.

For the irregularities in the motions of the primary and ſecondary planets by their mutual attractions, ſee ECLIPTIC, GRAVITATION, MOON, NUTATION, PRECESSION *of the Equinoxes*, *Solar* SYSTEM, TIDES, &c.

PLANETS, *the Phenomena of the inferior*, are their conjunctions, elongations, ſtations, retrogradations, phaſes, and eclipſes. See CONJUNCTION, ELONGATION, STATION, RETROGRADATION, &c.

PLANETS, *Phenomena of the ſuperior*, are the ſame with thoſe of the inferior; with an additional one, *viz.* oppoſition.

PLANET, *the particular phenomena, circumſtances, &c. of each*, ſee under the name of the reſpective planet, &c. JUPITER, MARS, &c.

PLANETS, *Configuration of the.* See CONFIGURATION.

PLANETS, *Theories of the.* See THEORY.

PLANETARIUM, a machine for repreſenting the motions of the primary planets by wheelwork. This machine differs from an *orrery* in this reſpect, that it does not profeſs to exhibit any of the diurnal rotations, but confines its operations to the production of the annual motions alone. Theſe motions may be either *mean* or *equated;* the latter of which were firſt exhibited, agreeably to the Copernican ſyſtem, by Huygens's automaton, in 1682; and the former by Roemer's planetarium, ſoon after. It is not, however, our intention to deſcribe, under the preſent article, any of the planetary machines which may at the preſent day be conſidered as obſolete; but to reſerve for our ſubſequent article an hiſtorical account thereof, agreeably to the order of time; and to confine ourſelves here to a deſcription of thoſe planetaria of our own time, which either have been adopted, or, from their ſuperior powers, appear to us to merit our public notice, as models for future imitation; to ſome of which we have already referred from our article ORRERY.

Common Planetarium.—It will be ſeen in our ſubſequent hiſtorical account of PLANETARY *Machines*, that the common planetarium, that preſents itſelf to the eye, as we paſs the windows of the mathematical inſtrument-makers, borrows the numbers of its planetary calculations chiefly from Huygens, and its conſtruction from the planetarium of Roemer, with little or no deviation, except what ariſes from ſuperior workmanſhip; and, in ſome inſtances, from the addition of the planet Georgian. The common planetarium has its wheelwork repreſented by *fig.* 1. of *Plate* X. of *Planetary Machines*, the effects produced by which may be thus briefly deſcribed; *viz.* *a b c d* is a braſs frame, ſimilar to the frame of an ordinary clock, in which are contained twelve wheels and pinions, actuating one another reſpectively in ſuch a way, as to produce the mean motions of the ſix primary planets, that have been long diſcovered, of which our earth is one. A B is a revolving arbor, pivotted into holes made in the upper and lower plates of the frame, and is made to revolve by means of an endleſs ſcrew, acting with the loweſt wheel of 83 teeth, which is made faſt to it, as are alſo the five other wheels and pinions, with the numbers of teeth ſpecified in the figure. C D is an upright ſtem of ſteel wire, ſcrewed faſt into the lower plate at C, and aſcending through a large hole made in the upper plate, which it does not fill. The ſix wheels revolving round this ſtem have each a ſeparate tube, to the inferior ends of which they are reſpectively attached; and the tubes are ſo contrived, that the exterior ſurface of the innermoſt forms a ſtem for the bore of the next largeſt, till all the ſix are fitted one within another round the ſtem of ſteel, which keeps them in a vertical poſition, while they revolve ſeparately with different velocities. The arbor A B, which receives its motion from the handle, by the medium of the endleſs ſcrew, is aſſumed as revolving in a year, which may be either civil, ſidereal, or tropical; but whichever be the period aſſume aſſumed, the pairs of wheels that act together reſpectively will be ſo many fractions of that period. Thus, the loweſt wheel of 83 teeth, on the annual arbor, will drive its fellow 20, with its tube, round in $\frac{20}{83}$ of a year; and the little arm, that is fixed by friction on its ſuperior end, will perform a revolution round the ſun in the ſame time. In like manner, the period of Venus will be performed in $\frac{32}{52}$ of the year; the earth in $\frac{50}{50}$, or one year; Mars in $\frac{75}{40}$; Jupiter in $\frac{83}{7}$; and Saturn in $\frac{147}{5}$; the driving wheels being the denominators of the fractions, and the driven ones the numerators, agreeably to our directions given under the article *Planetary* NUMBERS, for computing the value of wheelwork acting in this ſimple manner.

If we aſſume an exact ſolar year as the period of the firſt moving or driving wheels, then the fractions will produce the periods ſubjoined, *viz.*

				D.	H.	M.	S.
Mercury will revolve in	$\frac{20}{83}$	of 365.242, &c.	or	88	0	14	24
Venus - -	$\frac{32}{52}$	of ditto,	or	224	18	20	9
Earth - -	$\frac{50}{50}$	of ditto,	or	365	5	48	48
Mars - -	$\frac{75}{40}$	of ditto,	or	684	19	52	19
Jupiter - -	$\frac{83}{7}$	of ditto,	or	4330	17	30	3
Saturn - -	$\frac{147}{5}$	of ditto,	or	10738	2	54	43

If theſe periods be compared with the true periods given under *Planetary* NUMBERS, it will be ſeen that the mean motions produced by this ſimple mechaniſm are far from being accurate, and that the errors, by continual accumulation, will become ſenſible in a comparatively ſhort ſpace of time; but where general repreſentation only is aimed at, and the reſpective *times* of the phenomena exhibited by the planetarium are diſregarded, this is the cheapeſt and ſimpleſt conſtruction of a planetary machine that has yet been deviſed; and where its imperfections can be diſpenſed with, its ſimplicity is no ſmall recommendation. Still, however, the *true* places of the planets, depending on the *equations* as well as *mean motions* of theſe bodies, are not the places indicated by this planetarium, ſuppoſing its mean motions ever ſo accurate; nor are the motions of the five recently diſcovered planets attempted to be exhibited, which they might be by additional wheelwork, without altering the conſtruction of the machine. For the uſe of thoſe who are ſatisfied with the repreſentation of mean motions only, we beg leave to ſuggeſt the numbers ſuitable for wheels, that will produce the revolutions of theſe five diminutive bodies alſo. Let $\frac{95}{26}$ be taken for Veſta, $\frac{74}{17}$ for Juno, and $\frac{72}{20}$ for both Ceres and Pallas, with one tube only for theſe two pairs; and theſe wheels, acting in the ſame way that has been deſcribed, will give the mean revolutions with as much accuracy as the preſent ſtate of our knowledge of the motions of theſe little bodies will allow. The planet Herſchel would require $\frac{335}{4}$ for its long period, which numbers are impracticable in a ſmall machine; but for this planet a train might be ſubſtituted, ſuch as will be deſcribed as forming a part of the following machine.

When a planetarium of this common conſtruction is fitted up, its appendages are uſually a lunarium and tellurium, ſeparately adapted to the ſame ſtand; but in thoſe, the annual and lunar trains are never free from conſiderable errors.

Planetarium conſtructed at the Houſe of the Royal Inſtitution.—When the late Dr. Garnett reſigned the lectureſhip of the Royal Inſtitution, and took his aſtronomical and other apparatus with him into Great Marlborough-ſtreet, his ſucceſſor, Dr. Thomas Young, was authoriſed by the managers of the inſtitution to procure as good a planetarium for his lectures as he could get for about fifty pounds; this being conſidered as large a ſum as the ſtate of the finances would allow to be expended on one inſtrument, conſiſtently with the other demands of the apparatus room. The doctor, in conſequence of the permiſſion thus given him, examined the ſhops of the different mathematical inſtrument-makers for a machine already made, which might be conſidered as adequate to the illuſtration of the ſolar ſyſtem, in a large and magnificent lecture room. His inquiries, however, were unſucceſsful; but having heard that aſtronomical mechaniſm was a ſubject which had occupied the attention of the Rev. W. Pearſon, he introduced himſelf to that gentleman in the autumn of 1801, for the purpoſe of conferring with him on the ſubject. The reſult of this conference was, that, being a proprietor of the Royal Inſtitution from its firſt eſtabliſhment, and having conſequently an intereſt in promoting its ſucceſs, Mr. Pearſon agreed to calculate, contrive, and draw a plan for a new inſtrument, which was accordingly done, and put into the hands of Kenneth M‘Culloch, an old but ingenious workman employed at that time in the workſhops of the inſtitution.

The materials being prepared, the machine was begun in the ſummer of 1802, and finiſhed in that of 1803, after having been uſed, in an unfiniſhed ſtate, in the ſpring courſe of lectures of the latter year. The arrangement and dimenſions of the various parts of the machine are as follow, *viz.* In *fig.* 2, A B C D repreſent a ſtrong frame of mahogany, well ſeaſoned, and firmly put together, 5 feet 2 inches high, and 2½ feet acroſs; the two upright pieces of which are each in ſubſtance 4 inches by 1½, and braced, as ſeen in the figure; and the croſs foot-pieces are each 32 inches long, for the ſake of ſteadineſs. Above the croſs bar, A B, is another bar E F, 6 inches from the former, which turns upon very ſtrong metallic pivots of five-eighths of an inch diameter, upon braſs bearing-pieces, at E and F, which are divided acroſs the centres of their holes, and allow the bar to be taken off and put on at pleaſure, by means of a joint, that permits the upper part of each bearing-piece to be turned back. To the ſhoulders of the pivots are attached the ſemicircular braſs plates, G, G, one-fourth of an inch thick, in which holes are drilled in the horizontal and perpendicular lines, and alſo at 45°, and at other intermediate angles; into ſome of which holes two ſteel bolts, H, H, placed on the bar A B, are inſerted, to ſuſtain the mechaniſm, placed on the moveable bar E F, in any given poſition. This method of mounting the ſuperſtructure gives a degree of ſteadineſs, which could not be obtained from a central joint, and is equally capable of different degrees of elevation. It was found neceſſary, however, to have a contrivance for either diſcharging or locking both the bolts at the ſame time; which contrivance was the invention of K. M'Culloch, and anſwers its purpoſe completely. The mechaniſm is ſimply this: a thick circular plate of braſs has an arbor rivetted into it, which paſſes down through the centre of the fixed bar A B, and has a thumb-piece, I, inſerted below, and cloſe to the bar, on a ſquare filed upon its lower extremity, and pinned faſt. The circular plate lies with its plane flat upon the bar, with the upper end of the arbor projecting a little; then a diametrical line being drawn acroſs the plate, and divided into two equal parts, a ſemicircle is drawn from each of the two points, which lie equidiſtant at oppoſite ſides of the centre, with ſuch a radius, that the diameter of each may be equal to the portion of the bolt which requires to be drawn out. One of the ſmall ſemicircles is drawn entirely upon one ſemicircle of the plate, and the other upon the other; after which the two deſignated ſmall ſemicircles are perforated in various places, nearly in the ſhape of an S, and the intermediate ſolid parts filed away, and rendered perfectly ſmooth with a burniſher. Each bolt is bent in the form of a half-crank, the remote ends of which are cylindrical, and paſs through two cocks fixed on the bar A B; whilſt the interior ends are flat, and move each in a dove-tailed groove, made in the wood of the bar under the metallic plate. A ſteel pin, fixed into each ſliding braſs bar of the crank-piece, exactly fits, and paſſes through each ſemicircular perforation of the circular plate, and completes the contrivance. The manner of applying this mechaniſm to its purpoſe is this: as the thumb-piece below the bar, A B, is faſt to the arbor of the circular plate above the bar, turning it half round carries the plate along with it half a turn; in conſequence of which, the metallic pins, rivetted into the ſliding bars of the cranked bolts, are made to approach to, or recede from, the centre of the metallic plate, by reaſon of their connection with the ſmall ſemicircular perforations, accordingly as the thumb-piece is turned one way or the other half round; and thus both the bolts are puſhed in or out at pleaſure by the mere turning of the thumb-piece, and will be kept faſt to their places in any ſituation without an additional ſecurity.

Having deſcribed the ſtand of this planetarium, and pointed out the application of its different parts to conſtitute a whole, we come next to particularize the mechaniſm which the ſuperſtructure is compoſed of, and to ſhew the mutual relations of the various portions to each other, in regular ſucceſſion. The wheelwork, which conſtitute the ratios of the velocities of the different bodies, claim our firſt notice.

L M N O, in *fig.* 3, is a frame of ſtrong braſs, kept together by four braſs pillars, faſtened at both ends by thick ſcrews, ſo that either the upper or the lower plate will take off ſeparately. The length of each plate is $11\frac{1}{4}$ inches, and the breadth 7; and the height of the pillars between the plates $2\frac{1}{2}$. This frame contains the trains of wheelwork, which produce the reſpective revolutions of all the primary planets that had been diſcovered at the time of its invention, including Ceres and Pallas. To ſhorten the deſcription, we will poſtpone the dimenſions of the wheels, and inſert them in a table, where the reader may refer to them after.

At R is an arbor projecting downwards, pivotted into the upper and lower plates of the frame, and revolving, by the application of any power, in the aſſumed period of an exact ſolar year. Q Q is an arbor ſcrewed faſt to the lower plate, and, inſtead of revolving itſelf, ſuffers all the wheels which are borne by it to revolve looſely round it. P P is another arbor of the ſame kind, but longer, and extending 5 inches upwards above the frame, to ſupport the ſun and his mechaniſm. To give the reader a competent idea of the operation and order of the different trains, we will firſt lay before him the following Table, and then explain it, as it has a reference to the drawing where the ſame numbers occur.

Order of the Trains.

	Revolving Arbor R.	Fixed Arbor Q Q.	Tubes over P P.
Mercury -	90	22 68	67
Venus -	113	32 29	63
Earth -	60	60 60	60
Mars -	53	56 50	89
Ceres Pallas -	21	121 60	48
Jupiter -	22	111 40	94
Saturn -	7	124 59	98
Georgian, or Herſchel	7	105 12	67

1ſt. The wheel of 90 is placed firſt, or loweſt, faſt to the revolving arbor R, and drives the wheel of 22 round the fixed arbor Q Q; and along with it the contrate wheel of 68, which is attached to it, and which drives the contrate or laſt wheel of the train 67, fixed on the longeſt and innermoſt tube, to the top of which is fixed the radius vector of Mercury. The communication is made from 68 to 67 by the medium of two ſimilar pinions.

2dly. The wheel of 113 is fixed next over the 90, on the arbor R, and drives its fellow 32 round arbor Q Q, together with 29, to which it is faſtened; the latter of which impels the ſecond tubed wheel of 63 round in the tropical period of Venus.

3dly. Four wheels of each 60 teeth are employed in a ſimilar manner, to produce the earth's revolution in an exact ſolar year; and the laſt of the four is faſtened to the third revolving tube, to carry the annual bar, or radius vector of the earth.

4thly. A wheel of 53 ſucceeds on the arbor R, to drive round Q Q the wheel of 56, to which is faſtened the wheel 50, to actuate the fourth tubed wheel of 89 in the tropical period of Mars.

5thly. A ſmall wheel of 21 is next mounted on the arbor R, to drive 121 round Q Q, and with it 60 as a fellow for 48, to which is attached the fifth revolving tube, which carries both Ceres and Pallas round in the ſame period; the difference of their reſpective velocities being not yet ſufficiently aſcertained to require a difference in the wheelwork.

6thly. The ſmall wheel 22 comes next on the arbor R, and drives 111 round Q, and alſo with it 40, as a fellow for the ſixth tubed wheel of 94, with which is connected the radius vector of Jupiter.

7thly. The long pinion of 7, which is cut in the ſolid part of the arbor, is common to both Saturn and Georgian, and drives the wheel 124 round the fixed arbor Q Q, and with it 59, as a fellow, to impel the ſeventh tubed wheel of 98 in Saturn's period.

Laſtly: The ſaid pinion of 7 alſo drives, by its upper end, the wheel 105, and along with it the perforated pinion 12, which makes the wheel 67 together with the eighth tube revolve, and conduct on its upper end the radius vector of Herſchel.

This is the *order* in which the wheels ſtand when they act; and their number might have been diminiſhed one half, if accuracy in the calculations had not been conſidered as a primary object. But to obtain a great degree of accuracy, the numbers that conſtitute the ratios of a year neceſſarily run high, and render it unavoidably requiſite to break the high ſimple fractions into compound ones of fewer figures, but of the ſame value; or, which is the ſame thing, it became expedient to ſubſtitute, in the moſt convenient manner, a train of wheels for each planet, inſtead of a ſimple pair, where great accuracy muſt have been out of the queſtion. By this adoption, it will be ſeen in the ſubjoined table of the powers of the wheelwork, that a greater degree of accuracy is attained than had perhaps ever been before accompliſhed; and that not merely in one, but in all the revolutions of the different primary planets.

But before we give the tables of dimenſions and powers of the wheelwork, it will be proper to obſerve that *fig.* 4, which is an end-view of the frame, repreſents three braſs bridges, with tubes faſtened to them, to be interpoſed between the revolving tubes, in order to bear the weight of the machinery, and to take off the friction, which would otherwiſe have been too conſiderable to be diſpenſed with. The firſt bridge, 1,1, ſpans over the tubed wheel of Mercury, and has its tube next in length to that of Venus, that a motion may be derived therefrom to the ſun's axis. This bridge is ſcrewed to the upper ſide of the lower plate of the frame. The ſecond bridge, 2,2, with its tube, is placed over the tubed wheel of the earth, and is faſtened by ſcrews upon the lower plate, like the firſt bridge; and the third bridge, with its tube, lies between the tubed wheel of Saturn and that of Jupiter, and is ſupported by the upper plate of the frame, and is therefore inverted.

Powers of the Wheelwork.

Planets.	Fractions of a Year, or Trains from 365.24222 Days.	Periods of the Wheelwork.	Periods by Lalande's Tables.
Mercury - -	$\frac{22}{90} \times \frac{67}{68}$	D. H. M. S. 87 23 14 35.796	D. H. M. S. 87 23 14 35.2
Venus - -	$\frac{32}{113} \times \frac{63}{29}$	224 16 42 1	224 16 41 30
Earth - -	$\frac{60}{60} \times \frac{60}{60}$	365 5 48 48	365 5 48 48
Mars - -	$\frac{56}{53} \times \frac{89}{50}$	686 22 20 41.19	686 22 18 37
Ceres and Pallas -	$\frac{121}{21} \times \frac{48}{60}$	1683 14 14 26.592	
Jupiter - -	$\frac{111}{22} \times \frac{94}{40}$	4330 14 39 5	4330 14 40 30
Saturn - -	$\frac{124}{7} \times \frac{98}{59}$	10746 18 54 20	10746 19 20 0
Georgian or Herſchel	$\frac{105}{7} \times \frac{67}{12}$	30589 0 52 0	30589 8 27 0
Sun - -	$\frac{19}{137} \times \frac{25}{62}$ of Mercury's Rev.	25 10 0 0.223	25 10 0 0

But notwithſtanding the mean motions of all the planets are repreſented by this wheelwork with extreme accuracy, yet, if they were all *equable*, the true apparent places of the planets would not be accurately exhibited, except at the aphelion and perihelion points of their orbits, where the aggregate of all the increments and decrements of motion balance one another, *i. e.* where there is no equation of the centre, or proſthaphæreſis; for all the planets, that have any conſiderable excentricity in their orbits, continue many days longer in one half of their orbit than in the other: for inſtance, Mercury, as we have ſaid in another place, continues about 55½ days in one half of its orbit, and only 32½ in the other; and even in the earth's motion, the difference amounts to 7.8 days, where the excentricity of the orbit is very ſmall. Hence ariſes the neceſſity of ſome mechanical means for accelerating and retarding, alternately, the various motions of the different heavenly bodies in the reſpective parts of their orbits, that the heliocentric places may accord, from day to day, with the places calculated in the Nautical Almanac, and in White's Ephemeris; and alſo that the days of oppoſition and conjunction, the times of the ſtations, and the reſpective durations of the apparent direct and retrograde motions, may be all accurately indicated; none of which, a machine repreſenting only mean motions can have any pretenſions to effect, however accurately its wheelwork may be calculated. Likewiſe, to make the geocentric appearances what they are in the ſky as ſeen from the earth, and what they are calculated to be in the Nautical Almanac, and in White's Ephemeris, the *variable diſtances* muſt be alſo repreſented, otherwiſe the greateſt elongations of Mercury, and the annual parallaxes of the ſuperior planets, would always remain the ſame, as though their orbits were in concentric circles round the ſun.

To effect the two requiſites of varying velocities and of varying diſtances, the two following contrivances are adopted, which, without adding much to the complexity of the mechaniſm, completely produce both the deſired effects, and conſequently all the phenomena dependent upon them: firſt, the tubed wheels of thoſe planets, which have conſiderable excentricity, and conſequent variation of motion, have their teeth cut in ſo peculiar a manner, that the ſize of them varies gradually throughout the whole of each ſemicircle, ſo as to throw juſt ſo many teeth more into one half of the wheel than into the other, as are proper for producing *one half* of the grand equation of each planet; and, ſecondly, a ſmall arm ſuſpended at the extremity of each radius vector, and revolving with the planet in a retrograde direction, by means of an appended weight, ſhews both the *variation of diſtance*, and alſo the *other half* of the grand equation. The weight, too, is adjuſtable, ſo as to make the aphelion and perihelion points fall in their proper places in the ecliptic; and what is a wonderfully lucky coincidence of circumſtances, the ſame mechaniſm, that anſwers theſe purpoſes, preſerves, moreover, the paralleliſm of the axis of every planet, as well as of the ring of Saturn. The proportion between the radius vector and ſhort arm of each planet is as the radius of the planet's orbit to its excentricity; the radius *plus* the excentricity being equal to the aphelion diſtance, and the radius *minus* the excentricity being equal to the perihelion diſtance. See Equation *Mechaniſm.*

It would exceed the limits of this deſcription, were we to introduce here the proper directions for cutting the tubed wheels in the requiſite manner. Suffice it, therefore, to ſay, that the inventor lent to the inſtitution a cutting engine of his own, on the plate of which he had previouſly divided all the required circles in ſuch a way, as would neceſſarily divide and cut the wheels in a proper manner by its ordinary operation, without any extra ſkill in the workman. The danger of inaccuracy, in the execution of this otherwiſe extraordinary proceſs, was thereby obviated; and he had the ſatisfaction of ſeeing a practical difficulty vaniſh, which might have proved inſuperable to the mere theoriſt. Care, however, was previouſly taken to aſcertain that the largeſt and ſmalleſt tooth of every wheel were capable of being acted upon by the mean-ſized teeth of the driving wheel, with which each tubed wheel had to co-operate; but it was found that the diſparity between the largeſt and ſmalleſt teeth of Mercury's tubed wheel was too conſiderable to admit of the ſame method of cutting the teeth, that would apply to the reſt: hence, had no other practicable method of effecting half the equation of this planet preſented itſelf, the motion could not have been made perfect enough for the requiſite purpoſe; but fortunately a ſecond method occurred of producing the required degree of acceleration and retardation, and that without any inequality at all in the teeth, which was that of placing the tube as much out of the centre of the wheel as is equal to the excentricity of the orbit, the radius of the wheel being taken as its radius. The wheel conſequently was made a contrate one, and takes its motion from its fellow, by the interpoſition of two pinions placed at oppoſite ends of an horizontal arbor; which arbor is ſuſtained by the lower plate of the frame, and pivotted into a cock at each end. The pinion which drives the excentric contrate wheel was, therefore, required to be longer than double the excentricity of the wheel, that it might not eſcape its teeth: likewiſe the ſpaces of the wheel were required to be filed with an equalling file, held in a direction pointing not to its centre, but to the excentric point in which the tube is fixed, in order that, during its action, the friction might be as little as poſſible.

This method of producing unequal motion, we have before ſaid, was firſt applied by Huygens in his automaton planetarium; but we have ſhewn (under Equation *Mechaniſm*) that he miſtook the effect, by ſuppoſing that the *whole* equation would be thus produced, whereas, in fact, only *one-half* of it is effected, which is what the inventor's purpoſe requires.

As the exact periods and other data of the orbits of the two newly-diſcovered planets, Ceres and Pallas, were not aſcertained with ſufficient accuracy, their tubed wheel was cut, *pro tempore*, into equal teeth, as was alſo that of Venus, by reaſon of her excentricity being too inconſiderable to require notice; but the other planets have the teeth of their tubed wheels ſo diſtributed in the two ſemicircles, which are biſected by the line of the apſides, that one ſemicircle of each contains more teeth than the other, in the proportion expreſſed in the annexed table.

Table of the Teeth contained in the reſpective Aphelion and Perihelion Semicircles.

	Aphelion Semicircle.	Perihelion Semicircle.	Wheels.
	Teeth.	Teeth.	
Mercury -	37.9	29.1	67
Earth - -	30.3	29.7	60
Mars - -	47.2	41.8	89
Jupiter - -	48.4	45.6	94
Saturn - -	50.75	47.25	98
Georgian, or Herſchel	34.6	32.4	67

The above table will aſſiſt the workman in eſtimating the perfection of the cutting by an engine with appropriate unequal diviſions; for when a diametrical line is drawn from the aphelion to the perihelion points marked on each wheel, each of thoſe ſemicircles will contain the ſame number of teeth, notwithſtanding another line biſecting this at right angles will contain thoſe proportions which are expreſſed in the table; an examination of this kind will be a check upon the workmanſhip.

The tubes move round one another without the leaſt ſhake, and extend above the frame unequally, the innermoſt, or longeſt, being $6\frac{1}{2}$ inches long, and $\frac{5}{16}$ bore, and the outermoſt, or ſhorteſt, $\frac{7}{8}$ths of an inch long, and $1\frac{1}{4}$ bore; they go within one another, as in the common planetarium, in order that all the radii vectores may be borne by the upper ends of their reſpective tubes.

Fig. 5. exhibits to view the under face of the lower plate of the frame, in which the ſame letters denote the ſame parts as in *fig.* 3.

This lower plate of the frame, that contains the wheelwork, is bedded into and ſcrewed faſt to the upper ſurface of the moveable croſs-bar of mahogany E F, ſo that the tubes may be exactly over the middle of it; and the upper plate of the ſaid frame is bedded into, and made faſt to a circular mahogany board of forty-ſix inches diameter, to which it is attached by ſeveral ſtrong braſs bars, which are ſcrewed both to the braſs frame and to tapped braſs nuts let into the circular board below: the tubes project through a central hole, made in the large circular board, juſt large enough to admit them to paſs through it: the frame and circular board, therefore, may be put into either a horizontal or perpendicular direction, or into any intermediate elevation, in any of which poſitions it will be kept ſteady by the bolts H, H. The circular board is compoſed of many ſeparate pieces of wood, fitted together in ſuch ſhapes, and in ſo compact a manner, as to prevent its warping, in doing which, the contriver, M'Culloch, ſhewed great ingenuity: this circular board is painted blue on its upper ſurface, and has a large ecliptic mounted upon it by means of twelve perforated pillars of blackened wood, through which metallic rods paſs and ſcrew at both ends, above into fixed nuts under the ecliptic circle, and below into looſe nuts under the circular board, ſo that the ecliptic may be mounted or diſmounted at pleaſure. This ecliptic circle, which is three feet and a half diameter within, and four feet and a half acroſs the extremities, has the characteriſtic animals, or ſuppoſed animals, beautifully painted in oil colours on a black ground, and ſurrounds all the radii vectores, and therefore muſt be conſidered as the Earth's orbit projected into the heavens beyond the planetary ſyſtem; it ſerves admirably to rectify the planets by, and alſo to aſcertain all their heliocentric and geocentric places, at the ſame time that it adds greatly to the grandeur of the tout enſemble appearance of the machine, when in an erect poſition before an audience.

The radii vectores, ſhort arms, weights, and the other viſible parts of the mechaniſm, for the ſake of effect, are alſo painted blue, except the ivory balls which repreſent the planets, the contraſt between which and the blue ground behind, gives the ſemblance of real motion, without mechanical means, to an eye placed in front, at the remote part of the theatre.

A ſpectator viewing the planets obliquely, will moreover perceive them project beyond the ecliptic in one-half of their orbits, and retire within it in the other, which motion conſtitutes their variation of latitude, or deviation from the plane of the ecliptic; another effect which is not uſually ſhewn by a planetarium; and the quantity of latitude north or ſouth of each planet is indicated by ſmall fixed hands pointing to the reſpective ſmall revolving plates borne by the projecting ſtems of the radii vectores; which plates are ſilvered, and properly divided and figured by an engraver. The planets Mercury, Ceres, Pallas, and Mars, having no ſecondaries, have their latitudes ſhewn by a bend on the exterior ends of the projecting ſtems of the radii vectores, round which bent parts the ſmall arms revolve, ſo as to make their reſpective angles with the plane of the ecliptic. This method of ſhewing the latitude is very ſimple, but requires the ſmall arms to be elongated beyond what they would have been, when moving in the plane of the ecliptic, in the ſame proportion that the hypothenuſe of a right-angled triangle is to its baſe, the included angle being ſubtended by ſuch a perpendicular line as will be a ſine to the requiſite degrees of heliocentric latitude, at the diſtance from the ſun of the radius vector of each planet.

The ſtems on which the arms and weights revolve ſcrew into nuts under the ends of the radii vectores, by means of which the inclination of the bent ends may be ſet to any particular ſituation, ſo as to make the nodes fall in their due places with reſpect to the ecliptic; and by being thus adjuſtable, the ſtems may be eaſily rectified for the motion of the nodes at the end of every century, or longer period of time. The idea of bending the ends of the ſtems was ſuggeſted by Dr. T. Young, and affords a ſimple method of effecting the latitude of all the planets in queſtion, except that of Pallas, the latitude of which is too great to be altogether repreſented by ſuch a limited arm as the other parts of the mechaniſm will allow: the planet Venus having conſiderable latitude, and very little excentricity, required a different contrivance, as did alſo thoſe planets which have ſecondaries; otherwiſe the planes of the orbits of the ſecondaries would have been turned into various angles, as they regard the ecliptic, in different ſituations of the radii vectores. The application of an inclined circular plate promiſed beſt to produce the deſired effect of raiſing and depreſſing Venus, and the ſyſtem of Jupiter, Saturn, and Georgian or Herſchel, and were therefore adopted. The action of the inclined plate on the ſtem of the planet, is cauſed by a notch on the ſtem reſting againſt the edge of the fixed plate, while the ſmall arm, revolving round the ſaid plate, carries the ſtem round it; by which means the planet carried by the ſtem projects and recedes alternately, as much as one edge of the circular plate is more prominent than the other. This effect is not eaſily comprehended from a ſimple verbal deſcription, but is readily perceived in the machine.

With reſpect to the diſtances of the planets from the ſun, it was impoſſible to obſerve the exact proportions without making the ſun's ball very minute, and Mercury cloſe to it, or elſe Georgian at an immenſe diſtance from the ſun; in which caſe the machine muſt have been a horizontal one, and the ecliptic circle in another ſituation. It was, therefore, determined, that though the *exact proportions* of diſtance could not be preſerved, yet the lengths of the radii vectores ſhould be in due proportion, as far as to Mars incluſively, upon a ſcale that made the Earth five inches from the ſun, and that the longer radii vectores ſhould be an exact fractional part of their due lengths, rather than have no proportion at all, as is the caſe in the common planetaria.

Theſe lengths of the radii vectores, and the correſponding lengths of the ſhort revolving arms which repreſent the reſpective excentricities proportional to the lengths of the radii vectores, are expreſſed in the annexed table.

Table of Diſtances and Excentricities of the Planets in the Planetarium.

Planets.	Mean Diſtance from Sun in Inches.	Ratio to the Truth.	Short Arms.
Mrcury -	1.94	1 : 1	0.38
Venus - -	3.61	1 : 1	0.025
Earth - -	5.0	1 : 1	0.08
Mars - -	7.61	1 : 1	0.69
Ceres - -	10.35	3 : 4	0.87
Pallas - -	10.35	3 : 4	2.59
Jupiter - -	13.0	1 : 2	0.62
Saturn - -	15.9	1 : 3	0.88
Georgian or Herſchel	19.19	1 : 5	0.91

The radii vectores have each a counterpoiſe, and are faſtened to the ends of their tubes by a clamping-piece of braſs attached to each of them by pins, and made ſo as to be tightened by a ſcrew, which draws the ends near together.

The inclination of the orbits are proportioned thus: *viz.*

The inclination of			Inches.	diſtance is ſubtended by Inches.
Mercury -	=	7° 0′ 0″	at 1.94	0.237
Venus - -	=	3 23 35	at 3.61	0.213
Mars - -	=	1 51 0	at 7.61	0.247
Ceres - -	=	10 37 56	at 10.35	1.92
Pallas - -	=	35 0 42	at 10.35	6.3
Jupiter - -	=	1 18 56	at 13.0	0.296
Saturn - -	=	2 29 50	at 15.9	0.69
Georgian, or Herſchel	=	0 46 20	at 19.19	0.256

It muſt be obſerved, that the ſubtending lines here calculated muſt be doubled to ſhew both north and ſouth latitude; therefore the quantity of riſing and falling, or of projecting and retiring with reſpect to the plane of the ecliptic, muſt be *double* the quantity above expreſſed.

The ſun's mechaniſm remains yet to be explained, which, as we have ſeen, conſiſts of the train $\frac{19}{137} \times \frac{25}{62}$ of Mercury's tropical revolution $= 25^d\ 10^h\ 0^m\ 0^s.223$; the motion is communicated thus;—on the top of Mercury's long tube is faſtened the large contrate wheel of 137, which impels the pinion of 19, to which is attached the wheel of 62, which drives the ſmall wheel of 25 on the ſun's axis round in the ſpecified period, which does not vary a quarter of a ſecond from La Lande's laſt determination of the time of a rotation, as it regards a fixed point: the three laſt wheels with their bearing-pieces are borne by a ſmall braſs bar faſtened to the top of the fixed ſtem of 7½ inches long, round which Mercury's tube revolves, which piece of mechaniſm is ſeen in its proper place near the upper P, in *fig.* 3, under the ſun.

It muſt, however, be recollected that Mercury's tube does not revolve *equably*, by reaſon of its being faſtened into a point, as nearly as may be, $\frac{1}{5}$th of the wheel's radius out of its centre, and therefore a compenſation was neceſſary to equalize the motion of the ſun round the axis, which otherwiſe would have been quicker on ſome days than on others: this compenſation was very eaſily effected, by placing alſo the large wheel of 137, as nearly as may be, $\frac{1}{5}$th of its radius out of its centre, but in the ſemicircle diametrically oppoſite to that of Mercury at the lower end of the tube, in order that when the aphelion tooth of Mercury's wheel is in action with its pinion, the perihelion tooth of 137 may actuate its pinion of 19, which, by reaſon of the excentricity of 137, muſt be a long pinion: thus, when an acceleration takes place in the wheel of Mercury, a retardation takes place in that of the ſun, and *vice verſâ*, by which means the motion of the ſun round his axis becomes equable, the increments of one wheel's motion balancing the decrements of the other.

The inclination of the ſun's axis to a line perpendicular to the plane of the ecliptic is 7° 16′, and it points always to 17° 53′ of Virgo; hence the direction in which a ſolar ſpot will move, whether aſcending, deſcending, or horizontal, to an eye ſituated at the Earth, will be ſeen to depend upon the Earth's ſituation in her orbit, as ſhe has reference to the direction of the ſun's axis. The ſecondaries have no motions by wheelwork, becauſe ſuch motions would have added greatly to the complexity of the machinery, as well as have enhanced the expence.

The appendages of this planetarium are theſe; 1. A light rod is adapted to the Earth's ſtem, and extends to either of the interior planets, to ſhew the retrogradations, ſtations, and direct motions. 2. A rod with a fiducial edge, containing the mean diſtances marked, and having a curve piece at the remote end, applies to the ſun's ſtem, by means of a downward bend, which rod, laid on the ecliptic circle, level with the centre of the ſun, and extending with its oppoſite end to the ſun, will ſerve to place the planets in their due heliocentric places in the rectification, and alſo to aſcertain the places on any given day after they have been in motion: this rod will alſo ſerve the lecturer to point with to any part of the inſtrument during the lecture. 3. The handle, which is in an erect poſition, behind the circular wooden board, when the ecliptic is erect, has a ſingle endleſs ſcrew, ſeen in *fig.* 5, at S, acting with a wheel of 52 ſtrong teeth, placed on the lower end of the annual arbor R, without the frame, ſo that one turn of the handle correſponds very nearly to a week. A large ſpiral face is alſo behind the circular board, removed from the braſs frame L M N O, by the interpoſition of the moveable croſs bar of mahogany E F, to which it is ſcrewed with its centre open for the annual arbor to paſs through, which carries the annual index: to the end of the annual arbor is alſo fixed a pinion of ten, driving a wheel of 100 round in ten years, which wheel has another pinion of ten attached to it, to drive a ſecond wheel of 100 round in 100 years, the uſe of which two wheels, not ſeen, is to indicate the year in each ſucceeding century, for which the inſtrument at any time ſtands rectified, which addition aſſiſts the memory, and ſaves the trouble of frequent rectification. The ſpiral of the ſaid face is quadruple, and is divided into the months and days of the year, taking in the 29th of February in every fourth year, like the ſpiral we deſcribed under our article Orrery. The wheels for indicating the year and century lie behind the plate of the large ſpiral, and take their motion from the projecting arbor at R, and the figures are read through holes cut in the ſaid plate, the hands of which are ſecured by ſcrews, when ſet to their places. The rectification of this planetarium for a given time is attended

attended with ſome trouble, and therefore, when rectified, ſhould be guarded againſt the eye of curioſity. As the wheels have ſeveral of them unequal teeth, it is neceſſary that the aphelion teeth of each ſhould be in action, when the planets are reſpectively at the aphelion points of their orbits, and that the arms ſhould be made faſt when properly placed: when the wheelwork was firſt put together, the wheels were marked for their places of action, to correſpond to the 1ſt of January 1800; and if theſe marks be brought in contact for that time, and the arms be put to the correſponding heliocentric longitudes, turning the handle till the hands ſhew the preſent time, will always be the ſureſt, as well as eaſieſt way of rectifying: but ſhould the marks be effaced, each planet's diſtance from the aphelion muſt be calculated for the time, and both the wheel and arm be placed accordingly in ſucceſſion. In order to diſengage the ſcrew S at any time from the annual wheel of 52 teeth, the croſs bar T U (*fig.* 5.) is puſhed in, or drawn out, as the caſe may be, and while it moves in a parallel direction by means of its longitudinal openings, admitting the pin W and ſcrew X to guide them, the diagonal opening V, taking the pin Y of the cock that holds the ſcrew, draws it out of, or puſhes it into the wheel's teeth, accordingly as the bar is moved from T towards U, or from U towards T, in either of which ſituations it may be fixed by the nut of the ſcrew X. The arbor of the ſcrew S is ſquared, ſo as to admit of the handle at either end of it, as may be moſt convenient to the lecturer's aſſiſtant, who, ſtanding behind the machine to turn the handle, is concealed from the audience.

The new Planetarium for equated Motions, by the Rev. W. Pearſon.—Under our article ORRERY, when deſcribing *the new orrery for equated motions in three parts*, we referred the reader to our preſent article for that portion of it, which conſtitutes the planetarium at preſent under our conſideration. This planetarium, being contrived to exhibit the mean motions, the grand equations, and all the variations of diſtance, as well as of velocity, in the different parts of the reſpective orbits, demanded a new conſtruction, and conſequently new calculations. We have already deſcribed the *principle* by which *equated* motion is produced in this machine, under the title EQUATION *Mechaniſm*, near the end of that article; and have alſo given an example, under our *indirect method of approximation*, (ſee *Planetary* NUMBERS,) of the mode of calculating wheels for the motion of Venus, when one of thoſe wheels is *not in a ſtationary* ſituation, which mode applies to all the trains of this planetarium, except thoſe of the ſun and of Mercury; we muſt, therefore, requeſt the reader to recur to thoſe two articles, and to make himſelf maſter of them, before he proceeds to examine the calculations and contrivances that we now propoſe to preſent to him.

Fig. 1. of *Plate* XI. of *Planetary Machines*, preſents an elevation of all the wheelwork of their proportional dimenſions, and in the ſtate of action; and *fig.* 2. gives a plan of the arm or radius vector of Saturn, which will ſuffice to explain all the other arms. In *fig.* 1, A B is a ſection of an ornamental table or ſtand, broken into two parts at the ſide A, for the purpoſe of bringing it into the plate; and the legs are omitted for the ſame reaſon, but may be conceived to extend downwards the requiſite quantity, as repreſented in *Plate* V, which gives a perſpective view of a ſimilar table. Below A and B, a ſection of the ornamented rim of the table is ſeen; at C is the handle turning the horizontal arbor, C D, round in ſeven days, and the exterior end of this arbor carries a hand to indicate the ſeven days of the week, on an engraved plate attached to the ſide rim of the table under B. This period of ſeven days is aſſumed as the baſis of all the planetary calculations, and therefore all the motions muſt be traced in ſucceſſion from this firſt moving arbor. The inner end of this horizontal arbor is ſupported by the cock G, ſcrewed to the bottom of the table, and carries a pinion of 18 teeth, that drives a contrate wheel of 61 teeth placed under it, apparently without ſupport: the axis of this contrate wheel is a piece of ſteel wire, nicely poliſhed, which aſcends through a thick braſs tube, as high as F, under the ſun, and is retained within it, by a ſcrew entering its ſquared end at F. This thick tube of ſmall bore has a ſhoulder-piece attached to it, which reſts on the middle of the table at H, and the lower end of it is held by a large tapped nut under the table, above the wheel of 61 teeth. By theſe means the tube ſtands firmly in a vertical direction, and bears the ſuperincumbent weight of all the wheels and arms, both which are always expoſed to view. At F, on the ſuperior ſquared end of the axis, or wire E F, is fixed faſt, by the ſcrew we have mentioned, the pinion 28, which drives another pinion 30 round on the inferior end of the ſun's ſtem: the period of this revolution, or rather rotation, is $\frac{61}{18} \times \frac{30}{28}$ of 7 days = $25^d\ 10^h\ 0^m\ 0^s$, which is the period laſt determined by La Lande. To the pinion 28 is attached a wheel under it of 53 teeth, by means of a connecting piece of braſs tube that ſurrounds the ſteel wire, which wheel reſts on the top of the braſs tube, which in future we ſhall call the central ſtem, as though it were ſolid. The wheel of 53 drives another of 35, ſupported by a horizontal bearing piece that ſupports the ſun's ſtem at its oppoſite end, as ſeen in the figure; and this bearing piece has a ſhort tube ſoldered into it below, through which the arbor of this wheel of 35 paſſes, and receives a pinion of 13 at its lower end; the axis or arbor of pinion 13, and of wheel 35, is detained in a vertical poſition by a ſcrew above the centre of wheel 35, but ſo as to allow the wheel and pinion to revolve without any ſhake of the arbor within the tube: this pinion of 13 drives a wheel of 73 teeth, or rather a ring with the teeth cut on the inner edge, for the ſake of making its motion proceed in the requiſite direction, and the period of its revolution is $\frac{61}{18} \times \frac{35}{53} \times \frac{73}{13}$ of 7 days, or, which is the ſame thing, in $\frac{28}{30} \times \frac{35}{53} \times \frac{73}{13}$ of $25^d\ 10^h$, namely, in $87^d\ 23^h\ 14^m\ 36^s$. The ring we have deſcribed, therefore, carries the ſtem of Mercury, and is ſcrewed to a circular plate of braſs, the centre of which is fitted ſo as to turn eaſily round the central ſtem without ſhake. If the mean motion only of Mercury had been wanted, the wheels we have deſcribed would have been the whole that the planet would have required, but the equation of the centre required ſome additional wheels, which are thus applied; a little wheel of 30 teeth is attached to the ſun's bearing piece, by the interpoſition of a piece of braſs tube, and therefore has no motion; another ſimilar wheel lies on the circular plate of the ring and acts with it, while the axis of this ſecond wheel of 30 paſſes through the plate, and takes another ſimilar wheel, under the plate; while the plate and ring therefore revolve together in Mercury's period, the ſecond and third wheels, of each 30, revolve together juſt once by means of their connection with the firſt or fixed wheel, round which they are carried; then this motion is communicated to a fourth ſimilar wheel of 30, fixed to the lower end of Mercury's ſtem, which wheel gives Mercury a rotation on his axis in each revolution; but the ſtem of Mercury is cranked, as ſeen in the figure, and as the parallelifm of the crank is preſerved during its whole revolution, the diſtance of the planet will vary conſtantly, as well as its velocity, in the manner that has been explained under the article Equation *Mechaniſm*, above referred to. When the horizontal part of the crank is equal to double the excentricity of the orbit, the equation will be properly repreſented, but the diſtances will be better exhibited when the ſaid piece is equal to the ſimple excentricity; there are, therefore, two holes drilled and tapped in this piece, to ſuit either condition, but the nearneſs of the planet to the ſun will not allow the introduction of the correction, which moſt of the other planets have got, as will be preſently explained.

Hitherto the uſual mode of eſtimating the value of a common train of wheels has been adhered to, becauſe the two trains that we have examined are ſo placed, as to act in the uſual way in ſtationary poſitions; but henceforth we ſhall have to conſider trains, in each of which a certain portion is placed on and carried round the ſun by the very arm that is put into motion. In this conſtruction, for a reaſon that will appear preſently, the ſyſtem of concentric tubes, contrived by Roemer, and uſed in the common planetarium, is impracticable, unleſs as many fixed tubes could be introduced between them alternately, as there are revolving ones; the motion of each inferior planet is therefore tranſmitted to the next ſuperior, beginning with Mercury and ending with Georgian, ſo that each calculation is neceſſarily that of a ratio between the periods of every pair of contiguous planets taken in ſucceſſion. In calculating thoſe ratios the author had two choices, namely, of the *periodic*, and of the *ſynodic* revolutions; one of which, as we have ſhewn under the head Numbers *for Synodic Revolutions*, is eaſily convertible into the other: if the periodic revolutions had been preferred, the wheelwork muſt neceſſarily have been placed on cocks, bridges, or in other *permanent* ſituations; but when ſynodic periods are choſen, ſome of the wheels will require to be placed, or at leaſt will admit of being placed on *moveable* ſupports; the latter revolutions were thence choſen, in order to do away the neceſſity of cocks and bridges, and the numbers calculated to produce ſynodic revolutions, by the *mode* in which they are uſed, produce the periodic revolutions, after an allowance is made for the preceſſion of the equinoxes. Thus, if the tropical period of Venus be to that of Mercury as $224^d.69847 : 87^d.96579$, we ſhall find, by one of the methods of determining *planetary* numbers, that theſe periods are to each other as 1553 : 608 very nearly; but the numbers for the ſynodic period are here required; therefore let 608 be taken from 1553, and let the remainder, 945, be ſubſtituted for 1553, as one of the products for two wheels, while 608, the other product, remains unaltered; then while $\frac{1553}{608}$ of Mercury's tropical revolution is equal to that of Venus and alſo $\frac{608}{1553}$ of Venus's tropical period equal to that of Mercury, abſolutely conſidered, it will be found that $\frac{608}{945}$ of the tropical period of Venus will be the *ſynodic* or relative period of the two planets, Mercury and Venus, from conjunction to conjunction, namely, 144.54 &c. days, which time very nearly correſponds to the period given in our table of mean ſynodic revolutions, inſerted under the title Numbers. Now the factors compoſing the ratio $\frac{608}{945}$ are $\frac{38 \times 16}{15 \times 63}$, or in the form of a train inverted, (becauſe the motion is given by Mercury,) $\frac{15}{38} \times \frac{63}{16}$, or otherwiſe $\frac{63}{16} \times \frac{15}{38}$; but the latter portion is equal to $\frac{30}{76}$, and accordingly we find $\frac{30}{76} \times \frac{63}{16}$ the train adopted in the planetarium before us. The wheel 76 revolves along with Mercury's ring, to which it is made faſt, and drives a pinion of 30, revolving on a pin, or ſtud, at the poſterior end of Venus's arm, by which it is carried; then a pinion of 16 made faſt to the ſaid pinion of 30 acts with the wheel of 63, by the intervention of a pinion 14, the office of which is merely to change the direction of motion, without affecting the velocity. The wheel of 63, however, though connected with the train in the way we have mentioned, is made faſt to the central ſtem, by cloſe fitting, and therefore does not move, but by its reſiſtance cauſes the arm of Venus to move inſtead, thereby making the pinion of 14 revolve round it, and producing an effect on the motion of the train equal to what would have been produced by one entire revolution of itſelf. In this way the calculations made for ſynodic revolutions in all the other trains, produce the requiſite tropical periods of all the remaining primary planets, agreeably to the table of wheelwork which we have ſubjoined, for the ſake of abbreviating our deſcription.

Again, the wheel 126, under the arm of Venus and made faſt to it, drives a pinion of 26 and its attached pinion of 32, both which revolve on a ſtud on the earth's arm; and the intermediate pinion 13, being reſiſted by the fixed wheel of 97, revolves round it and carries the earth's arm round the ſun in a ſolar year, as it regards the ecliptic; but as it regards Venus, in the proper ſynodic period of 583.9 &c. days. On the earth's arm are carried the wheels and pinions for preſerving her parallelifm and alſo for producing the moon's period, both which are effected with great accuracy: juſt above the ſaid arm the wheel of 107 is fixed to the central ſtem, and by its reſiſtance gives motion to the wheel 62, which again impels another wheel of 107 in a contrary direction, thereby producing true parallelifm; in the mean time wheel 86, made faſt to wheel 62, revolves with it on a ſtud, and, through the medium of a ſmall wheel of 32, for changing the direction of motion, impels the pinion 12, with which the moon is connected. The lunation thus occaſioned is $\frac{62}{107} \times \frac{12}{86}$ of 365.242, &c. $= 29^d\ 12^h\ 44^m\ 0^s.4$. At a ſmall diſtance below the earth's arm, and faſt to it, revolves the wheel 142, impelling the pinion 28 and with it the pinion 30, reſting together on a ſtud in the arm of Mars; while the intermediate pinion of 13, reſiſted by the fixed wheel 134, draws the arm of Mars round in his proper period. To the arm of Mars and not far under it is made faſt the wheel 166, which impels the wheel 53, and with it the 34 attached to it, round a ſtud on the arm of Pallas, while the intermediate pinion 15, oppoſed by the fixed wheel of 154, pulls the arms of both Pallas and Ceres round with the ſame velocity in a period which was calculated to be a mean between the two, and as far as we yet know, is not much different from either. At the time when theſe periods were calculated (1806), thoſe of Juno and Veſta had not been aſcertained, nor had Veſta been diſcovered; but room was left during the progreſs of the work for their introduction, and arms were ſince inſerted on the ſame tube that carries the other two arms, which may be adjuſted by hand occaſionally when their places are required for any particular purpoſe; but when the period of thoſe little bodies are finally ſettled they may be alſo repreſented by appropriate mechaniſm. Below the four arms of the little planets, and faſt to their common tube, revolves the wheel 182 in the common period of Pallas and Ceres, actuating the ſmall wheel 40 and its attached pinion 17, carried by a ſtud on the arm of Jupiter, while the interpoſed pinion of 25, taking hold of the fixed wheel 122, conducts the arm round the ſun in its proper period. Again, beneath Jupiter's arm, and attached to it, revolves the wheel 126, actuating the wheels 43 and 41 round a ſtud on Saturn's arm; and the ſmall pinion 11, taking the teeth of both the ſmall wheel 41 and of the large fixed wheel 178, conducts Saturn's arm round in his due period. And, laſtly, the wheel 129 under Saturn's arm moves faſt to it, and drives the ſmall wheels 39 and 28, made faſt together and placed on a ſtud on Georgian's arm, while the intermediate pinion 20, taking the teeth of the fixed wheel 171, thereby conducts Georgian's arm through its revolution by a ſlow motion in its requiſite time. Thus each planet, except the little ones lately diſcovered, from Mercury downwards, has got a train of a moveable wheel, two ſmall wheels united together, a ſingle intermediate pinion, and a fixed wheel; and our explanation of the mode of action of the train of Venus, will apply individually to all the reſt. Before the wheelwork was put together, it was apprehended that there would be a conſiderable portion of time loſt in the tranſmiſſion of motion through all the trains from Mercury to Georgian, when the handle ſhould have commenced its operation, which apprehenſion conſtituted the inventor's principal objection to the theory of the conſtruction, before the machine was put into hand; but Fidler, the workman, being forewarned of this probable imperfection, laid all his teeth ſo deeply into one another, that no one wheel has any ſhake, and the moment that the handle commences its motion, all the wheels of the machine are immediately in action, and conſequently all the planets begin to move, as nearly as can be perceived, at the ſame time. Perhaps a more complete ſtructure of wheelwork was never put together, to anſwer a ſimilar purpoſe, and yet the handle moves with freedom and without any ſenſible jerks. Many of the wheels were at firſt calculated to have ſmaller numbers of teeth, but the nature of the conſtruction required that the fixed wheels, and conſequently ſome of the moving wheels, ſhould be large, in order to guide the arms of mean motion with uniform ſteadineſs, as well as to render all the motions contemporaneous at their commencement.

A Table of Tropical Periods produced by the Synodic Trains.

		D.	H.	M.	S.
The handle is aſſumed to revolve in	- - - -	7	0	0	0
Sun's axis	$\frac{61}{18} \times \frac{30}{28}$ of ſeven days - - -	25	10	0	0
Mercury	$\frac{61}{18} \times \frac{35}{53} \times \frac{73}{13}$ of ditto. - -	87	23	14	36
Venus	$\frac{30}{76} \times \frac{63}{16} = \frac{945 + 608}{608} = \frac{1553}{608}$ of Mercury's period =	224	16	41	56
Earth	$\frac{26}{126} \times \frac{97}{32} = \frac{1261 + 2016}{2016} = \frac{3277}{2016}$ of Venus's period =	365	5	48	39
Mars	$\frac{28}{142} \times \frac{134}{30} = \frac{938 + 1065}{1065} = \frac{2003}{1065}$ of the Earth's period =	686	22	17	11
Pallas and Ceres	$\frac{53}{166} \times \frac{154}{34} = \frac{4081 + 2822}{2822} = \frac{6903}{2822}$ of Mars's period =	1680	7	43	23
Jupiter	$\frac{40}{182} \times \frac{122}{17} = \frac{2440 + 1547}{1547} = \frac{3987}{1547}$ of Pallas's period =	4330	14	28	28
Saturn	$\frac{43}{126} \times \frac{178}{41} = \frac{3827 + 2583}{2583} = \frac{6410}{2583}$ of Jupiter's period =	10746	20	52	36
Georgian	$\frac{39}{129} \times \frac{171}{28} = \frac{2223 + 1204}{1204} = \frac{3427}{1204}$ of Saturn's period =	30589	7	18	58
Moon	$\frac{62}{107} \times \frac{12}{86}$ of 365.242 &c. - -	29	12	44	0

In computing the exact value of each of thoſe periods in ſucceſſion, we have had no reference to the true periods as given in La Lande's Tables, but have deduced each period from that of the preceding planet, as produced by the wheelwork, which is the only true method of appreciating the real values; and if theſe periods be compared to thoſe of the planetarium made at the houſe of the Royal Inſtitution, or indeed to thoſe of any other machine, they will be found to claim a preference, as to accuracy, in many of the periods, and are inferior in none, except in thoſe of the Earth and Jupiter; but in all the other planetaria the earth is *aſſumed* as having its period *exact*, and is made the ſtandard by which the others are guided, and therefore requires no calculation for particular wheels; whereas in this machine all the periods are derived from the motion of the weekly handle; and with reſpect to Jupiter, when the periods of Juno and Veſta are introduced, his period will neceſſarily be altered by the new calculations that will be introduced to complete the motions of all the primary planets.

The reader will recollect that when we explained the mode of converting a tropical calculation into a ſynodic train, we ſubtracted the denominator of the large ratio, put into the form of a fraction from the numerator; that is, we *ejected unity* from the value, as a compenſation for the *addition* made to each revolution by the *mode* in which the wheels are placed to act; we have therefore, in reverſing the operation to find the value of the train for a tropical period, ſubſtituted + for −, and by this ſubſtitution have given in their loweſt terms the identical numbers that the author calculated to expreſs the ratios of the reſpective tropical periods, before they were metamorphoſed into numbers ſuitable for ſynodic trains. If we conceive, when all the planets are in motion, that the firſt mover is Georgian and the laſt the handle, which would be the caſe, if any external force were applied to Georgian's arm inſtead of to the handle, then the explanation will be obvious of the neceſſity that exiſts for *ejecting unity* out of each improper fraction, that is compoſed of the ratio of any two contiguous periods. Let us ſuppoſe Georgian's arm puſhed forward by any force in the direction of the planet's proper motion, then, by looking at the figure, we ſhall ſee that the loweſt wheel 171, which is made faſt to the central ſtem, will produce a motion in the little pinion 20, which is given again to the ſmall wheel 39, by the medium of its attached wheel 28; but wheel 39 cannot revolve without moving its fellow, or wheel 129 made faſt to Saturn's arm, therefore Saturn's arm muſt evidently have a motion from this direct action of the ſmall wheels; but the ſmall wheels in queſtion are ſupported by and carried round upon Georgian's arm; and if they did not revolve at all, by their connection with Saturn's arm they would make Saturn revolve in the ſame time with Georgian; or in other words, if pinion 20 were even detached from wheel 171, Saturn's and Georgian's arms would move as one arm, on account of the connection of the ſmall wheel 39 with the large one 129, the former being faſt to one arm, and the other to the other. Thus the arm of Georgian in each of its revolutions, *puſhes* Saturn's arm *once* round independently of the direct effect of the train, and hence the number of Jupiter's revolutions in one of Georgian was diminiſhed by *one*, when the wheelwork was calculated; which diminution ſhews the inventor's foreſight as well as ingenuity; and hence we muſt add *one* of thoſe revolutions to the revolutions ſimply produced by the train, in order to obtain the combined effect of the two ſeparate cauſes of motion.

In the ſame way Saturn's arm may be ſaid to puſh that of Jupiter once round in each of Saturn's revolutions, and ſo of the reſt till we arrive at Mercury, which is puſhed by Venus in the manner we have deſcribed, when the moving force is applied at Georgian. The ſame effect takes place when the force is applied at the handle, but on that ſuppoſition is not eaſily explicable by inſpection.

From what has now been explained, it will be perceived, that all the arms, or radii vectores of the planets, are ſo connected together, like ſo many links of a chain, that no one can move without giving motion to all the reſt, and that therefore when once rectified they will be always ſo for ſome ſpecified year or other, which may be known from the ſituation of Georgian's arm, that reſts on a roller ſupported by the large ecliptic plate ſurrounding the table; and the month will be indicated by the earth's arm, as well as the day by the index at the handle. But theſe motions of the arms, partly derived from the wheels and partly from the mutual connection of the arms themſelves, are *mean motions*, like the motions produced in the common planetarium; and it remains yet to be explained, why the inventor preferred the more complex conſtruction.

In *fig.* 2. Saturn's arm is detached, in order to ſhew how the equations and variations of diſtance are effected in all the orbits by the help of the mean motions: this arm, like Jupiter's and Georgian's, is made of wood, and gilt, for the ſake of lightneſs; but an edge-bar of braſs is ſcrewed to it, to give it ſtrength, which is in contact with it the whole length from A to B: immediately above the centre of motion of this arm is a pulley, fixed to the central ſtem between the arm and the fixed wheel, indeed the pulley is made faſt to the under face of the wheel; then another ſimilar pulley is placed on the remote end of the arm, ſo that an endleſs gut, embracing both, may give motion to the pulley at B, as the arm revolves round the fixed pulley under the wheel A. Under the pulley, B, is an oblong aperture in the arm, through which the ſtud paſſes, on which the pulley revolves, and as this ſtud is tapped into a ſcrew below, a nut fixes it ſo that any degree of tenſion may be given to the gut that may be requiſite for moving the pulley, or even for ſupporting the weight of the arm's appendages. A ſhort arm, B C, is made faſt to the pulley B, and revolves with it once in each revolution of Saturn, by reaſon of the two pullies being of the ſame dimenſions; but the motion is in a contrary direction to that of the arm; now, we have ſhewn, under our article EQUATION *Mechaniſm*, that if the ſhort arm, B C, bear the ſame proportion to the radius vector, or long arm A B, that the mean diſtance of the planet does to the excentricity, a point fixed at C will deſcribe an *excentric circle*, very nearly ſimilar to the real orbit of the planet, and all the variations of *diſtance* will be exhibited as nearly to the truth, as ſuch an orbit is to the true elliptic orbit itſelf; and in all the orbits of ſmall excentricity, the difference, even on a large ſcale, is hardly perceptible. But though ſuch a point would always ſhew the diſtances properly, it would produce only *one-half* of the acceleration and alternate retardation on mean motion that is due to ſuch excentricity; and doubling the ſhort arm B C, ſo as to make it give the whole acceleration and retardation, or, which is the ſame thing, the whole *equation of the centre*, would exhibit improper variations of diſtance, by giving them in exceſs by one-half; therefore to fulfil the two conditions of variable velocity, and of variable diſtance, the ſhort arm B C was made equal to ⅔ds of the excentricity, or once and a half, and another ſhort arm, C D, was made to revolve round its extremity *twice*, while the arm B C revolves once, that is, twice in each revolution of the planet; this effect is produced by another couple of pullies, one juſt double of the other, the larger one fixed faſt over pulley B, and the ſmaller over the point C, while the ſtem of the planet reſts at the point D, at the remote end of the ſecond ſmall arm; under theſe circumſtances the ſmalleſt arm C D, which is juſt one-third of the length of the other ſmall arm B C, has a direct motion, while that of the other arm is retrograde, and the effect produced by their united motions is a due repreſentation of both the *equation* and *diſtances* in every part of the orbit. But in order that the little arms might have the proper motions imparted to them, it was neceſſary that the pulley A ſhould be fixed immoveably, which would not have been the caſe had it been inſerted on a revolving tube, and as each arm has a fixed pulley, like that of Saturn, which we have deſcribed, as well as a fixed wheel, the ſyſtem of concentric revolving tubes was evidently incompatible with the demands of this conſtruction. On the axis of pulley B, and under it, cloſe to the long arm, is made faſt a ſilvered circular plate, that contains the equations and latitudes of the planet, and this plate, when fixed in its due ſituation by the nut under the arm, is pointed to by a hand attached to the pulley, that revolves along with it. Thus, not only is the planet carried in its excentric path, according to the Keplerian law of planetary motion, but its equation and latitude are alſo indicated, at the ſame time that the mean motion is referred to the large ecliptic by the long arm of equable motion; ſo that the exact correſpondence between the conſtruction of the planetary tables, and of the motions produced by this machine, affords the beſt poſſible illuſtration of the proceſs by which the places of the planets are calculated for the Nautical Almanac, and the machine may be conſidered as a ſpecies of perpetual ſelf-calculating almanac.

It is true, the planets are made to revolve all in the ſame plane, which, in an horizontal machine, could not well be avoided, yet the ſtems of thoſe that deviate any ſenſible diſtance from the ecliptic, are compoſed of tubes that draw out, or puſh in, to the required marks made on them, by way of graduation for latitude; and therefore, as the ſilvered plates exhibit the quantum of latitude, north or ſouth, at all times, it is an eaſy matter to draw out, or to puſh in, at any time, the planet's ſtem, till the planet ſtands at its due latitude, as ſeen from the ſun, on that particular day. The proportional diſtances, however, of all the planets could not poſſibly be preſerved in the lengths of the arms, and therefore the ſubjoined proportions were adopted, which we will give in a table that ſhall contain alſo the correſponding lengths of the ſecond and third arms.

Lengths of the reſpective Arms.

Planets.	Radii Vectores.	Firſt ſhort Arms.	Second ſhort Arms.
	Inches.	Inches.	Inches.
Mercury	1.54	0.62	0.0
Venus	2.9	0.0	0.0
Earth	4.0	0.0	0.0
Mars	6.1	1.14	0.0
Veſta	9.4	1.17	0.39
Juno	10.6	4.04	1.34
Ceres	11.06	1.31	0.43
Pallas	11.06	4.15	1.38
Jupiter	20.8	1.50	0.50
Saturn	¾ = 28.65	2.48	0.83
Herſchel	½ = 38.4	2.70	0.90

From this table it will be ſeen that none of the planets have two ſmall arms till we come to Veſta, and the reaſon is, becauſe their mean diſtances from the ſun are too ſmall to admit of ſuch addition, and alſo Venus and the Earth have their equations too ſmall to require them. We might alſo have added a table of dimenſions of the wheelwork, if there had been any difficulty in obtaining the due ſizes, but as each train may have its wheels of any diameter, provided its large driving wheel be larger than its ſubjacent fixed one, in order to admit of an intermediate pinion of any number of teeth, the workman may fix on any dimenſions that will admit of teeth to be from eight to ten *per* inch, provided thoſe pairs which act together be duly proportioned to each other. In the trains of the Sun, of Mercury, and of Venus, where there is but little ſtreſs on the teeth, the wheels may have 14 or 15 teeth *per* inch, without any danger of injury. In the train of Georgian the driving wheel of 129 has only about ſeven teeth in the inch. The wheels on the Earth's arm have their diameters limited, the diſtance from the ſun to the Earth being exactly four inches; hence the diameter of each of the wheels of 107 teeth is 2.53 inches, that of 62, 1.47, and that of 86, 2.0, and each of them have 13.4 teeth in every inch of their geometrical circumference. The ſatellites are made to move by hand, as in other planetaria, and the dimenſions of the ivory balls are optional. What we have ſaid under our article ORRERY, reſpecting the *rectification* of that machine, will apply to a planetarium alſo; we will therefore conclude our account of the preſent planetarium by ſubjoining ſuch tables as are requiſite for graduating the ſilvered faces that indicate the equations and latitudes of the planets, which tables will be a proper ſupplement to thoſe of the ſun and moon, which are before explained, and with which we concluded our article ORRERY.

TABLE I.—The angular Diſtances of Mercury from the Aphelion and Perihelion Points, which correſpond to exact Degrees of Equation.

Ang. Diſt.	Equation.	Ang. Diſt.	Equation.
Aphelion	0° 0'	Perihelion	0° 0'
3° 3'.1	1 0	1° 49'.1	1 0
6 7.7	2 0	3 38.4	2 0
9 12.3	3 0	5 28.2	3 0
12 17.6	4 0	7 18.8	4 0
15 24.1	5 0	9 10.4	5 0
18 31.5	6 0	11 3.4	6 0
21 38.5	7 0	12 58.0	7 0
24 51.6	8 0	14 56.7	8 0
28 8.7	9 0	16 54.0	9 0
31 23.1	10 0	18 56.1	10 0
34 40.6	11 0	21 15.8	11 0
38 7.9	12 0	23 11.2	12 0
41 36.3	13 0	25 25.8	13 0
45 19.0	14 0	27 45.3	14 0
48 53.4	15 0	30 14.4	15 0
52 43.2	16 0	32 47.2	16 0
56 43.5	17 0	35 33.7	17 0
60 56.5	18 0	38 31.2	18 0
65 27.0	19 0	41 52.2	19 0
70 30.8	20 0	45 25.0	20 0
75 47.4	21 0	49 38.1	21 0
82 13.9	22 0	54 48.6	22 0
90 48.4	23 0	62 8.2	23 0
105 maximum	23 39 59"	75 maximum	23 32 59"

TABLE II.—Angular Diſtances of Venus for every Five Minutes of Equation.

Ang. Diſt.	Equation.	Ang. Diſt.	Equation.
Aphelion	0° 0	Perihelion	0° 0'
6° 7'.0	0 5	6° 1'.2	0 5
12 14.0	0 10	12 6.1	0 10
18 37.8	0 15	18 19.2	0 15
25 12.3	0 20	24 46.9	0 20
32 8.7	0 25	31 36.3	0 25
39 39.5	0 30	39 15.7	0 30
48 3.5	0 35	47 19.4	0 35
58 6.9	0 40	57 16.0	0 40
72 24.0	0 45	71 28.0	0 45
91 0	0 47 20"	89 0	0 47 20"

Table III.—Angular Diſtances of Mars for every Degree of Equation.

Ang. Diſt.	Equation.	Ang. Diſt.	Equation.
Aphelion	0° 0′	Perihelion	0° 0′
6° 0′.4	1 0	4° 45′.3	1 0
12 3.6	2 0	9 33.8	2 0
18 12.1	3 0	14 29.7	3 0
24 31.9	4 0	19 31.9	4 0
31 50.3	5 0	24 50.1	5 0
37 48.8	6 0	30 29.1	6 0
45 22.9	7 0	36 38.1	7 0
53 33.9	8 0	43 34.3	8 0
63 6.6	9 0	51 52.2	9 0
75 45.6	10 0	63 15.9	10 0
97 0	10 40 39″	83 0	10 40 39″.

Table IV.—Angular Diſtances of Veſta for every Degree of Equation.

Ang. Diſt.	Equation.	Ang. Diſt.	Equation.
Aphelion	0° 0′	Perihelion	0° 0
6° 20′	1 0	6° 0′	1 0
13 0	2 0	10 33	2 0
19 42	3 0	16 0	3 0
26 22	4 0	21 36	4 0
33 53	5 0	27 36	5 0
41 26	6 0	33 53	6 0
50 0	7 0	40 37	7 0
59 40	8 0	49 24	8 0
72 0	9 0	60 45	9 0
97 0	9 49	83 0	9 49

Table V.—Angular Diſtances of Juno for ever Degree of Equation.

Ang. Diſt.	Equation.	Ang. Diſt.	Equation.
Aphelion	0° 0′	Perihelion	0° 0′
2° 34′	1 0	1° 20′	1 0
5 10	2 0	2 42	2 0
7 47	3 0	4 4	3 0
10 24	4 0	5 26	4 0
13 0	5 0	6 49	5 0
15 37	6 0	8 13	6 0
18 13	7 0	9 36	7 0
20 50	8 0	11 1	8 0
23 33	9 0	12 27	9 0
26 14	10 0	13 53	10 0
28 55	11 0	15 19	11 0
31 38	12 0	16 48	12 0
34 26	13 0	18 19	13 0
37 17	14 0	20 0	14 0
40 11	15 0	21 40	15 0
43 6	16 0	23 20	16 0
46 6	17 0	25 0	17 0
49 6	18 0	26 45	18 0
52 16	19 0	28 37	19 0
55 17	20 0	30 34	20 0
58 47	21 0	32 44	21 0
62 11	22 0	35 7	22 0
65 49	23 0	37 33	23 0
69 36	24 0	40 3	24 0
73 39	25 0	42 38	25 0
78 0	26 0	45 47	26 0
82 55	27 0	49 37	27 0
88 33	28 0	54 27	28 0
96 20	29 0	60 45	29 0
108 30	29 35	71 30	29 35

Table VI.—Angular Diſtances of Ceres for every Degree of Equation.

Ang. Diſt.	Equation.	Ang. Diſt.	Equation.
Aphelion	0° 0′	Perihelion	0° 0′
6° 53′	1 0	5° 36′	1 0
14 0	2 0	11 36	2 0
21 22	3 0	17 36	3 0
28 52	4 0	24 0	4 0
36 51	5 0	30 40	5 0
45 30	6 0	38 9	6 0
55 30	7 0	46 50	7 0
67 45	8 0	57 45	8 0
96 0	8 59	84 0	8 59

Table VII.—Angular Diſtances of Pallas for every Degree of Equation.

Ang. Diſt.	Equation.	Ang. Diſt.	Equation.
Aphelion	0° 0′	Perihelion	0° 0′
2° 37′	1 0	1° 28′	1 0
5 20	2 0	2 32	2 0
8 3	3 0	4 24	3 0
10 42	4 0	5 53	4 0
13 22	5 0	7 20	5 0
16 5	6 0	8 48	6 0
18 49	7 0	10 15	7 0
21 33	8 0	11 42	8 0
24 17	9 0	13 9	9 0
27 5	10 0	14 39	10 0
29 54	11 0	16 14	11 0
32 43	12 0	17 50	12 0
35 34	13 0	19 28	13 0
38 33	14 0	21 10	14 0
41 33	15 0	22 56	15 0
44 36	16 0	24 42	16 0
47 41	17 0	26 31	17 0
50 50	18 0	28 28	18 0
54 6	19 0	30 31	19 0
57 32	20 0	32 42	20 0
61 4	21 0	34 58	21 0
64 36	22 0	37 25	22 0
68 40	23 0	40 5	23 0
72 51	24 0	42 54	24 0
77 23	25 0	46 11	25 0
82 33	26 0	50 4	26 0
88 40	27 0	55 0	27 0
97 12	28 0	62 20	28 0
108 30	28 26	71 30	28 26

Table VIII.—Angular Diſtances of Jupiter for every Half Degree of Equation.

Ang. Diſt.	Equation.	Ang. Diſt.	Equation.
Aphelion	0° 0′	Perihelion	0° 0′
5° 31′.4	0 30	4° 53′.4	0 30
11 6.9	1 0	9 50.1	1 0
16 44.4	1 30	14 51.9	1 30
22 33.0	2 0	20 22.9	2 0
28 33.1	2 30	25 25.6	2 30
34 52.3	3 0	31 9.3	3 0
41 37.6	3 30	37 15.4	3 30
49 31.8	4 0	44 31.8	4 0
57 34.4	4 30	51 56.8	4 30
68 16.6	5 0	62 15.1	5 0
89 54.9	5 30	83 0.0	5 30
93 0	5 30 37″.7	87 0	5 30 37″.7

Table

TABLE IX.—Angular Diſtances of Saturn for every Half Degree of Equation.

Ang. Diſt.		Equation.			Ang. Diſt.		Equation.		
Aphelion		0°	0′		Perihelion		0°	0′	
4°	45′.9	0	30		4°	8′.4	0	30	
9	35.4	1	0		8	18.4	1	30	
14	23.6	1	30		12	31.9	1	30	
19	20.4	2	0		16	50.4	2	0	
24	23.8	2	30		21	16.5	2	30	
29	37.8	3	0		25	53.1	3	0	
35	5.6	3	30		30	43.2	3	30	
40	53.0	4	0		35	52.8	4	0	
47	6.7	4	30		41	29.5	4	30	
54	1.0	5	0		47	46.6	5	0	
62	2.1	5	30		55	9.7	5	30	
72	21.0	6	0		64	51.0	6	0	
94	0	6	26	41″.7	86	0	6	26	41″.7

TABLE X.—Angular Diſtances of Georgian for every Half Degree of Equation.

Ang. Diſt.		Equation.			Ang. Diſt.		Equation.		
Aphelion		0°	0′		Perihelion		0°	0′	
5°	40′.6	0	30		5°	3′.0	0	30	
11	24.1	1	0		10	9.1	1	0	
17	13.3	1	30		15	20.9	1	30	
23	12.4	2	0		20	42.6	2	0	
29	25.5	2	30		26	18.0	2	30	
35	58.8	3	0		32	14.2	3	0	
43	3.0	3	30		38	40.4	3	30	
50	53.4	4	0		45	53.6	4	0	
60	40.4	4	30		54	26.8	4	30	
72	16.0	5	0		66	1.0	5	0	
82	8.7	5	15		75	35.4	5	15	
93	0	5	21	2″.7	87	0	5	21	2″.7

TABLE XI.—Mercury's Heliocentric Latitude for every Quarter of a Degree.

Angular Diſt.		Hel. Lat.	
Node		0°	0′
2°	3′.1	0	15
4	6.4	0	30
6	9.9	0	45
8	13.9	1	0
10	18.8	1	15
12	24.3	1	30
14	30.9	1	45
16	38.2	2	0
18	47.4	2	15
20	58.5	2	30
23	11.3	2	45
25	26.2	3	0
27	43.8	3	15
30	2.0	3	30
32	37.2	3	45
34	55.1	4	0
37	27.2	4	15
40	2.7	4	30
42	48.2	4	45
45	37.5	5	0
48	39.9	5	15
51	51.7	5	30
55	17.9	5	45
59	3.5	6	0
63	18.2	6	15
68	15.9	6	30
74	41.2	6	45
90	0	7	0

TABLE XII.—Heliocentric Latitude of Venus.

Ang. Diſt.		Hel. Lat.		
Node		0°	0′	
4°	13.′5	0	15	
8	28.8	0	30	
12	46.3	0	45	
17	9.1	1	0	
21	38.1	1	15	
26	15.1	1	30	
31	3.9	1	45	
36	4.5	2	0	
41	33.4	2	15	
47	28.7	2	30	
54	9.7	2	45	
62	9.8	3	0	
73	19.0	3	15	
90	0	3	23	35″

TABLE XIII.—Heliocentric Latitude of Mars.

Ang. Diſt.		Hel. Lat.	
Node		0°	0′
7°	45.′9	0	15
15	41.3	0	30
23	55.5	0	45
33	43.4	1	0
42	30.7	1	15
54	10.7	1	30
71	4.8	1	45
90	0	1	51

TABLE XIV.—Heliocentric Latitude of Veſta.

Ang. Diſt.		Hel. Lat.	
Node		0°	0′
8°	0′	1	0
16	0	2	0
24	40	3	0
33	50	4	0
44	12	5	0
57	0	6	0
78	0	7	0
90	0	7	8

TABLE XV.—Heliocentric Latitude of Juno.

Ang. Diſt.		Hel. Lat.	
Node		0°	0′
4°	19′	1	0
8	39	2	0
13	3	3	0
17	32	4	0
22	9	5	0
26	56	6	0
31	56	7	0
37	16	8	0
43	2	9	0
49	26	10	0
56	52	11	0
66	19	12	0
84	6	13	0
90	0	13	4

Table XVI.—Heliocentric Latitude of Ceres.

Argument.		Hel. Lat.	
Node		0°	0′
5°	26′	1	0
10	54	2	0
16	29	3	0
22	13	4	0
28	11	5	0
34	30	6	0
41	20	7	0
48	57	8	0
57	58	9	0
70	14	10	0
90	0	10	37½

Table XVII.—Heliocentric Latitude of Pallas.

Argument.		Hel. Lat.	
Node		0°	0′
1°	44′	1	0
3	34	2	0
5	14	3	0
6	59	4	0
8	44	5	0
10	30	6	0
12	16	7	0
14	2	8	0
15	49	9	0
17	37	10	0
19	26	11	0
21	15	12	0
23	5	13	0
24	56	14	0
26	49	15	0
28	43	16	0
30	39	17	0
32	31	18	0
34	29	19	0
36	36	20	0
38	40	21	0
40	46	22	0
42	56	23	0
45	10	24	0
47	19	25	0
49	51	26	0
52	20	27	0
54	56	28	0
57	42	29	0
60	40	30	0
63	37	31	0
67	30	32	0
71	44	33	0
77	8	34	0
90	0	34	37½

Table XVIII.—Heliocentric Latitude of Jupiter.

Ang. Dist.		Hel. Lat.		
Node		0°	0′	
10°	56.′2	0	15	
22	18.7	0	30	
34	42.3	0	45	
49	23.4	1	0	
71	32.9	1	15	
90	0	1	19	2″

Table XIX.—Heliocentric Latitude of Saturn.

Ang. Dist.		Hel. Lat.		
Node		0°	0′	
5°	44.′6	0	15	
11	32.8	0	30	
17	28.0	0	45	
23	35.8	1	0	
30	1.8	1	15	
36	54.2	1	30	
44	27.8	1	45	
53	10.9	2	0	
64	14.1	2	15	
90	0	2	29	55″

Table XX.—Heliocentric Latitude of Georgian.

Ang. Dist.		Hel. Lat.		
Node		0°	0′	
6°	12.′5	0	5	
12	29.4	0	10	
18	56.1	0	15	
25	37.6	0	20	
32	43.5	0	25	
40	25.8	0	30	
49	9.7	0	35	
59	50.0	0	40	
76	38.2	0	45	
90	0	0	46	16″

PLANETARY, ſomething that relates to the planets. In this ſenſe we ſay, planetary worlds, planetary inhabitants, &c. Huygens and Fontenelle bring ſeveral probable arguments for the reality of planetary worlds, and animals, plants, men, &c. The former in his Κοσμοθεωρος, ſive de Terris Cœleſtibus; the latter in his Dialogues, ſur le Pluralité des Mondes.

Planetary *Hours*, in *Chronology*. See Hour.

Planetary *Days*. Among the ancients, the week was ſhared among the ſeven planets, each planet having its day. This we learn from Dion Caſſius; and Plutarch, Sympoſ. lib. iv. q. 7. Herodotus adds, that they were Egyptians who firſt diſcovered what god, that is, what planet, preſides over each day; becauſe among this people the planets were directors. And hence it is, that, in moſt European languages, the days of the week are ſtill denominated from the planets; Sunday, Monday, &c.

Planetary *Years*, the periods of time in which the ſeveral planets make their revolutions round the ſun, or earth.

As from the proper revolution of the ſun, the ſolar year takes its original; ſo from the proper revolutions of the reſt of the planets about the earth, ſo many ſorts of years do ariſe, *viz.* the Saturnian year, the Jovial year, the Martial year. For Venus and Mercury, as their years, when judged of with regard to the earth, are almoſt equal to the ſolar year; they are more uſually eſtimated from the ſun, the true centre of their motions. See periodic times under Planets, *ſupra*; and Year.

Planetary *Machines, an Hiſtorical Account of.*—" The apparent motions of the heavenly bodies," ſays profeſſor Vince, " are the moſt obvious phenomena in nature; and as a knowledge of the return of the ſeaſons muſt always have been neceſſary for the huſbandman, the courſe of the ſun probably engaged the attention of mankind in the early ages of the world." Accordingly the Jewiſh hiſtorian, Joſephus, tells us, that the ſons of Seth applied themſelves to the ſtudy of aſtronomy, and engraved their obſervations on pillars of ſtone to ſurvive the deluge; and that Abraham read lectures on aſtronomy to the Egyptians. Beroſus, the Chaldean author, alſo ſays, that Providence prolonged the life of the antediluvians, on purpoſe that they might improve in virtue, and in the knowledge of geometry and aſtronomy, which were deemed eſſential to human welfare. Indeed, if we ſearch into the hiſtory of the Chineſe, Brahmins, Chaldeans, or Egyptians, we find that aſtronomy was cultivated by each of theſe nations ſoon after the diſperſion of the human race and confuſion of tongues. So much it ſeemed neceſſary to premiſe on the antiquity of aſtronomy itſelf, before we entered upon a detail of the different machines which have been conſtructed to repreſent the different ſyſtems which prevailed at the time of their conſtruction; and, indeed, the hiſtories of aſtronomy, and of aſtronomical inſtruments, are ſo intimately united, that they cannot be ſeparated, but throw mutual light on each other.

To aſcertain the date and particulars of the *firſt* machine which was invented for repreſenting the motions of the heavenly bodies, is the province of the antiquarian, rather than of the cultivator of ſcience; but as the order of *time* ſeems to be the moſt ſyſtematic to adopt in a regular deſcription of different celeſtial machinery, it ſhall be obſerved, as far as the materials that we have collected will furniſh an hiſtorical ſketch.

The firſt celeſtial mechaniſm of which we have met with any intimation, is the Chineſe ſphere, mentioned by profeſſor Vince in his excellent Treatiſe on Aſtronomy (vol. ii. p. 253.), which was made by Yu-chi, in the reign of the emperor Hoang-ti, in the year before Chriſt 2697, and which is deſcribed as having had many both moveable and fixed circles belonging to it; but with reſpect to further particulars, we are not in poſſeſſion of any information.

The next machine that occurs is alſo a Chineſe ſphere, mentioned by Martin, in his Hiſtory of China, as being made by a man of the name of Xuni, 2400 years before Chriſt. His words are theſe; "Xuni, 2400 ans avant J. C. fit faire une ſphere d'or, enrichie de pierreries, ou l'on voyoit les ſept planetes, et la terre au milieu:" *i. e.* "Xuni, 2400 years before Jeſus Chriſt, had a ſphere made of gold, enriched with precious ſtones, in which were to be ſeen the ſeven planets, and the earth in the middle." This ſhort notice informs us what the ſyſtem of the early Chineſe aſtronomy was, and exactly accords with the account we have of the aſtronomical ſyſtem of the Brahmins, who not only ſuppoſed the earth to be the centre of the planetary orbits, but alſo believed that it was placed on a mountain of gold, to which probably the golden ſphere had ſome reference.

A third Chineſe ſphere is mentioned by Dr. Long in his Aſtronomy, vol. ii. p. 662, as having been made 2277 years before the Chriſtian era by Chun, who, on ſucceeding Yao, found a great quantity of gold and jewels, of which he made a ſphere that included the ſeven planets.

The contriver of this machine muſt have had the advantage of the aſtronomical determinations of the aſtronomers Hi and Ho, who about the year before Chriſt 2332, amongſt other aſtronomical notices, determined that *one* year ſhould conſiſt of 366 days, and *three* of each 365, alternately. It will probably be ſaid, that the emperor might have made a better uſe of his newly found treaſure than in converting it into a ſphere, but perhaps he had the circumſtance in his recollection, that 2513 years before Chriſt, or 181 years before that time, Chueni was created emperor of China entirely on account of having calculated an ephemeris of the motions of five planets.

We do not meet with any mention made of inſtruments conſtructed by the Chaldeans or Egyptians for repreſenting their ſyſtem of aſtronomy, though they cultivated aſtronomy very early, nor does it appear quite certain what their ſyſtem was. According to the authority of Macrobius, the ancient Egyptians made the planets revolve about the earth, and reckoned the ſun to be a planet, with Mercury and Venus revolving as ſecondaries round him; and Diodorus Siculus ſays, the ancient Egyptians diſcovered that the planets (ſuperior as well as inferior) had ſometimes a direct, and ſometimes a retrograde motion, and that they were ſometimes ſtationary. He alſo aſſerts, that they made the ſun move in a circle inclined to the equator, and in a direction contrary to the diurnal motion. Theſe accounts favour the idea, that ſyſtems, ſomewhat different, were adopted, either at the ſame time, or ſucceſſively; but that a ſyſtem with the earth in the centre was the prevalent one, particularly among the later Egyptians, may be thus inferred. The Alexandrian ſchool, we believe, is univerſally allowed to have given the names of the planets to the days of the week, which names are yet retained in the Latin language. Philander, in his learned notes to Vitruvius, has given us two reaſons for the *order* Dies Saturni, Solis, Lunæ, Martis, Mercurii, Jovis, Veneris, *viz.* Saturday, Sunday, Monday, Tueſday, &c. This arrangement may have puzzled many of our readers who have conſidered it, and who probably have not been able to find out the reaſon of ſuch a ſucceſſion. The firſt reaſon, ſays Philander, is ſaid, in the ſeventeenth book of Dion, to be this: "Cum exiſtimarent Egyptii, planetarum eum eſſe ordinem, ut orbis ſummus Saturni diceretur, proximus Jovis, tertius Martis, quartus Solis, quintus Veneris, ſextus Mercurii, ſeptimus Lunæ; diateſſaron harmoniæ rationem habentes, quod in eâ vis omnis muſica contineretur, orbium tetrachorda ſeptem commenti ſunt, quorum ſingulas primas ſtellas ſingulis hebdomadis diebus aſſignarent. Primum tetrachordum a Saturno ad Solem concipiebant, ſecundum a Sole ad Lunam, tertium a Luna ad Martem, quartum a Marte ad Mercurium, quintum a Mercurio ad Jovem, ſextum a Jove ad Venerem. Inde factum, ut primus dies ſit appellatus Saturni, quia primi tetrachordi princeps erat Saturnus, et pari ratione ſecundus Solis, tertius Lunæ, quartus Martis, quintus Mercurii, ſextus Jovis, et ſeptimus Veneris:"—that is,—"As the Egyptians thought the order of the planets to be ſuch, that the orbit of Saturn was called the higheſt, that of Jupiter the next, that of Mars the third, that of the ſun the fourth, that of Venus the fifth, that of Mercury the ſixth, and that of the moon the ſeventh; conceiving a certain harmonic ratio to run by *fours*, as the groundwork of muſic, they made ſeven tetrachords (as they called them) of the orbits, and aſſigned the firſt planet of each (tetrachord or ſpace of *four* ſucceſſively) to each day of the week. Thus they imagined the firſt tetrachord to reach from Saturn (the higheſt) down to the ſun, the ſecond from the ſun down to the moon, the third from the moon round again to Mars, the fourth from Mars down to Mercury, the fifth from Mercury round a third time to Jupiter, and the ſixth from Jupiter down to Venus. Hence it came to paſs, that the firſt day was called Saturday, or day of Saturn; the ſecond Sunday, or day of the ſun; the third Monday, or day of the moon; the fourth (or Tueſday) the day of Mars; the fifth (or Wedneſday) the day of Mercury; the ſixth (or Thurſday) the day of Jupiter; and ſeventh (or Friday) the day of Venus."

The other reaſon of this order of the planetary names of the ſeven days, as given by Johannes Oxiphilinus, was this: “Cum naturalis dies quatuor et viginti horis conſtaret, primam dabant Saturno, ſecundam Jovi, tertiam Marti, quartam Soli, quintam Veneri, ſextam Mercurio, ſeptimam Lunæ; rurſus octavam Saturno, nonam Jovi, ac deinceps ad viceſimam quartam, quæ Martis cum eſſet, contingebat, ut proximæ diei prima eſſet Solis, tertiæ Lunæ, quartæ Martis, quintæ Mercurii, ſextæ Jovis, et ſeptimæ Veneris. Ex eo diebus hebdomadis planetarum inditum eſt præſidium, quos memorato ratiocinio primis horis præeſſe contigerat. Quem morem receperunt longo poſt tempore, & non ita pridem, Græci & Romani. Et revera, ut legas omnia omnium antiquorum monumenta, nunquam reperias eam dierum appellationem.”—Namely: “As a natural day conſiſts of 24 hours, they gave the firſt to Saturn, the ſecond to Jupiter, the third to Mars, the fourth to the Sun, the fifth to Venus, the ſixth to Mercury, and the ſeventh to the Moon; again the eighth to Saturn, the ninth to Jupiter, and ſo on till the twenty-fourth, which happening to fall to Mars, made the ſun the firſt of the next day, the moon the firſt of the third day, Mars of the fourth, Mercury of the fifth, Jupiter of the ſixth, and Venus of the ſeventh. Hence thoſe planets to which the firſt hour of each day fell, by this mode of counting, were made to preſide over thoſe particular days: which mode the Greeks and Romans did not adopt till a long time afterwards, indeed not till recently: and in tracing the inſcriptions of the ancients this manner of naming the days is not to be met with.”

Thus have we two reaſons given for the origin of the ſame cuſtom, of equal authority and probability; both of which may be eaſily underſtood if we deſcribe a circle and divide it into ſeven equal portions, and mark them ſucceſſively with the characters ♄ ♃ ♂ ☉ ♀ ☿ ☾; for the extent from ♄ to ☉ will make the points of a pair of dividers fall ſucceſſively thus, ♄ ☉ ☾ ♂ ☿ ♃ ♀, which are in the ſame order of ſucceſſion, as the days of the week which they reſpectively repreſent; alſo if, according to the ſecond reaſon given, we begin with ♄ and count to 24, the firſt of the next 24 will be ☉, and of the next 24 ☾, and ſo of the reſt.

Whichever of theſe reaſons was the original one for thus deſignating the days of the week, it is equally evident *what* the Egyptian ſyſtem was at the period this aſtronomical nomenclature was aſſigned; the earth was evidently placed in the centre, and the ſun was conſidered as a planet revolving round it in a year; and it is worthy of remark that Saturday, which was the Jewiſh ſabbath, was made the firſt inſtead of the ſeventh day of the Egyptian week.

Perhaps we ſhall be pardoned the ſhort digreſſion, if we ſhould remark here, that a natural and eaſy ſolution preſents itſelf, from a conſideration of the Chaldæan and Egyptian ſyſtem of aſtronomy, of the difficulty of thoſe paſſages of ſcripture, which relate to the motion of the ſun, and which have been uſed to countenance the cavils of ſome of our modern Deiſts: in Joſhua, chap. x. verſes 12, 13, it is ſaid that the ſun and moon ſtood ſtill for the ſpace of a whole day; and in the prophet Iſaiah, chap. xxxviii. v. 8. it is ſaid, that in order that the ſhadow might go back on the dial of Ahaz, “the ſun turned ten degrees backward, by which degrees it was gone down;” and again in the ſecond book of Kings we read, chap. xx. v. 11. the Lord “brought the ſhadow ten degrees backward, by which it had gone down in the dial of Ahaz.” The objection to theſe paſſages has been that they attributed a motion to the ſun which is not agreeable to the true ſolar or Copernican ſyſtem, as now unqueſtionably eſtabliſhed; the anſwer to which, and in our opinion a complete anſwer, ariſes out of the ſyſtem at preſent before us: which is this, that at the time when theſe paſſages were written, the prevailing ſyſtem was, that the ſun actually moved as the fourth or middle planet, once round the earth as its centre, from weſt to eaſt in a year, and alſo, in common with all the other planets, moved along with their primum mobile once round from eaſt to weſt in 24 hours: if, therefore, ſcripture had ſaid that to produce the effect in queſtion, “the rotation of the earth on its axis was ſuſpended for a day,” or that “the earth turned backward on its axis ten degrees,” ſuch language would have been *unintelligible* to the people of that remote age, who knew not that the earth was a planet, nor yet that ſhe has a rotation on her axis, to produce the changes of day and night; the expreſſions, conſequently, in this, as in all other inſtances that we known of, were ſuited to the *apprehenſions* of the people to whom they were addreſſed, and were on that account ſufficiently expreſſive of the magnitude of the miracles which were performed by divine agency, for purpoſes of importance ſufficient to juſtify our credence of the facts related.

If it ſhould be here objected, that in one of the paſſages quoted, it is ſaid that the *ſhadow* went back *ten degrees*, and that in another of them it is ſaid, the *ſun* went back *ten degrees*, whereas in dials in general the degrees on the face do not correſpond in each hour, nor indeed in any hour, to the degrees of the ſun’s apparent motion in the heavens, our further anſwer is, that in equinoctial dials, which were the earlieſt, as well as moſt ſimple, and the eaſieſt to make, the degrees on the dial-plate do exactly accord in number with the degrees of the ecliptic; until, therefore, it has been ſhewn, that the dial of Ahaz was not an equinoctial dial, the objection will not apply: on the contrary, there are other reaſons beſides the above for ſuppoſing that it was an equinoctial dial, one of which will ſuffice to mention, which is this: when Vitruvius is ſpeaking (chap. iv.) of the origin of ſun-dials, he ſays, “Ea autem ſunt divina mente comparata, habentque admirationem magnam, conſiderantibus, quod umbra gnomonis æquinoctialis alia magnitudine eſt Athenis, alia Alexandriæ, alia Romæ, non eadem Placentiæ, cæteriſque orbis terrarum locis.”——“Theſe things are comprehended by minds which are as it were divine, and afford much admiration to thoſe who conſider them, becauſe the ſhadow of an *equinoctial gnomon* is different in length at Athens, at Alexandria, at Rome, at Placentia, and at other parts of the world.” This extract ſerves to ſhew that the equinoctial dial was generally known in Egypt, Greece, Rome, and other parts of the globe before the time of the Romans. It was, indeed, an attentive obſervation and meaſurement of the length of the ſhadow compared with the height of the gnomon of a dial, which led to a knowledge, amongſt other things, of the obliquity of the ecliptic with reſpect to the equator, in very early ages; and it is by comparing more modern obſervations on the ſun’s place, when croſſing the equator, with ancient determinations effected in this manner, that later aſtronomers have been enabled to determine not only the annual preceſſion, or rather retroceſſion of the equinoctial points, but have thereby very nearly aſcertained the period in which ſome of the ancient aſtronomers flouriſhed, and alſo the authenticity of many hiſtorical facts.

From Egypt, it is generally underſtood, that Thales of Miletus firſt introduced a knowledge of the circles of the ſphere, and the cauſes of ſolar and lunar eclipſes into Greece, about ſix centuries before the Chriſtian era, and that he calculated an eclipſe, probably from the aſſiſtance of the *Chaldean Saros*, which was a period of 223 lunations, or 6585$\frac{1}{4}$ days for the revolution of the nodes, from which a lunation was determined to be 29^{d} 12^{h} 44^{m} 7″, which is only about 4″ above the period that our beſt tables are calculated from.

Very ſoon after this time Anaximander, the ſcholar of Thales, who died in 547 A. C., taught that the earth was a ſphere placed in the centre of the world, and that the moon borrows her light from the ſun. Pliny ſays that he firſt diſcovered the obliquity of the ecliptic, but this muſt be a miſtake, as we have before ſeen, that it was known to the Egyptians, unleſs, indeed, we diſcredit the authority of Diodorus Siculus; the invention of the ſun-dial has alſo been attributed to him, but this is equally doubtful: he might probably be the firſt who made one in Greece.

A ſhort time after Anaximander, Pythagoras of Samos became famous for his knowledge of aſtronomy, which he gained from the prieſts in Egypt; it is generally ſaid that he placed the ſun in the centre of the ſyſtem, and laid the foundation of the Copernican ſyſtem, but Laertius affirms that the ſyſtem he held was, "that the earth was in the centre, with a diurnal motion, in the next place the moon, then the ſun, and then the orbits of the planets." His diſciple, however, Philolaus of Crotona, about the year 450 B. C. placed the ſun in the centre, with the earth and other planets revolving round him; and ſoon afterwards Hicetas of Syracuſe gave the earth a diurnal motion; and Plutarch ſays, that Pythagoras in his old age repented that he had not given to the earth its proper place. We might mention other names of men who contributed to the advancement of aſtronomy, if it did not interfere too much with our plan; but we muſt not omit to mention here Eudoxus of Cnidos, who was a ſcholar of Plato, and who, about 360 years B. C., made not only a ſun-dial, but alſo a ſphere or globe, with the conſtellations marked on it, as Chiron the centaur is ſaid by fabulous hiſtory to have done before. According to Seneca, it was he who brought the hypotheſis of the motions of the five planets out of Egypt into Greece.

About 300 years before Chriſt, Euclid of Alexandria wrote his admired treatiſe on geometry, which paved the way for aſtronomical calculations; and about a century after him the celebrated Grecian mathematician Archimedes, not only wrote a deſcription of the ſphere, but actually conſtructed one, in which, it ſhould ſeem from the account of the Roman poet Claudian, the ſun, moon, and planets had their reſpective motions, which they were at that time ſuppoſed to have in the ſyſtem of nature, and that the globe which ſurrounded theſe moving bodies was made of glaſs, and had the conſtellations depicted on its ſurface: and as Archimedes had invented an engine for raiſing great weights by wheelwork, there can be no doubt but that wheels and pinions were introduced in his ſphere to produce the reſpective motions. The deſcription alluded to is this; *viz.*

" Jupiter in parvo cum cerneret æthera vitro,
  Riſit, et ad ſuperos talia dicta dedit:
Huccine mortalis progreſſa potentia curæ!
  Jam meus in fragili luditur orbe labor.
Jura poli, rerumque fidem, leges-que Deorum
  Ecce Syracuſius tranſtulit arte ſenex.
Incluſus variis famulatur ſpiritus aſtris,
  Et vivum certis motibus urget opus.
Percurrit proprium mentitus ſignifer annum,
  Et ſimulata novo Cinthia menſe redit:
Jamque, ſuum volvens audax induſtria mundum,
  Gaudet, & humanâ ſidera mente regit.
Quid falſo inſontem tonitru Salmonea miror?
  Emula naturæ parvo reperta manus."
Epig. in Sphær. Archimedis.

As the tranſlation which Dr. Derham has annexed to this quotation is not remarkable for its elegance, we beg leave to ſubſtitute the following:

" When Jove beheld in glaſs his heaven made,
He laugh'd, and to the deities thus ſaid:
That human power and art ſhould ſo ſucceed
With brittle orb, to imitate my deed!
Behold! that aged Syracuſan's ſkill
Has made the very ſkies obey his will.
An hidden ſpirit guides, by certain laws,
Each animated planet as it goes.
The ſun, well feign'd, his annual circuit makes;
And Cynthia too her monthly journey takes:
Man now by induſtry too bold is grown,
With joy who dares to make the world his own.
Why wonder at Salmoneus' dreadful lot?
Since nature's artiſt has a rival got."

The poet could not better expreſs his admiration of the mechaniſm in queſtion, than by ſuppoſing Jupiter more enraged at the ſight of it, than he was at the king of Elis, who imitated his thunder by driving a chariot over a brazen bridge, and by throwing down burning torches at the ſame time inſtead of lightning; for which preſumption, the ſtory is, that he was hurled headlong by a thunderbolt into the infernal regions: but when we conſider that the "hidden ſpirit" which actuated the various motions was probably a *dead weight*, his incenſed majeſty had not much reaſon to be jealous in either inſtance. Beſides the above authentic account of the ſphere of Archimedes, we have the two following notices of the Roman orator Cicero; the firſt is in the Tuſculan Queſtions, where, as an argument to prove the divine nature of the ſoul (lib. i.) he introduces the contrivance of Archimedes thus: "Nam cum Archimedes lunæ, ſolis, quinque errantium motus in ſphæram illigavit, effecit idem, quod ille, qui in Timæo mundum ædificavit Platonis deus, ut tarditate, et celeritate diſſimillimos motus una regeret converſio. Quod ſi in hoc mundo fieri ſine deo non poteſt, ne in ſphæra quidem eoſdem motus Archimedes ſine divino ingenio potuiſſet imitari." In Engliſh thus; "For when Archimedes connected together in his ſphere the motions of the moon, ſun, and five wandering ſtars, he effected the ſame thing which that god did in Timæus, who built Plato's world in ſuch a manner, that one revolution of it produced motions very diſſimilar in ſlowneſs and quickneſs. But if this thing cannot be effected in that world without the aid of a god, neither could Archimedes in his ſphere imitate ſimilar motions without a divine genius." And again, in his ſecond book "de Natura Deorum," Tully ſays, when ſpeaking of the philoſophers of his age, "Archimedem arbitrantur plus valuiſſe in imitandis ſphæræ converſionibus, quam naturam in efficiendis," *i. e.* they imagined that "Archimedes could better imitate the motions of the ſphere than nature could keep them in motion." Such was their veneration of that great philoſopher and mechanic.

If we paſs over ſun-dials which were conſtructed in very early ages, and clepſydræ or water-clocks, (the invention of which has been attributed by Pliny to P. Cornelius Naſica, 150 years before Chriſt, but by Vitruvius to Cteſibius about the ſame time,) we find no machine or inſtrument repreſenting the motions, or meaſuring the periods, of any of the heavenly bodies, till nearly eighty years before the Chriſtian era, when Poſidonius made a ſphere which ſeems to have been ſimilar to that of Archimedes. Cicero's deſcription of it, in his ſecond book "de Natura Deorum," is this; "Quod ſi in Scythiam, aut in Britanniam, ſphæram aliquis tulerit hanc, quam nuper familiaris noſter effecit Poſidonius cujus ſingulæ converſiones idem efficiunt in ſole, & in luna, & in quinque ſtellis errantibus quod efficitur in cœlo ſingulis diebus & noctibus; quis in illâ barbarie dubitet, quin ea ſphæra ſit perfecta ratione?" In Engliſh thus; "If any one ſhould convey into Scythia or into Britain this ſphere which our friend Poſidonius lately conſtructed, the revolutions of which produce the ſame effect in the ſun, moon, and five planets, as they experience in heaven; who is there in the midſt of ſuch barbarity, who could doubt that this ſphere is perfected by the operation of reaſon?"

It is the opinion of Ferdinand Berthoud, a French author, who has written many books on the different branches of clock-work, that this ſphere, like that of Archimedes, had wheels and pinions, but that it was put in motion by a water-clock, which kept it going day and night; and to reſcue our own country from the imputation of *barbarous ignorance* at the age in queſtion, it is grateful to the feelings of an Engliſhman to be told, by the ſame author, ſpeaking of clepſydræ, (Hiſtoire de la Méſure du Tems, tome i. p. 20, 21.) that "Ceſar les trouva même en Angleterre, lorſqu'il y porta ſes armes. Cet inſtrument nouveau lui donna lieu d'obſerver que les nuits de ce climat etoient plus courtes que celles d Italie:" *i. e.* "Cæſar found them, even in England, when he carried his arms thither. That *new* inſtrument gave him an opportunity of obſerving that the nights of that climate were ſhorter than thoſe of Italy." It muſt have been in ſummer that this obſervation was made by Cæſar, otherwiſe the reſult would have been juſt the reverſe.

Beſides the ſpheres above named, Dr. Derham ſays that Cardan mentions another belonging to Sapor, king of Perſia, in the middle of which his majeſty could ſit, and ſee all the ſtars riſe and ſet, though it was made of glaſs; but whether this was the ſame Sapor who was contemporary with Conſtantine the Great, is uncertain; nor is it known what wheelwork or planetary motions belonged to it, nor yet what ſyſtem of aſtronomy was the groundwork of the calculations, if there were any.

What the ſyſtem of the Romans was may be collected from their writings, particularly thoſe of Vitruvius and Tully in his dream of Scipio. The former deſcribes it very minutely in theſe words; (de Architectura, lib. ix. cap. 4.) *viz.* "Signa cum ſintnumero xii, partes que duodecimas ſingula poſſideant mundi, verſentur que ab oriente ad occidentem continentèr, tunc per ea ſigna contrario curſu Luna, ſtella Mercurii, Veneris, ipſe Sol, item que Martis, et Jovis, et Saturni; ut per graduum aſcenſionem percurrentes, alius aliâ circuitionis magnitudine ab occidente ad orientem in mundo pervagantur. * * * Mercurii autem et Veneris ſtellæ, circum ſolis radios, ſolem ipſum, uti centrum, itineribus coronantes, regreſſus retrorſum et retardationes faciunt."

"There are twelve ſigns, occupying each a twelfth part of a circle of the world, and turning round continually from eaſt to weſt; then through theſe ſigns, in a contrary direction, run the Moon, Mercury, Venus, the Sun, Mars, Jupiter, and Saturn, moving, as it were, along an aſcent of ſteps, each in an orbit of a different ſize from weſt to eaſt. * * * But Mercury and Venus moving round the rays of the ſun, and conſidering the ſun himſelf as their centre, make retrograde motions, and experience a diminution of velocity."

Tully's account, which is in a more ornamental ſtyle, runs thus (M. Tul. Cic. Somnium Sciponis): "Extimus (orbis) qui reliquos omnes complectitur, ſummus ipſe Deus, arcens et continens cæteros; in quo infixi ſunt illi, qui volvuntur, ſtellarum curſus ſempiterni; cui ſubjecti ſunt ſeptem, qui verſantur retrò, contrario motu, atque cœlum, ex quibus unum globum poſſidet illa, quam in terris Saturniam nominant. Deinde eſt hominum generi proſperus et ſalutaris ille fulgor, qui dicitur Jovis: tum rutilus horribilis que terris, quem Martium dicitis: deinde ſubter mediam fere regionem Sol obtinet, dux et princeps, et moderator luminum reliquorum, mens mundi, et temperatio, tantâ magnitudine, ut cuncta ſuâ luce illuſtret et compleat. Hunc ut comites conſequuntur alter Veneris, alter Mercurii curſus; in infimo que orbe luna, radiis ſolis accenſa, convertitur. Infra autem jam nihil eſt, niſi mortale et caducum, præter animos generi hominum munere deorum datos. Supra lunam ſunt æterna omnia. Nam ea, quæ eſt media et nona, tellus, neque movetur, et infima eſt, et in eam feruntur omnia ſuo nutu pondera."

"The outermoſt (orb) which ſurrounds all the reſt, is the great God, impelling and holding together all the reſt; within which (orb) the eternal courſes of the ſtars, which roll along, are fixed; under this are ſeven others carried backwards by a motion, contrary to that of heaven, one of which has a globe, called on earth Saturnia. Next is that luminary which is propitious and ſalutary to man, called Jupiter: then that ruddy and horrible one, which is denominated from Mars; after that, and nearly in the middle region, is the ſun, the prince and guide, as well as ruler of all the other luminaries, the mind and regulating power of the world, of ſuch magnitude as to illuminate and fill all places. The courſes (or orbits) of Venus and Mercury follow him as his companions; and the moon, lighted by the rays of the ſun, is carried round in the loweſt orb. Below her is nothing but what is mortal and frail, except the minds of men, which are the gift of the gods. Above the moon all things are eternal. For this Earth, which is the middle (or centre), and the ninth in order, does not move, and is the loweſt; and towards it are voluntarily carried all ponderable bodies."

We could produce further accounts of this ſyſtem from Pliny, Martianus Capella, and Caſſiodorus, if more were deemed neceſſary for our purpoſe; but we have perhaps already dwelt too long upon the accounts of heathen authors to be conſiſtent with our plan, of giving only a hiſtory of planetary machines; we will therefore ſubjoin only one further remark with reſpect to theſe authors and their ſyſtem, which is, that many of our words, particularly epithets, are evidently taken from this order of the planets, and owe their original ſignification to it; ſuch are the words *ſupernal*, *infernal*, *ſuperior*, *inferior*, *ſublunary*, *ſolſtice*, *ſun's path*, *aſcenſion*, *deſcenſion*, *declination*, and others which we ſtill retain, notwithſtanding we have placed the ſun in the centre, and made the earth a planet to deſcribe the ſame orbit which was formerly attributed to him.

It being then probable, that, as the ancient Egyptian was the prevailing ſyſtem on the continent before and for ſome time after the Chriſtian era, the machines which were invented before and about that memorable period, were contrived to exhibit *diurnal*, as well as contrary *annual* revolutions

tions of all the planets, except of Mercury and Venus, which planets were made to revolve as ſecondaries to the ſun, or ſecond planet in order from the centre; the moon being the firſt: ſuch a ſyſtem would exhibit the phenomena relating to the ſun, Mercury, Venus, and moon very well, but would not give a repreſentation of the retrogradations of our ſuperior planets.

Ptolemy, who died about 138 years after the commencement of the Chriſtian reckoning, ſaw the difficulty of explaining the retrogradations of the ſuperior planets by the Alexandrian ſyſtem, and therefore deviſed the circles and epicycles that diſtinguiſh his ſyſtem, in order to account for the apparent irregularities of the planetary motions; and though he probably could not conſtruct a machine to repreſent the ſaid motions exactly, yet in his Almageſt is deſcribed a ſphere, with the conſtellations depicted thereon, to which he could refer the apparent paths of the heavenly bodies, and by which he could explain his ſyſtem.

From the time of Ptolemy to the ſixteenth century, in which Copernicus revived the ſyſtem of Philolaus, or as is generally ſaid of Pythagoras, the machines which were conſtructed we muſt ſuppoſe repreſented the Ptolemaic ſyſtem, which, like the Egyptian, placed the earth in the centre, but ſuppoſed the moon and planets all ſeparately revolving round it every day, whilſt they ſlowly performed periodic cycles and epicycles, to account for the ſtationary and retrograde appearances, that could not otherwiſe be explained. The moſt ancient machine of which we have met with any account during this period is that of Chromatius, the governor of Rome, in the third century, which is mentioned in the firſt volume of Beckmann's "Hiſtory of Inventions and Diſcoveries." According to the accounts of St. Sebaſtian and St. Polycarp, this coſtly piece of mechaniſm conſiſted of a pavilion of glaſs, in the conſtruction of which were conſumed two hundred pounds weight of gold, as materials for the workmanſhip; and all the heavenly bodies were repreſented by mechaniſm, together with the change of the phaſes of the moon: there appears to have been alſo an ecliptic circle divided into ſigns. But whatever the particular conſtruction of this machine may have been, it was loſt to poſterity by the violent hands which the ſaints laid upon it, either on account of the valuable materials of which it was conſtructed, or by reaſon of ſome ſuppoſed *impiety* attached to ſuch a repreſentation of the heavens. St. Sebaſtian repreſents Chromatius as ſpeaking thus; "Habeo cubiculum holovitreum, in quo omnis diſciplina ſtellarum ac matheſis mechanicâ eſt arte conſtructa in cujus fabricâ pater meus Tarquinius amplius quam ducenta pondo auri dignoſcitur expendiſſe," *i. e.* "I have a chamber of glaſs, in which all the knowledge relating to the ſtars is laid down by mechanical contrivance, in the conſtruction of which my father Tarquin is known to have conſumed more than two hundred pounds weight of gold:" to which St. Sebaſtian anſwers, "Si hoc tu integrum habere volueris teipſum frangis," *i. e.* "if you wiſh to preſerve this entire, you ruin yourſelf;" to which Chromatius replies, "Quid enim? matheſis aut ephemeris aliquo ſacrificiorum uſu coluntur, cum tantum eis menſium et annorum curſus certo numero per horarum ſpatia diſtinguuntur? Et lunaris globi plenitudo, vel diminutio, digitorum motu, rationis magiſterio, et calculi computatione prævidetur?" (Act. Sanc. Seb. cap. 16.) *i. e.* "But why? this knowledge of the daily motions, is it not uſeful for the obſervance of the ſacred rites, ſeeing that the lapſe of months and of years is diſtinguiſhed by the paſſage of a certain number of hours? And are not the increaſe and decreaſe of the lunar globe foreſeen by the motion of indexes, guided according to certain calculations?" St. Polycarp, ſpeaking of the ſame mechaniſm, uſes theſe words; "Illic ſigna Leonis, et Capricorni, et Sagittarii, et Scorpionis, et Tauri ſunt; illic in Ariete Luna, in Cancro hora, in Jove ſtella, in Mercurio tropica, in Venere Mars, et in omnibus iſtis monſtruoſis dæmonibus ars deo inimica cognoſcitur:" that is, "There are the ſigns of Leo and of Capricorn, of Sagittarius and of Scorpio, and of Taurus; there are the moon in Aries, the hour-hand in Cancer, a ſtar in Jupiter, the tropic in Mercury, in (or with) Venus Mars; and in all thoſe monſtrous dæmons is diſcovered an art hoſtile to the Deity."

The next inſtrument in the order of time which occurs in our reſearch, is that which was contrived by Y-tang, the celebrated Chineſe aſtronomer, in the year 721, and which merited the admiration of his contemporaries. Berthoud (tome i. p. 38, and tome ii. p. 178, 179, Hiſtoire de la Méſure,) ſpeaks of this inſtrument in the words of father Gaubil, thus: "L'eau faiſoit mouvoir pleuſieurs roues; et par leur moyen, ou repreſentoit le mouvement propre, et le mouvement commun du ſoleil, de la lune, et des cinque planetes; les conjonctions, les oppoſitions, les éclipſes du ſoleil et de la lune; les occultations des etoiles et des autres planetes."—Which account in Engliſh may be thus; "Many wheels were put in motion by water, and by their means were repreſented both the proper and common motions of the ſun, moon, and five planets; the conjunctions and oppoſitions, the eclipſes of the ſun and moon, and occultations of the ſtars, as well as of the planets."—By the proper and common motions, we conceive, we muſt underſtand the apparent or ſuppoſed diurnal motion of the planets round the earth, as well as their progreſſive motions in the ecliptic, and alſo the lunation and motion of the moon's nodes. For it is ſaid, moreover, that this inſtrument exhibited, by two pointers, the *hours* of the day and night, and alſo the *ke*, or hundredth part of the Chineſe day; and it may be worthy of remark here, that at every return of the index to the *ke* a little wooden ſtatue ſtept forth, and gave a blow on a wooden board, and then retired; which probably was the origin of *ſtriking* clocks; but what was the regulator of this early horological, as well as aſtronomical machine, does not appear.

We muſt now paſs on to the eleventh century, in which William, the learned abbot of Hirſham, is ſaid "to have invented a natural horologe in imitation of the celeſtial hemiſphere;" (naturale horologium ad exemplum cœleſtis hæmiſpherii excogitâſſe:) but this ſhort notice conveys no exact idea of the conſtruction of this piece of mechaniſm.

The next machine that we find deſcribed is an *horologium*, which, Trithemius ſays, was preſented to the emperor Frederic II., of Germany, by one of the ſultans of Egypt, in the year 1232: his deſcription is as follows. "Saladinus Egyptiorum Frederico Imperatori dono miſit per ſuos oratores tentorium pretioſum, mirabili arte compoſitum, cujus pretii æſtimatio quinque ducatorum millium procul valorum exceſſit. Nam ad ſimilitudinem ſphærarum cœleſtium intrinſecus videbatur conſtructum, in quo imagines ſolis, lunæ, ac reliquorum planetarum artificioſiſſimè compoſitæ movebantur ponderibus et rotis incitatæ; ita videlicet, quod, curſum ſuum artis ac debitis ſpatiis peragentes, horas tam noctis quam diei infallibili demonſtratione deſignabant; imagines quoque xii ſignorum zodiaci certis diſtinctionibus ſuis motæ cum firmamento curſum in ſe planetarum continebant."—"The ſultan of Egypt preſented to the emperor Frederic, by his orators, a valuable tent (or pavilion), conſtructed with admirable art, the value of which has been eſtimated at more than five thouſand ducats. For its appearance within repreſented the celeſtial ſpheres, in which were the repreſentatives of the ſun, moon, and the reſt of the planets, moſt ingeniouſly made and actuated by means of wheels and weights; ſo that, performing their courſes in certain ſtated periods, they deſignated the hours both of night and day with infallible clearneſs; the ſhapes alſo of the twelve ſigns of the zodiac diſtinctly moving along with the firmament, contained upon them the paths of the planets." Here it may be obſerved the ſun and moon are reckoned among the primary planets, according to the Ptolemaic ſyſtem: and if this horologium was an aſtronomical clock going by wheelwork, by the power of an appended weight, we think it may be conſidered as the firſt of which we have had any deſcription handed down to us: we are at a loſs, however, to know what was the *regulator*, if it had any; and alſo whether the *time* indicated was really *contemporary* with the earth's motion on its axis, (their ſuppoſed diurnal motion of the ſun,) or only a nominal or *relative* time, many days of which might paſs in a ſhort period, when the machine was in quick uncontrolled motion.

Next in order comes an aſtronomical machine or clock, made by Richard of Walingford, abbot of St. Alban's, in the fourteenth century, which was called Albion (all by one). Leland ſpeaks of the inventor and inſtrument thus: *viz.* "Electus in monaſterii præſidem —— cum jam per amplas licebat fortunas, voluit illuſtri aliquo opere non modo ingenii, verum etiam eruditionis ac artis excellentis miraculum oſtendere. Ergo talem horologii fabricam magno labore, majore ſumptu, arte vero maximâ compegit, qualem non habet tota, meâ opinione, Europa ſecundam; ſive quis curſum ſolis ac lunæ, ſeu fixa ſidera notet, ſive iterum maris incrementa et decrementa, ſeu lineas una cum figuris ac demonſtrationibus ad infinitum pene variis conſideret."—"After being elected abbot, now that his fortune would permit, he wiſhed to give proof, by ſome illuſtrious work, not only of his ingenuity, but of his learning alſo, and ſkill in the arts: he therefore conſtructed by great labour, and ſtill greater expence, with uncommon ſkill, ſuch a machine as, in my opinon, cannot be equalled in all Europe, whether you regard the courſe of the ſun and moon and fixed ſtars, or you take into conſideration the ebbing and flowing of the ſea, and the almoſt infinite variety of lines and geometrical demonſtrations." Nearly about the ſame time John, ſon of James Dondi, afterwards called Horologius, made a machine ſimilar to the foregoing, which is thus deſcribed by Petrus Paulus Vergerius. "In quo erat firmamentum & omnium planetarum ſphæræ, ut ſic ſiderum omnium motus, veluti in cœlo, comprehendantur; feſta edicta in dies monſtrat, plurima que alia oculis ſtupenda; tantaque fuit ejus horologii admiranda congeries, ut uſque modo poſt ejus relictam lucem corrigere, & pondera convenientia aſſignare ſciverit aſtrologus nemo. Verum de Franciâ nuper aſtrologus & fabricator magnus, fama horologii tanti ductus, Papiam venit, plurimis que diebus in rotas congregandas elaboravit; tandem que actum eſt, ut in unum, eo quo decebat ordine, compoſuerit, motum que ut decet dederit:" that is to ſay, this is a machine, "in which the firmament and ſpheres of all the planets, together with the motions of all the ſtars, are contained exactly as in heaven; it points out the feſtivals and other wonderful things; and ſo great and admirable was the ſtructure of this horologe, that after his (Dondi's) death, no aſtrologer could rectify, or aſſign the proper weights to the different parts. At length, however, an aſtrologer and famous mechanic of France, attracted by the report reſpecting ſuch an horologe, came to Pavia, and after many days labour collected the wheels, and put them into ſuch order, as to produce the requiſite motions."

The next inſtrument which we meet with is the famous aſtronomical clock at Straſburg, made in 1370, an account of which is given by Conradus Daſypodius in a German book, (Jac von Konigſhovens Elſaſs and Straſb.-Chronik, p. 574.) which we have not at preſent before us.

Again, John Werner of Nuremberg, that eminent aſtronomer and geometer, who firſt propoſed the lunar method of diſcovering the longitude, about the year 1500 employed Andrew Heirlin, an excellent mechanic, to conſtruct a machine which repreſented by wheelwork the Ptolemaic ſyſtem (Doppelmayer de Mathemat. Nurem.); but we are not in poſſeſſion of a more particular account of this machine.

Hitherto we have been able to collect only an hiſtorical ſketch of aſtronomical mechaniſm, as it is connected with the progreſs of aſtronomy, without knowing the preciſe diſpoſition of the parts, or the numbers into which the wheels were divided which produced the various motions; but imperfect as it is, it will furniſh us with a proof, that in all ages of the world, a repreſentation of the ſyſtem of the univerſe by mechaniſm has not only been deemed worthy of the efforts of the greateſt geniuſes, but has been conſidered as the moſt arduous and wonderful undertaking.

In coming down nearer to our own time, we propoſe to admit into our account notices of thoſe machines only, of which we can deſcribe ſome or all of the powers and properties from authentic ſources of information, and concerning which, therefore, we may be able to make appropriate remarks.

The firſt machines of modern conſtruction that offer themſelves to our notice, are the planetary clocks of the late Mr. Peckitt, of Compton-ſtreet, London, and the turret clock at Hampton-Court, in both of which are ſolar and lunar trains of wheelwork; but we have already deſcribed thoſe under our article Clock, and the latter at conſiderable length; to which we therefore refer our readers for further information.

Next in order after theſe we may place the famous planetary clock invented by Oronce Finée, mathematician to the kings Francis I. and Henry II. of France, begun in 1553, and made, during the ſpace of ſeven years, by the beſt workmen that could be found: this machine was preſented to the cardinal du Lorraine, and is at preſent placed in the library "de Sainte Geneviéve," or Pantheon at Paris. The exterior ſhape of this machine is repreſented as a pentagonal column, ſeventeen inches diameter and ſix feet high, ſurmounted by a braſs celeſtial globe of ſeven inches diameter, which contains 48 conſtellations, and which revolves once in every 24 hours from eaſt to weſt. The interior part of this pillar contains upwards of one hundred wheels to give the reſpective motions to the ſun, moon, and planets, which are actuated by clockwork, and the whole are kept in their reſpective motions by one weight ſuſpended within the pillar, the fall of which is one foot *per* day, and the motions continue 48 hours and upwards. The movement of each planet conſiſts of twelve, ten, or eight wheels, as the neceſſary accuracy requires, and they are all made of Spaniſh ſteel and actuated by one common arbor. The deſcription of this elaborate inſtrument is contained in a printed *recueil*, N° $\frac{V}{68}$, of the library at the Pantheon, Paris, in which it is ſaid, that the increaſe and decreaſe of velocity is ſomehow effected by the mechaniſm in the motion of the heavenly bodies, which are repreſented, together with the excentricities and motions of the apogees, nodes, and latitudes of each. The five plain ſides of the pentagonal column have each a braſs face of two feet in length, and ten inches in breadth, in each of which are two circles, the upper and the lower, except in that containing the places of the ſun and moon, which has three circles ; and hands or pointers are made to indicate the different motions on the reſpective d'or moulu dials or circles, which are appropriated according to the ſubjoined arrangement, *viz.*

Faces.—1. The motion of Saturn above, and of Jupiter below.

2. The motion of Mars above, and of Mercury below.

3. The motion of Venus above, and of the ſun below.

4. The motion of the moon above, and of the moon's node below.

5. The hours above, an aſtrolabe below, and in the middle the conjunctions, oppoſitions, eclipſes, &c. of the ſun and moon.

The wheelwork and other mechanical parts of the inſtrument are not contained in Berthoud's extract, whence this detail is abridged ; but the times of the various revolutions attributed to the movements, and alſo to the celeſtial bodies themſelves, which are ſaid to be repreſented to a minute in a revolution, are given in the ſubjoined table.

Planets.	Whole Periods.	Motion in 24*h*.
	D. H. M. S.	
Mercury -	87 23 15 36	0 59 8
Venus - -	224 17 53 2	0 59 8
Sun - -	365 5 48 15	0 59 8
Mars - -	686 23 31 56	0 31 26
Jupiter -	4332 14 49 31	0 4 59
Saturn -	10759 4 58 25	0 2 1
Moon -	27 13 18 35	13 3 54
Ditto ſynodic	29 12 44 3	13 8 35
Ditto nodes -	19 years	

This machine does not exhibit to the eye the repreſentatives of the planets in their orders and diſtances, but only indicates on the different faces the periods of their ſidereal revolutions ; the earth is conſidered by the inventor as the centre of the orbits of the Moon, Sun, Mars, Jupiter, and Saturn, the three laſt of which are made to move in the Ptolemaic epicycles; but the planet Sol, or ſun, is made the centre of the orbits of Mercury and Venus, according to the Egyptian ſyſtem, which is the reaſon why the daily progreſs in the ecliptic is put down for theſe three alike. It is ſomewhat remarkable, that this arrangement is not according to the Copernican ſyſtem, though Copernicus had publiſhed his book called the " Revolutions of the celeſtial Orbs," which laid the foundation of his ſyſtem, twelve years before ; hence we muſt ſuppoſe, either that the book had not found its way from Pruſſia into France at that time, or elſe that the ſyſtem at firſt met with oppoſition. Thus an union of the Ptolemaic with the old Egyptian ſyſtem became the favourite of the aſtronomer before us, and three years afterwards he publiſhed a book in defence of this theory. This machine, then, ſtill in exiſtence, is a ſtanding proof of what has been aſſerted of the nature of the old original ſyſtem deſcribed by Vitruvius and Cicero, ſo far as relates to the inferior planets; and it is highly worthy of remark, that the ſidereal periods of our ſuperior planets are nearer the periods according to La Lande, than Dr. Halley gives them, who wrote more than a century after him, and whoſe aſtronomical tables were long held in the higheſt eſtimation. That the period of Mercury and Venus ſhould not be ſo accurate, we need not be ſurpriſed, when we conſider that they are made ſecondaries to the ſun ; nor can we wonder that there is no diſtinction made between a tropical and a ſidereal year ; but we think it certainly ſurpriſing, that both the anomaliſtic and ſynodic revolutions of the moon are agreeable to the preſent ſtate of our knowledge of the lunar motions as nearly as may be. As teleſcopes were not invented at the period we are now treating of, the ſecondary planets of Jupiter and Saturn were out of the queſtion; but it appears evident from the mechaniſm before us, that the *mean motions* of thoſe primary planets, which were known two centuries and a half ago, were *then* determined with that degree of accuracy, which left more modern aſtronomers little more to do in practical obſervations, with reſpect to them, than to contraſt their preſent places with ancient determinations, and ſo to correct the inaccuracies which have neceſſarily ariſen from want of good inſtruments of obſervation.

Planetarium of P. Schirleus de Rheita.—The next machine we meet with is the planetarium of P. Schirleus de Rheita, deſcribed in the " Technica Curioſa" of Schott, and made about the year 1650. This machine is ſaid to have repreſented all the true and mean motions of the planets, their ſtations, and direct and retrograde appearances, without epicycles or equations, and with very few wheels by the help of endleſs ſcrews and pullies. The movements were actuated by water, and on the exterior part of the inſtrument were three ſeparate faces, or dials, deſcribed into a number of circles for the orbits of the planets and ſigns of the zodiac; the loweſt face contained the circles of the Sun, Venus, and Mercury, which were denominated the inferior planets, and their reſpective hands or arms ; the uppermoſt face had the circles of Saturn, Jupiter, and Mars, with their reſpective hands ; and the face in the middle had twelve hours, and alſo a circle for the moon. The firſt wheel which gave motion to all the reſt was carried round by a fall of water once in a minute, on the arbor of which was a ſingle endleſs ſcrew, which drove a wheel of 15 teeth round in as many minutes ; on the arbor of this was another ſimilar ſcrew, actuating another wheel of 24 once round in ſix hours ; again, on the arbor of the wheel of 24 was another ſcrew, making a wheel of 20 teeth revolve in five days ; and laſtly, a ſcrew on the arbor of the laſt mentioned wheel of 20 impelled a wheel of 73 once round in exactly 365 days, which repreſented the annual motion of the ſun in his ſuppoſed orbit round the earth. The laſt ſcrew alſo drove a wheel of 45 teeth round in 225 days, which, by the help of two equal pullies, carried Venus round the ſun in this period; and in like manner, it is ſaid, motions were produced in the reſt of the planets, but the numbers of the other wheels are not given by Berthoud, from whom this account is taken. Alexander, in his " Traité des Horloges," has anticipated, in ſome meaſure, the obſervations which we ſhould have made in theſe words ; " this machine," ſays he, " cannot be of great utility, nor will it repreſent the motions of the planets with ſufficient juſtice ; for

" 1. The firſt wheel which moves all the reſt, is carried round by a fall of water, which cannot have the requiſite regularity.

" 2. The movement is not regulated by a balance, pendulum, or fly.

" 3.

"3. The motion of the ſun completes the year in exactly 365 days, which makes an error of 25 days in a century.

4. The diſcs of the planets are made much too large in proportion to the ſun."

The laſt of theſe obſervations muſt neceſſarily conſtitute an objection in every inſtrument, where the ball for the ſun is not made inconveniently bulky.

We are diſpoſed to think, that the irregularities of motion were not repreſented by the wheelwork in this machine, which appears not to have had accurate movements, but were indicated by the manner in which the circles were divided, ſome of which were moſt likely excentric. The ſuppoſed apogeal points (not aphelion points) of the orbits of the planets, are put down in the account for the year 1642, thus:

Saturn	26°	53′	of Sagittarius
Jupiter	7	26	of Libra
Mars	29	49	of Leo
Venus	2	12	of Cancer
Mercury	14	6	of Sagittarius
Sun	6	29	of Cancer.

If we add to theſe numbers the annual motions of the aphelion points, as at preſent aſcertained, the above quoted places will be found to differ only in the *minutes*, except in the inſtances of Mercury and Venus, in the former of which there is an error of about 2°$\frac{1}{3}$, and in the latter, if we reckon forwards, of more than ſeven ſigns.

The ſyſtem which is repreſented by this mechaniſm is the ſame as was repreſented by the preceding one of Oronce Finée, which proves that the Copernican ſyſtem had not generally prevailed in the middle of the ſeventeenth century.

It may not be improper to mention here, that Cardan, who wrote in the middle of the ſixteenth century, mentions the names of William of Zealand, and Junellus Turrianus, who invented machines of this deſcription about the ſame time.

Automaton of C. Huygens.—We come now to the firſt machine, in all probability, which repreſented the true ſolar or Copernican ſyſtem, namely, the automaton planetarium of Chriſtian Huygens; the deſcription of this inſtrument was not, indeed, publiſhed till the year 1703, among the author's other poſthumous works; but Benjamin Martin ſays, that this was the *original* from which all the more recent inſtruments were afterwards made, and informs us, moreover, that during the reſidence of this very ingenious mechanician and able mathematician at Paris, from 1665 to 1681, "he invented and perfected ſeveral uſeful inſtruments and machines" (Biograph. Phil. p. 340.): we muſt, therefore, fix the date of the automaton to be in this interval. The learned inventor ſays, that he had ſeen and read of many elaborate inſtruments contrived for exhibiting the celeſtial motions, but as they were all very imperfect, he employed his mathematical attainments and mechanical ſkill, for both which he was juſtly renowned, in conſtructing a more perfect machine than any which had been before made, inaſmuch as it was to repreſent the excentricities and unequable motions of a ſyſtem, which was likely to maintain its ground amidſt the ſcrutiny of after ages.

In the "Deſcriptio Automati Planetarii" we meet with an account of the numbers, and a drawing of the wheelwork of this machine, which we briefly ſhall deſcribe, and attach the proper value to each movement, and then make ſuch obſervations on them as may occur.

In this machine there is a large watch or clock movement, regulated by a balance and balance ſpring, which actuates all the planetary motions, and keeps them contemporary with the real motions in the heavens. The motions are thus effected; a pinion of 4, which revolves by means of the clockwork in 4 days, drives a wheel of 45, on the arbor of which is another pinion of 9, driving a ſecond wheel of 73 once round in a year; $\frac{45}{4} \times \frac{73}{9}$ of 4 days being equal to 365 exactly. The laſt mover of 73 has a long arbor lying horizontally, or nearly ſo, acroſs the machine, on which arbor all the firſt moving or driving wheels are placed of the different planetary movements; the ratios, therefore, conſtituted by the wheelwork are ſo many fractions of 365 days, according to the ſubjoined plan, in which the value of each ſeparate movement is given in days, hours, minutes, and ſeconds, reſpectively: *viz.*

		D.		D.	H.	M.	S.
Mercury's movement - -	$\frac{12}{121} \times$	$\frac{17}{7}$ of 365	=	87	21	50	47.4
Venus' ditto - -		$\frac{32}{52}$ of do.	=	224	14	46	9.2
Earth's ditto - -		$\frac{60}{60}$ of do.	=	365	0	0	0
Mars' ditto - -		$\frac{158}{84}$ of do.	=	686	13	8	34.2
Jupiter's ditto - -		$\frac{166}{14}$ of do.	=	4327	20	34	17.1
Saturn's ditto - -		$\frac{206}{7}$ of do.	=	10755	17	8	34.2
Moon's lunation ditto - -	$\frac{12}{137} \times$	$\frac{12}{13}$ of do.	=	29	12	16	34.49

Beſides the above wheels and pinions, there is a ſingle ſcrew driving a wheel of 300 teeth once round in 300 years of 365 days each, to ſhew for what year the inſtrument is at any time rectified: alſo the wheel of 73 drives a large wheel of 219 teeth round in three years, on which the days and months are marked.

Upon comparing theſe periods with the exact periods which the beſt tables give, the reader will obſerve many very conſiderable errors, and be diſpoſed to conclude unfavourably of the calculations here employed; but what will be his ſurpriſe when he is told that Huygens wrote expreſsly upon an excellent method of approximating to the truth, in calculations of this kind, which no doubt he employed before he began making his inſtrument! He will naturally conclude that the ſcientific contriver of this mechaniſm has not made the moſt of his calculations and ingenuity; and that this was really the caſe may be unqueſtionably proved; for the fact is, he has calculated periods in fractions of a *ſolar* year, and afterwards has introduced a firſt mover to revolve in a *civil* year of 365 days, as we have ſeen; whereas, he ought to have made the annual arbor revolve in 365.242 days, as his calculations ſuppoſed, and then the periods would have been theſe: *viz.*

				D.	H.	M.	S.
Mercury	$\frac{12}{121} \times \frac{17}{7}$ of 365.242	=		87	23	14	47.9
Venus	$\frac{32}{52}$ of ditto	=		224	18	20	48
Earth	$\frac{60}{60}$ of ditto	=		365	5	48	48
Mars	$\frac{158}{84}$ of ditto	=		687	0	4	38.8
Jupiter	$\frac{166}{14}$ of ditto	=		4330	17	30	3
Saturn	$\frac{206}{7}$ of ditto	=		10748	13	21	49.6
Moon	$\frac{12}{137} \times \frac{12}{13}$ of ditto	=		29	12	44	46.35

Theſe periods, being very near the true tropical periods, muſt evidently have been calculated from a ſolar year, and therefore ought to have been produced by wheels placed on a common arbor revolving exactly in that time; hence, the ſubſtitution of a proper annual movement in this machine will reſtore to all the other wheels their proper intended motions, and make the periods what the wheelwork was calculated to effect. See NUMBERS, *Planetary*.

The laſt moving wheels, which are here put as numerators of the different reſpective fractions, were ſo many flat rings with the teeth cut in their poſterior or concealed ſurfaces, and projecting more or leſs from their planes to meet their drivers; theſe were ſupported by intermediate fixed rings with friction rollers at both the inner and outer edges, and the driving wheels or pinions on the common horizontal arbor met their teeth, and impelled them round, whilſt they were kept in their proper poſition by the rollers. On theſe moveable rings the planetary balls were ſupported, and the aphelion and perihelion points, latitudes, and ſhape of the orbits, were marked on the intermediate fixed rings, which, together with the revolving rings, reſting on ſhoulders turned at the outward and inward edges of the fixed ones, formed the cover of the machine, and concealed the wheelwork from ſight. The frame was too feet in diameter, and ſix inches deep, placed in an erect poſition; and the periods to be repreſented were collected from the tables of Ricciolus, according to which the ſolar year was $365^d\ 5^h\ 49^m\ 15^s$, and a lunation $29^d\ 12^h\ 44^m\ 3^s$, as we now generally reckon it. The aphelia, aſcending nodes, inclinations of the orbits, mean diſtances, excentricities, and proportional diameters, with reſpect to the ſun, were taken from that ancient aſtronomer for January 1, 1682, as expreſſed in the annexed table:

	Aphelia.				Aſcending Node.				Inclination.			Mean Diſt.	Excentr.	Diam. comp. with the Sun.
	°	′	″		°	′	″		°	′	″			
☿	15	11	19	♐	14	29	47	♉	6	54	0	38806	8149	1 : 308
♀	2	59	44	♒	13	54	52	♊	3	22	0	72400	500	1 : 84
⊖	7	7	20	♉								100000	1800	1 : 110
♂	0	30	17	♍	17	38	12	♉	1	50	30	152350	14115	1 : 166
♃	7	55	43	♎	5	30	42	♋	1	19	20	519650	20558	2 : 11
♄	27	39	46	♐	21	36	26	♋	2	32	0	951000	54207	Ring 11 : 37
														Do. to ♄ 9 : 4

It ſhould ſeem from theſe dates that the inſtrument was finiſhed in the year 1681, which was the year in which Huygens finally left Paris.

In the machine before us no diurnal motion of the earth, nor motion of the moon's nodes or apogee, was introduced, nor yet the motions of Jupiter's or Saturn's ſatellites, ſo that it was properly what is now called a planetarium, and differed from a common planetarium in what it profeſſed to exhibit only, inaſmuch as the variable diſtances and velocities of the planets were attempted to be exhibited: theſe two requiſites are deſcribed as being produced in ſome of the planetary motions by unequal teeth cut in the laſt moving wheels, and in others by means of rings, cut into equal teeth, and placed excentrically as they regarded the ſun: but it has been ſhewn, when we treated of the different methods that have been deviſed for producing unequable motion, under our article EQUATION *Mechaniſm*, that neither of theſe two methods, adopted by Huygens in his automaton, as he has deſcribed them, will produce more than *one half* of the grand equation, and it does not appear that he, in any inſtance, uſed them *jointly*; whence we may fairly conclude, that the accelerations and retardations of velocity, being repreſented in only *half* their due quantity, were much leſs perfect than the author himſelf imagined.

Should our readers wiſh to attain a more clear conception of the internal ſtructure and external appearance of the automaton of Huygens, he may conſult the deſcription of Antide Janvier, given in his quarto pamphlet entitled "Des Revolutions des Corps Céleſtes par le Mechaniſme des rouages," (Paris 1812,) who, like ourſelves, has given the ſubſtance of the original, together with two plates that illuſtrate the conſtruction, but which did not fall into our hands till our deſcription was finiſhed. From a view of theſe plates it is evident, that both Mr. Walker's eidouranion, and Mr. Lloyd's celeſtial mechaniſm, are copied from the automaton on an enlarged ſcale, with but little deviation as to the mode of imparting and modifying the reſpective motions, though we have reaſon to believe that the periods produced in the latter machines are not ſo accurate as in the prototype.

Laſtly, the objection which father Alexander made very properly to the preceding machine of Schirleus de Rheita, in regard to its loſing 25 days in a century, is equally applicable to the automaton, excluſively of its other defects; but this objection would be completely obviated by the ſubſtitution of an accurate annual movement, which has been juſt recommended to rectify the other movements.

Roemer's Satellite Inſtrument.—The ſatellite inſtrument of Romer, or Roemer, preſents itſelf next to our conſideration, an account of which was preſented by him to the firſt aſtronomer royal, Mr. Flamſtead, in the year 1679. Romer was mathematician to the French king (Louis XIV.) during the period that Huygens was reſident at Paris, under royal patronage, and as this inſtrument was produced during the reſidence of Huygens, who had a great propenſity for mechanics, as well as aſtronomy and mathematics, we think it extremely probable that Romer's taſte for aſtronomical mechaniſm was owing to his acquaintance with Huygens; nor is it improbable that the plan and calculations of it might be ſubmitted to the conſideration of the Dutch reſident.

This is the firſt machine in which we meet with a number of *tubes*, or what the French artiſts have called canons, introduced to move within one another for the purpoſe of connecting the arms of the planets, or ſecondaries, with their correſponding wheels, whilſt the latter are concealed from ſight: this original contrivance was, no doubt, meant to ſuperſede the uſe of revolving rings and friction-wheels, which were heavy, as well as tedious to make; but then the idea of *variable diſtances* and *velocities* was given up with its introduction: ſince the author's time the common planetaria have been made upon this plan, but chiefly with the numbers aſcertained by Huygens. (See PLANETARIUM.) The machine before us had a common arbor revolving in ſeven days, on which all the four driving wheels for the four ſatellites of Jupiter were fixed faſt, which drove each its fellow, placed at the lower extremity of the correſponding tubes; the firſt ſatellite had the longeſt and innermoſt tube, the ſecond the next, and ſo on as in the common planetarium.

The numbers of the wheelwork, and their correſponding values in time, may be expreſſed thus: *viz.*

	Wheels.			D.	H.	M.	S.
Sat. 1.	$\frac{22}{87}$	of 7 days	=	1	18	28	57.93
2.	$\frac{32}{63}$	of ditto	=	3	13	20	0
3.	$\frac{43}{42}$	of ditto	=	7	4	0	0
4.	$\frac{67}{28}$	of ditto	=	16	18	0	0

There appears to be two reaſons why ſeven days was the period aſſumed for a revolution of the common arbor; firſt, becauſe a hand placed upon it would indicate the ſeven days of the week; and, ſecondly, becauſe a period of ſeven days is nearly a mean period between the two extreme ſynodic revolutions of the 1ſt and 4th ſatellites, ſo that it is not neceſſary to uſe either a large wheel or a ſmall pinion.

The four pairs of wheels were intended to be kept going by clockwork, but it does not appear that there was any movement propoſed to require an annual index to point out the phenomena beyond the preſent or current moment, on which account the utility of the inſtrument was circumſcribed.

The periodic errors in this inſtrument are as follow: *viz.*

In the movement of the	1ſt	=	+	0′	21″.93
———————	2d	=	+	2	6
———————	3d	=	+	0	4
———————	4th	=	−	5	7

Romer's Planetarium.—But the ſatellite inſtrument of Romer was not the only inſtrument of which he ſuperintended the conſtruction: in the "Baſis Aſtronomiæ Roemeri," Hauniæ, 1735, there is an account of a planetarium by this gentleman, conſtructed with tubes moving round one another, after the plan of his ſatellite inſtrument, and finiſhed in the year 1697. The numbers of the wheels were, according to the ſize of the machine, as under; *viz.*

				D.	H.	M.	S.
Mercury	-	$\frac{33}{137}$	-	87	23	28	19
or ditto	-	$\frac{13}{54}$	-	88	2	44	30
Venus	-	$\frac{24}{39}$	-	224	18	20	48
Earth	-	$\frac{36}{36}$	-	365	5	48	48
Mars	-	$\frac{79}{42}$	-	687	0	4	38.3
or ditto	-	$\frac{47}{25}$	-	686	15	44	20.6
Jupiter	-	$\frac{83}{7}$	-	4330	17	30	3
Saturn	-	$\frac{206}{7}$	-	10748	13	21	49.6
or ditto	-	$\frac{147}{5}$	-	10738	2	54	43

Theſe were the effective wheels of the machine under our preſent notice; beſides which, there were ſome others of high numbers, which might be conſidered as dial-work, a part of which effected the revolution of a hand or index in ſeven days for the week hand, and the reſt produced a revolution in ten years, to indicate the year for which the inſtrument was at any time rectified.

The reaſon why the author has given the inſtrument-maker the choice of two pairs of wheels for Mercury, Mars, and Saturn, is, probably, that he might adopt thoſe which beſt accord with the ſcale upon which his inſtrument is to be made. We have here calculated the tropical periods from the ſtandard of an exact ſolar year; and on examining the numbers, the reader will find that Romer borrowed all his ratios, except thoſe of Mercury, from Huygens; indeed all the modern planetaria of the ſhops have their numbers taken from the ſame ſource, except that, in ſome inſtances, 148 has been uſed for 147 in the wheels of Saturn, either by miſtake, or becauſe it was much more convenient to cut into teeth; but the difference occaſioned by an omiſſion of this one tooth in each revolution is 127 days' motion; and yet it does not appear that an error of ſuch magnitude has been before detected!

For an account of the manner in which the wheeelwork of this planetarium is conſtructed, and of the mode by which the motion of the planetary bodies are produced, our readers are deſired to revert to the title *Common Planetarium,* in our article PLANETARIUM.

Martinot's Armillary Sphere.—In the " Traité des Horloges" of father Alexander (p. 323.), is contained a deſcription of an inſtrument made by Martinot, a Frenchman, and preſented to the king of France, on February 28th, 1701, an exact tranſlation of which will conſtitute the moſt faithful account we can give. " The deſign of this piece of workmanſhip," ſays the author, " is the conſtruction of an armillary ſphere, which, by the motion of its circles, may imitate thoſe of the heavens, particularly of the primum mobile of the ſun and moon, and imitate, by a ſenſible reſemblance, the apparent ſituation of heaven at every moment.

" The primum mobile makes its revolution in 24 hours from eaſt to weſt upon the poles of the world, by means of a movement which is below the equinoctial polar dial-plate. The equator is divided into 360°; and the zodiac, upon which are marked the ſigns, is pierced (in the middle we ſuppoſe), that its breadth may not conceal the ſun and moon.

" The heaven is compoſed of three large circles, namely, the ecliptic and two meridians. The body of the ſun is attached to a point of the common ſection of the meridian with the ecliptic. The ecliptic, turning upon its centre according to the order of the ſigns, carries the ſun, and makes him perform a revolution through the ecliptic in 365 days; and at the ſame time the heaven is carried by the primum mobile from eaſt to weſt in 24 hours. The heaven of the moon is alſo compoſed of three circles, like that of the ſun; but the poles are five degrees removed from thoſe of the ecliptic. The moon, turning upon the poles of her heaven, moves through the zodiac, according to the order of the ſigns, in the ſpace of one lunar month, and in 24 hours from eaſt to weſt upon the poles of the primum mobile. The body of the moon is of ſilver, of a ſpherical ſhape, one-half of which is darkened, and, preſenting the illuminated half always to the ſun, ſhews the phaſes. The moon's circles carry her from weſt to eaſt in twenty-nine days and a half, to make a lunar revolution from one conjunction to another.

" In the middle of the ſphere there is a little globe which repreſents the earth: this globe is immoveable, and Paris is conſtantly on its zenith. The meridian is divided two ways into degrees, which begin at the equator and end at the two poles, upon which the primum mobile turns. The equinoctial dial conſiſts of two plates; that in the middle has the hours, and is immoveable; the other, which contains the names of the principal cities of the world, is carried by the primum mobile in 24 hours; and one may ſee at any inſtant what hour it is at each city which is marked. On the immoveable plate is ſeen the hour of the ſun's riſing and ſetting. The horizon carries two concentric circles, on which are marked the ſigns, and their correſponding days of the month. There are alſo the names of the winds and their diviſions. Upon the ſtand of the ſphere are put the allegorical figures which repreſent the four elements. The diameter is two feet."

Such is the account given by Alexander of Martinot's armillary ſphere, to which he has annexed the following obſervation. " The motion of this ſphere," ſays he, " is not very exact, becauſe the ſun's period is only 365 days, and wants almoſt ſix hours in a year. The motion of the moon, too, is performed in $29\frac{1}{2}$ days; ſo that it wants 44 minutes in a lunation; and in leſs than three years this quantity amounts to more than a day."

Whether the motion of the ſun in this ſphere was conſidered as *real* or only *apparent*, does not appear certain from the account which is here given. In accommodation to natural appearances, we ſtill, it is true, continue to ſpeak of the ſun's place in the ecliptic; and the idea of the ſun's performing an annual journey through the heavens is countenanced by the language of our poets; but in all caſes it will be allowed, that an inſtrument ought to exhibit the ſyſtem which it profeſſes to illuſtrate, in a manner which cannot miſlead the uninſtructed. The inventor of the armillary ſphere before us, we are diſpoſed to believe, like Martin and Parke in our own time, affected to diſcredit the Copernican ſyſtem.

Pigeon's Sphere.—Nearly about the ſame time with Martinot, M. Jean (or John) Pigeon conſtructed a ſphere, in which the planets were introduced and kept in motion by clockwork: the account which M. Saverieu has given of this inſtrument in his " Dictionnaire des Mathematiques," makes it rank much higher in our eſtimation than the laſt we examined, and it is much to be regretted, that the numbers of the wheelwork have not been tranſmitted to us. The author expreſſes himſelf to this purpoſe: " Many ages have paſt over, before we have found ourſelves in a ſituation to execute the plan of the ſphere of Archimedes. It is not till our own days that a ſphere in motion has been ſeen, for which we are indebted to the ſkill of our ingenious artiſt, M. Jean Pigeon. His ſphere is eighteen inches in diameter, and elevated to the height of five feet four inches by a ſupport, from the ſummit of which is ſuſpended a pendulum: in the middle of the ſphere ſtands the repreſentative of the ſun, which is a large gilt ball, and all the planets are attached to their orbits in reſpective order. Thus, Mercury is the neareſt to the Sun, next moveth Venus, then the Earth, Mars, Jupiter, and Saturn. A pendulum gives motion to all the planets, and conducts them within the ſphere, according to the order of the ſigns around the ſun as their common centre. The earth turns upon its axis in 24 hours, and alſo makes the tour of the zodiac, according to the order of the ſigns, in $365^{d}\ 5^{h}\ 49^{m}$. Around the earth is a little circle which repreſents the ecliptic, ſo that one may judge in what ſign any planet is, and whether its declination be north or ſouth. This circle alſo ſerves to aſcertain the retrogradations, direct motions, and ſtations of the planet. There are alſo two other ſmall circles round the earth, one of which repreſents the horizon, and the other the meridian, which is adjuſtable to any place on the earth. To the orb of this planet is attached an index, pointing towards the ſun, the uſe of which is to mark the times of the new and full moons; another index is placed below the moon to mark her latitude upon a plate, on which are marked the nodes, called the *head* and *tail* of the *dragon*, by means of which one may ſee if the moon be at any time in the ecliptic, &c."—From this deſcription of Pigeon's ſphere, it ſeems to have been the moſt comprehenſive repreſentation of the Copernican ſyſtem of any which we have hitherto met with, inaſmuch as the diurnal motion of the earth, and the motion of the moon's nodes, have been added to the revolutions of the planets. All the motions, we muſt conclude, were mean motions, and as nothing is ſaid about the wheelwork, we know not how far theſe motions were accurate. The plan, however, ſeems to have been happily conceived, and well calculated to produce a pleaſing object to the eye of a ſpectator.

Orrery by Graham and Rowley.—We have now come down to the time when our own country produced in a machine a combination of the annual and diurnal motions of the earth, together with the motions of the moon and primary planets, and gave to ſuch combination the name of *Orrery*, in honour of the earl of Orrery, who at that time patronized the ſciences; but as we have deſcribed this complex mechaniſm with conſiderable minuteneſs under our article ORRERY, it would be ſuperfluous to ſay more in this place, than that the date alluded to was about the year 1715.

A Sphere moving by Clockwork, calculated by M. Paſſemant, and conſtructed by Dauthiau, Clock-maker to the King of France.—As this machine appears to be much ſuperior to any of the preceding ones, both in accuracy and extent, it claims a detailed notice, which cannot be given more faithfully than by tranſlating the abridged deſcription given by Ferdinand Berthoud, from a ſmall pamphlet of Dauthiau, publiſhed at Paris in 1756, in duodecimo.

“This clock, which is ſurmounted by a ſphere, which it puts in motion according to the Copernican ſyſtem, was preſented to the Academy of Sciences on the 23d of Auguſt 1749, by M. Paſſemant, the author of the calculations of the ſphere, to which he applied himſelf about 20 years. The gentlemen of the academy, from the report of Meſſrs. Camus and Deparcieux, the committee named for the examination of this clock, have certified that the revolutions of the planets are exact in it; for that they did not find a degree of difference from the aſtronomical tables in leſs than 3000 years. Dauthiau, the clock-maker, who conſtructed this machine, employed twelve years upon it. It was preſented to the king at Choicy on the 7th of September 1750. His majeſty, being a protector of the ſciences and arts, teſtified his ſatisfaction of it, and ordered a new caſe to be made for it after a deſign of his own choice, which was executed by Meſſrs. Caffiery, father and ſon, after which it was again preſented to the king at Choicy, the 20th of Auguſt 1753, and thence ſent to Verſailles.

“The ſphere repreſents from day to day the different motions of the planets round the ſun, *i. e.* of Saturn, Jupiter, Mars, the Earth, Moon, Venus, and Mercury, alſo their places in the zodiac, their configurations, ſtations, and apparent retrogradations with reſpect to the earth. Upon every circle which carries the orb of a planet, is engraven the time of its revolution round the ſun. The earth, during its annual revolution, makes its movement of paralleliſm, and views the ſun paſſing through the ſigns and degrees of the zodiac; alſo through the months and their day ſpaces, (quantièmes,) indicating the ſeaſons, the equinoxes, and ſolſtices; beſides, it makes a rotation in 24 hours, being divided by 24 meridian lines: it has likewiſe a map of the principal places of the globe; ſo that the riſing, ſetting, and meridian paſſage of the ſun, together with his different elevations, and the continuance of day and night, may be ſeen for every principal place. The moon finiſhes her revolution round the earth in $29^{d}\ 12^{h}\ 44'\ 3''$, during which time are indicated her age and different phaſes; her progreſs through the ſigns of the zodiac; her nodes, her eclipſes, and thoſe of the ſun with preciſion, *viz.* their place, ſize, and duration; beſides the various altitudes, and times of riſing, ſetting, and ſouthing.

“The clock beats ſeconds, which are indicated in the centre of the dial-face by a dead-beat eſcapement (échappement à repos) of a particular conſtruction. This clock effects the equation by itſelf, by ſhewing both apparent and mean time (called by the French “le temps *vrai* et le temps *moyen*,” which, in England, mean the ſame thing); it ſtrikes the hours and the quarters of ſolar time, which it will repeat at pleaſure. The movement of the ſtriking part is by a ſpring, fuſée, and chain, that of the clock by a weight of twenty pounds doubly-ſuſpended, which has a deſcent of eight inches in ſix weeks, and the going is not interrupted by winding up the weight. The pendulum rod conſiſts of bars of ſteel and braſs, adjuſted ſo as to keep the metallic lens always at the ſame diſtance from the point of ſuſpenſion by the difference of their expanſions; and by this difference a hand is made to point out the variation of temperature on a divided circle on the top of the rod, which forms therefore a natural thermometer by the ſole action of metals.

“On the front of the clock, over the face, is a planiſphere marking the age and phaſes of the moon; in which are, beſides the day of the week, the names and days of the month, and year ſpaces after a new and ſingular method; for though ſome months have 28, 30, and 31 days each, yet the clock makes February to have 29 days every fourth year for biſſextile. The mechaniſm for ſhewing the days of the year will point them out for ten thouſand years, if the clock will wear ſo long, by means of four indexes revolving reſpectively in 10, 100, 1000, and 10,000 years.”

In this clock and ſphere are three contrivances for diſengagement; the firſt for the eſcapement; the ſecond for the ſphere to be detached from the clockwork to move by a handle; and the third for detaching the diurnal motion of the earth, that the planets may have a quick motion by means of a correſponding handle. Thus the different portions may be diſengaged from each other to make the neceſſary rectifications. The number of wheels and pinions employed in this mechaniſm are 60, ſome of which are in the interior part of it; the diameter of the ſphere is one foot, and is ſurrounded by a cover of glaſs; the caſe of the clock is d'or moulu, with four faces, having glaſs covers, neatly deſigned, well finiſhed, and expoſed ſo far to view, that all the mechaniſm may be ſeen: the whole height from the top of the ſphere is ſeven feet.

According to the report of Antide Janvier, who was employed to repair this inſtrument, previouſly to its being placed in the gallery (of the firſt conſul) at the palais des Thuilleries at Paris, in the year 8, the following are the numbers of the wheels and pinionswhich are put down in his own method of noting them, and alſo their reſpective values in time.

The periodic revolution of the Moon from a motion of 48 hours.

$$\left.\begin{array}{ll}\text{Pinions} & 72.25.20.41.20\\ \text{Wheels} & 75.54.44.31.73\end{array}\right\} = 27^{d}\ 7^{h}\ 43'\ 4''\ 58'''.$$

Revolution of Mercury from a motion of 27 days 7 hours, &c.

$$\left.\begin{array}{ll}\text{Pinions} & 31.\ 85\\ \text{Wheels} & 84.101\end{array}\right\} = 87^{d}\ 23^{h}\ 14'\ 15''\ 56'''.$$

Annual revolution of the Earth from a motion of 87 days 23 hours, &c.

$$\left.\begin{array}{ll}\text{Pinions} & 8.35.83\\ \text{Wheels} & 43.44.51\end{array}\right\} = 365^{d}\ 5^{h}\ 48'\ 58'',\ 3'''.$$

Revolution of Venus from a motion of 365 days 5 hours 48 minutes, &c.

$$\left.\begin{array}{ll}\text{Pinions} & 53.76\\ \text{Wheels} & 42.59\end{array}\right\} = 224^{d}\ 16^{h}\ 40'\ 30''.$$

Revolution of Mars from a motion of 365 days 5 hours 48 minutes, &c.

$$\left.\begin{array}{ll}\text{Pinions} & 53.75\\ \text{Wheels} & 84.89\end{array}\right\} = 1^{y}\ 321^{d}\ 16^{h}\ 32'\ 11''.$$

Revolution of Jupiter from a motion of 365 days 5 hours 48 minutes, &c.

$$\left.\begin{array}{ll}\text{Pinions} & 9.45\\ \text{Wheels} & 49.98\end{array}\right\} = 11^{y}\ 312^{d}\ 22^{h}\ 28'\ 0''.$$

Revolution of Saturn from a motion of 365 days 5 hours 48 minutes, &c.

$$\left.\begin{array}{ll}\text{Pinions} & 7.\ 40\\ \text{Wheels} & 80.103\end{array}\right\} = 29^{y}\ 156^{d}\ 12^{h}\ 46'\ 40''.$$

Revolution of the Moon, with reſpect to the node, from a motion of 29 days 12 hours 44 minutes 3 ſeconds.

$$\left.\begin{array}{ll}\text{Pinions} & 50.67\\ \text{Wheels} & 49.63\end{array}\right\} = 27^{d}\ 5^{h}\ 5'\ 36''.$$

N. B. Each dot between the figures in the above examples is a ſign of multiplication.

“It may be aſked,” ſays Janvier, in a note to his report, „ where is the revolution of $29^{d}\ 12^{h}\ 44'\ 3''$ which gives motion to this laſt movement, it being not contained in the preceding ſtatement; but we have ſeen the periodic revolution, which conſiſts of the time in which the moon goes round the heavens; that interval, we know, is ſhorter than a ſynodic revolution; but this (ſynodic) revolution has no real exiſtence, but by means of the earth's change of ſituation, whoſe orbit carries a wheel immoveably fixed at the centre of the moon's orbit, round which the moon revolves really in $29^{d}\ 12^{h}\ 44'\ 3''$; it is this wheel, then, which gives motion to the wheelwork which repreſent the eclipſes with great accuracy. The laſt wheel of this movement carries a ſmall dial-plate on which the moon ſhews her poſition with reſpect to the node; this dial carries beſides an excentric piece, which makes the moon's place above and below the plane of the ecliptic within the limits of her greateſt latitude.

“The dial of the nodes is placed vertically, it accompanies the moon, and turns round the earth at the ſame time that it makes a revolution round its centre in the period we have ſpecified. This peculiarity has rendered the calculation ſingularly complex, and the effect leſs convenient to obſerve. Notwithſtanding this defect, this function is one of thoſe which ſhews a greater genius than that of Paſſemant; it was neceſſary to be better acquainted with aſtronomy than the reſt of the parts demand, to deviſe a ſimilar diſpoſition of parts, which it is impoſſible to comprehend without figures.”

P. le Roi, ſpeaking of this ſphere, ſays “the calculations are ſo exact, that one could hardly imagine it poſſible to arrive at ſuch accuracy.”

Such are the ample notices which we have procured of this inſtrument; but notwithſtanding the accuracy of the mean motions above ſtated, it muſt be recollected that, as the equations of the centre and excentricity are not attempted to be repreſented, nor even the relative diſtances, the conjunctions, oppoſitions, ſtations, and retrogradations will be far from accurate in reſpect to the *times* of their appearance; beſides, the want of the five laſt diſcovered planets renders it otherwiſe at this time incomplete.

In the account which has been here tranſlated, it does not appear whether the *year* mentioned in the periods of Mars, Jupiter, and Saturn, is a ſolar or civil year of 365¼ days, or whether it is taken at 365 exactly; we will therefore go through all the calculations again according to our own method, which, though attended with ſome trouble, (ſee NUMBERS, *Planetary*,) will afford us the ſatisfaction of knowing the preciſe value of each movement in days and parts of a day. The whole work abridged will ſtand thus: *viz.*

		D.	H.	M.	S.
Moon's period -	$\frac{75}{72}\times\frac{54}{25}\times\frac{44}{20}\times\frac{31}{41}\times\frac{73}{20}=\frac{403266600}{29520000}$ of 2^{d} =	27	7	43	4.96932
Mercury's revolution	$\frac{84}{31}\times\frac{101}{85}=\frac{8484}{2635}$ of $27^{d}.3215853$ =	87	23	14	16.4976
Earth's revolution -	$\frac{43}{8}\times\frac{44}{35}\times\frac{51}{83}=\frac{96492}{23240}$ of $87^{d}.9682465$ =	365	5	48	59.04048
Venus' ditto -	$\frac{42}{53}\times\frac{59}{76}=\frac{2478}{4028}$ of $365^{d}.2423507$ =	224	16	40	28.408
Mars' ditto -	$\frac{84}{53}\times\frac{89}{75}=\frac{7476}{3975}$ of ditto =	686	22	21	23.76
Jupiter's ditto -	$\frac{49}{9}\times\frac{98}{45}=\frac{4802}{405}$ of ditto =	4330	14	26	43.64
Saturn's ditto -	$\frac{80}{7}\times\frac{103}{40}=\frac{8240}{280}$ of ditto =	10748	4	52	59.20
Moon's node -	$\frac{49}{50}\times\frac{63}{67}=\frac{3087}{3350}$ of $29^{d}.53059$ =	27	5	5	32.67

From theſe calculations we find that the *ſolar* year is the year intended, as mentioned in the periods of Mars, Jupiter, and Saturn, which year is made by the wheelwork 11″ longer than La Lande's tables make it. The revolutions of the planets in his machine are tropical, and, though not ſo accurate as they might have been calculated in a ſhorter time than *twenty years*, yet are they more accurate than in any other machine which preceded it. The period of Saturn, which is the moſt inaccurate, is pretty nearly equally diſtant from that of Dr. Halley and that of La Lande.

Paſſemant's Planetary Clock.—Beſides the preceding machine of M. Paſſemant, this author invented a clock in the year 1754, which has a caſe of five feet in height, and which gives motion to a terreſtrial globe of four inches in diameter, on which the different countries are engraven, and which is placed in the midſt of artificial rocks and waterfalls that ſerve as an univerſal horizon: at ſome diſtance is repreſented the ſky, containing a ſun of three feet diameter, and all the primary planets in motion round him, according to their reſpective velocities, and the four neareſt according to their proportional diſtances; the excentricities and alternate increaſe and decreaſe of velocity at the perihelion and aphelion points are alſo effected, and all the phenomena depending upon the earth's paralleliſm and diurnal rotation are accurately repreſented. There is alſo a moon performing a lunation, and all her various phaſes in the ſky, in a natural manner. F. Berthoud has given his abridged notice of this clock from “Deſcription et Uſage des Teleſcopes,” a work publiſhed at Paris by Paſſemant in 12mo.; but as there is no account given of the numbers of the wheelwork, nor other particulars of the conſtruction, we muſt ſuppoſe that the numbers of the preceding machine were adopted: the clock is ſaid to have been made for the king of Golconda, and to be ſtill in exiſtence at Paris. It is matter of regret that we have it not in our power to deſcribe by what contrivance the excentricity of each orbit is effected.

Aſtronomical Machine by Phil. Mat. Hahn.—If we paſs over the days of Benjamin Martin and James Ferguſon, whoſe aſtronomical mechaniſm has in part been explained under our article ORRERY, and is to be found in their works in almoſt every one's hands, we meet with no original machinery of any importance till we arrive at the year 1791, in which a deſcription was publiſhed in a pamphlet, in London, of a planetarium or aſtronomical machine, invented and partly executed by Phil. Mat. Hahn, member of the Academy of Sciences at Erfurt, and completed by Albert de Mylins.

This machine conſiſted of three ſeveral portions, which were actuated by a pendulum clock, and which compoſed three different ſyſtems; *viz.* 1ſt, the ſolar ſyſtem of ſeven primary planets; 2dly, the particular planets only which have ſecondaries, in which thoſe ſecondaries have their motions given by wheelwork as well as their primaries; and 3dly, a celeſtial ſphere of copper, with 1500 ſtars engraved on it, in which were contained about 100 wheels that gave motion to the planets as they appeared when viewed from the earth. All theſe motions are ſaid to have been produced by trains of wheelwork that were calculated with the greateſt accuracy, but as the numbers have not been diſcloſed that compoſe the teeth of thoſe wheels, we cannot form an eſtimate of their accuracy; neither can we gratify our readers with an account how the inequalities of motion were produced, according to which ſeveral of the planets are ſtated to have moved. The whole fabric was of the beſt workmanſhip, and its different portions were ſo ſymmetrically arranged, that it was deemed a handſome preſent to be taken by lord Macartney in his capacity of ambaſſador to China, where probably its uſes will not be duly appreciated.

Planiſphere and Sphere by Antide Janvier of Paris.—A. Janvier, whoſe new *orrery* we have deſcribed in its place, received his mechanical and mathematical inſtructions from l'Abbé Tournier, who maintained a ſyſtem of aſtronomy in ſome reſpects ſimilar to that of Ptolemy; and during the early part of his life the pupil employed himſelf in repreſenting, by means of wheelwork, the planetary ſyſtem of his maſter, as ſeen from the earth as the centre of all the apparent motions. The terreſtrial globe, placed in the middle of the ſyſtem, was made to have the diurnal motion, while the ſun was made a planet, with his ſecondaries, Mercury and Venus, beyond the orbit of the moon, which was conſidered as the firſt planet. The other planets had their periodic revolutions in their reſpective times; but, to repreſent the retrogradations and ſtations, a ſecond arm was made to revolve at the point of mean diſtance, in the ſame direction as the radius vector of each planet, once in each *ſynodic* revolution, as they regarded the ſun, each ſhort arm being made equal to the radius vector of the ſun. This arrangement produced the geocentric appearances ſo well, that the author of the ſyſtem pertinaciouſly withſtood all the arguments of Caſſini in favour of the Copernican ſyſtem; and a peruſal of it has probably laid the foundation of what has very recently been denominated the *Martinian* ſyſtem by a pretender, who is endeavouring, in our own time, to inſtitute a *Society*, under *royal patronage*, for the defence of his ſyſtem, as compared to that of Copernicus and ſir Iſaac Newton! Janvier, however, was ſoon convinced that the ſyſtem of his preceptor was erroneous, and in the year 1789 he began the conſtruction of a ſphere that was to include the motions of the planets agreeably to the Newtonian ſyſtem, and that was finiſhed in the year 1801, after a period of eleven years ſpent in the calculations and conſtruction. The ſphere is mounted on a pillar with four faces, in the interior of which pillar are concealed a great variety of wheels and pinions, that are put in motion, like Hahn's machine, by a ſeconds' pendulum clock of the beſt conſtruction. To theſe four faces are attached ſeveral dials and correſponding hands to indicate the various phenomena of the planets that are exhibited within the ſphere, where the heavenly bodies are in motion. It would not be poſſible to give ſuch a verbal deſcription of this machine as would enable the reader to comprehend the peculiarities of its conſtruction, without ſeveral plates for the repreſentation of the reſpective parts; but we will not conclude our preſent article without giving an abridged account of its leading features. The trains of wheelwork contained within the pillar, and giving motion to the hands, have each ſix or eight wheels and pinions, from which conſequently great accuracy may be expected; but thoſe that actuate the planets within the ſphere are not ſo numerous, and conſequently not ſo accurate; ſo that the indication of the phenomena is more exact than the occurrence of thoſe phenomena. The wheels and pinions that are principally employed, and the periods correſponding to the reſpective trains, may be put down thus:

The Tropical Revolutions.

					D.	H.	M.	S.
Mercury	-	$\frac{80}{10} \times \frac{140}{43} \times \frac{179}{53}$	of 24 hours	=	87	23	14	30
Venus	-	$\frac{62}{7} \times \frac{81}{17} \times \frac{197}{37}$	of ditto	=	224	16	41	25
Earth	-	$\frac{52}{7} \times \frac{61}{13} \times \frac{241}{23}$	of ditto	=	365	5	48	$49\frac{31}{161}$
Mars	-	$\frac{89}{6} \times \frac{137}{6} \times \frac{144}{71}$	of ditto	=	686	22	18	35
Jupiter	-	$\frac{57}{6} \times \frac{72}{6} \times \frac{89}{6} \times \frac{105}{41}$	of ditto	=	4330	14	38	2
Saturn	-	$\frac{82}{4} \times \frac{92}{6} \times \frac{92}{8} \times \frac{110}{37}$	of ditto	=	10476	19	14	35
Georgian	-	$\frac{60}{6} \times \frac{73}{6} \times \frac{97}{6} \times \frac{108}{7}$	of ditto	=	30347	3	25	43
Moon	-	$\frac{23}{5} \times \frac{37}{20} \times \frac{61}{19}$	of ditto	=	27	7	43	4.4

The Synodic Revolutions.

					D.	H.	M.	S.
Mercury	-	$\frac{24}{6} \times \frac{27}{8} \times \frac{103}{12}$	of 24 hours	=	115	21	5	37
Venus	-	$\frac{19}{4} \times \frac{53}{4} \times \frac{167}{18}$	of ditto	=	583	22	5	0
Jupiter	-	$\frac{132}{6} \times \frac{158}{61}$	of 7 days	=	398	19	12	54
Moon	-	$\frac{58}{15} \times \frac{65}{22} \times \frac{137}{53}$	of 24 hours	=	29	12	44	2.87
Ditto	-	$\frac{19}{235}$	of 365.24222	=	29	12	43	31
1. Satellite of ♃		$\frac{4}{3} \times \frac{76}{31} \times \frac{98}{181}$	of 24 hours	=	1	18	28	35.6
2. Ditto	-	$\frac{11}{6} \times \frac{13}{6} \times \frac{19}{17}$	of ditto	=	3	13	17	54.7
3. Ditto	-	$\frac{63}{19} \times \frac{67}{31}$	of ditto	=	7	3	59	35.55
4. Ditto	-	$\frac{61}{4} \times \frac{78}{71}$	of ditto	=	16	18	5	4.2

The Moon's Apogee.

From 24^h	- -	$\frac{69}{6} \times \frac{127}{8} \times \frac{177}{10}$	=	3231	8	33	0
From $27^d\ 7^h\ 43^m$		$\frac{57}{10} \times \frac{74}{13} \times \frac{113}{31}$	=	3231	8	44	0
From 365 5 48 49^s		$\frac{93}{98}$, *viz.* $\frac{93}{98-93}$	=	$19\frac{3}{5}$ years			

The Moon's Node.

From half ſynodic revolution of the Moon		$\frac{106}{25} \times \frac{259}{59}$	=	6798	5	0	0
From $365^d\ 5^h\ 48^m\ 49^s$	- -	$\frac{115}{102}$, *viz.* $\frac{115}{115-102}$	=	$8\frac{11}{13}$ years.			

Beſides theſe trains of wheelwork, there is one that converts mean ſolar into ſidereal time, the numbers of which are theſe, *viz.* $\frac{19}{29} \times \frac{67}{40} \times \frac{239}{63} = \frac{304247}{305085}$, the difference between the numerator and denominator of which large fraction is 833; the acceleration of ſidereal on ſolar time is, therefore, $\frac{86400'' \times 833}{305085} = \frac{2160 \times 833}{7627} = 3'\ 55''\ 54'''\ 33''''\ 40'''''$; and the time required for its accumulation into 24^h will be very nearly $365^d\ 5^h\ 48^m\ 49^s$. There are various ingenious contrivances in the conſtruction of this machine, that atteſt the mechanical ſkill of the inventor, but which cannot be intelligibly deſcribed without drawings: the principal of them are the manner in which the diurnal train is made to act; a repreſentation of the two ſeparate cauſes of the equation of time; and an union of the grand equation, of the evection, and of the heliocentric latitude of the moon, in every part of her orbit. In both the planiſphere and the ſphere there are ſome complex calculations introduced, in order that the periods, which would be altered by the mode in which the wheels are placed for action, may be rectified by correſponding alterations in the numbers of the wheels, after the original calculations were made. But accurate as the trains in general are, we are of opinion that, in many caſes, fewer wheels would have effected equal accuracy in the periods, particularly in that of Georgian, which is very erroneous; and as the four newly-diſcovered planets are left out, the machine cannot be called perfect at the preſent moment, notwithſtanding the great pains that have been beſtowed upon its conſtruction for the continued ſpace of eleven years. A memoir of this elaborate machine was laid before the National Inſtitute of France, through the medium of Coulomb, Delambre, and Fred. Berthoud, which the laſt named has copied into his "Hiſtoire du Temps," together with the various drawings, which the curious reader may conſult with advantage, who wiſhes to make himſelf maſter of all the particulars of the conſtruction.

In this hiſtorical ſketch we might have introduced notices of other machines, ſuch as the orrery of Ribright in the Poultry, of Dean in Dublin, and of Bolton, belonging to her majeſty, at Windſor, if we had been aware that there is any thing peculiar in the conſtruction of any of them; and with reſpect to the pendulous orrery of Rittenhouſe in Philadelphia, and to that lately exhibited at the Pantheon, London, as well as to Mr. Walker's eidouranion, and Mr. Lloyd's dioaſtrodoxon, we conſider theſe not as objects of cloſe examination, but as conveying only general information by a ſcenic effect, not depending on the accuracy of the wheelwork, and therefore not claiming our minute attention. For an account of thoſe modern machines, which appeared to us to merit a more particular deſcription than we could allot them in this article, we muſt requeſt the reader to conſult our articles ORRERY, PLANETARIUM, and SATELLITE *Machine*.

PLANETARY *Dials*, thoſe whereon the planetary hours, latitudes, or equations, are inſcribed. See DIAL, ORRERY, and PLANETARIUM.

PLANETARY *Globe*. See GLOBE.

PLANETARY *Syſtem*, is the ſyſtem or aſſemblage of the planets, primary and ſecondary, moving in their reſpective orbits round their common centre, the ſun.

PLANETARY *Squares*, the ſquares of the ſeven numbers from 3 to 9, diſpoſed magically.

Corn. Agrippa, in his famous book of magic, has given the conſtruction of the ſeven planetary ſquares: M. Poignard, canon of Bruſſels, in his Treatiſe of Sublime Squares, gives new, eaſy, and general methods for making the ſeven planetary ſquares, and all others to infinity, by numbers, in all ſorts of progreſſions. See MAGIC *Square*.

PLANGESTA, in *Geography*, a town of Bengal; 21 miles N.N.W. of Kiſhenagur.

PLANIARY, a town of Bohemia, in the circle of Kaurzim; 3 miles N.N.E. of Kaurzim.

PLANIER, a ſmall iſland in the Mediterranean, near the coaſt of France. N. lat. 43° 12′. E. long. 6° 19′.

PLANIFOLIOUS FLOWERS. See FLOWER.

PLANIMETRY, PLANIMETRIA, that part of geometry which conſiders lines and plain figures; without any conſideration of heights or depths.

Planimetry is particularly reſtrained to the menſuration of planes or ſurfaces; in oppoſition to *ſtereometry*, or the menſuration of ſolids. See MEASURING and SURVEYING.

Planimetry, or the art of meaſuring the ſurfaces and planes of things, is performed with the ſquares of long meaſures, as ſquare feet, ſquare inches, ſquare yards, ſquare perches, &c.; that is, by ſquares whoſe ſides are an inch, a foot, a yard, a perch, &c.; ſo that the area or content of any ſurface is ſaid to be found, when we know how many ſuch ſquare inches, feet, yards, &c. it contains.

PLANING MACHINES, are machines uſed to diminiſh the great manual labour of planing the ſurface of planks and boards of wood: in ſtrictneſs, thoſe alone ſhould be termed planing machines, which operate to reduce the ſurface of the wood to a true and ſmooth plane, by means of planes or inſtruments of a ſimilar nature, though actuated by the power of machinery inſtead of the ſtrength of a man's arm; but cuſtom has denominated thoſe machines which cut flat ſurfaces in a different manner from planes by the ſame name.

Theſe machines are of modern invention; the firſt, we believe, was projected by general Bentham, who obtained a patent for it in 1791. It conſiſted of a plane, to be put in motion by means of a crank turned by a mill, to give it a reciprocating motion; or on a ſmaller ſcale it might be worked by hand in the uſual manner, but the plane was ſo formed as to require none of the ſkill and attention neceſſary in the ordinary method of operating: here the workman, beſides exerting the force neceſſary to force the inſtrument along, has ſeveral points to attend to, even in the ſimple caſe of planing a ſtraight board he muſt adjuſt his tool to the board in a proper manner for beginning the ſtroke, and employ ſufficient force to keep it down to the board; and in returning, he muſt raiſe it up off the board ſufficient to ſave the cutting edge from injury; he muſt alſo guide it ſideways to prevent it ſlipping off the board, and if this is wider than the plane, he muſt conſtantly examine if he reduces the middle and the ſides in a proper manner to make a plane ſurface; and, laſtly, he muſt obſerve the marks he previouſly makes for the thickneſs of the board, that he may keep it parallel, and not reduce it too thin. By the general's invention all theſe circumſtances are gained at once; the plane is made the full width of the boards intended to be planed, and on each ſide of it fillets or cheeks are fixed, which project beneath the face of the plane juſt as much as the thickneſs the board is to be reduced to: theſe cheeks, therefore, guide the plane ſideways in paſſing along the board, and gauge it in thickneſs; becauſe, when the board is reduced to the quantity which the cheeks are beneath the ſurface of the plane, the cheeks reſt upon the bench or ſurface on which the board lies, and bear off the plane, ſo that it can cut no longer. The plane is kept down by its own weight, which is increaſed, when neceſſary, by loading it with weights, and theſe are contrived to be capable of ſhifting their poſition from one end of the plane to the other during the time it is making the ſtroke; becauſe, at firſt the preſſure is required at the fore end to enter the cut, but at the concluſion it muſt be greateſt at the hinder end, to prevent the fore end tripping down the inſtant it leaves the board. By another contrivance the plane is cauſed to riſe up ſufficiently to clear the cutting edge from the wood when the plane is on its return. It is by a piece which acts as a handle to the plane, and to which the power is applied, that it is fixed in the manner of a lever upon an axis extending acroſs the width of the plane, and carrying at each ſide thereof a ſhort lever, provided with rollers in their extremities; the handle projects upwards from the plane, which being forced forwards by it, aſſumes an inclined poſition, as do alſo the ſhort levers, and their rollers then riſe above the cheeks of the plane; but when the plane is drawn back, its handle is firſt drawn back into an erect poſition, and the levers moving with it, their rollers project beneath the cheeks of the plane, and raiſe it off the bench, the plane being in its return borne by them.

The bench for ſupporting the board during the operation was alſo of a peculiar conſtruction, in order to confine the work ſteady upon it. In caſes when the boards to be planed are winding or irregular on the lower ſide, ſo that they cannot lie flat upon the bench, it is provided with two ſides, which can be brought to cloſe upon the edges of the board, and hold it ſteady between them, being furniſhed with one or more rows of flat teeth to penetrate the wood and retain it; theſe ſides are contrived to riſe or fall upon the bench, to accommodate the different thickneſſes of the boards. When a very thin board is to be planed, it might be liable to ſpring up to the iron, ſo as to be reduced even after the plane came to reſt with its cheeks upon the bench; to avoid this the edges of the board are to be held by the ſides to the bench above-mentioned, but as it would ſtill be liable to ſpring up in the middle part, heavy rollers, or rollers loaded with weights, are fitted in apertures made in the plane as near as poſſible to the cutting edge, and theſe will keep the board down cloſe upon the bench. For planing pieces of greater thickneſs at one end than the other, the cheeks of the plane are to be borne upon rulers of wood laid on the bench on each ſide, the wood being as much thicker at one end as the board is intended to be thinner at that end; therefore, when the plane has reduced the wood, the cheeks come to bear upon theſe rulers, and cauſe it to move not parallel to the bench, but inclined, according as they are thicker at one end than the other: in like manner, by uſing them of different thickneſſes at the different ſides the boards may be made feather-edged.

Mr. Bramah invented a planing machine, which he has uſed very advantageouſly for planing all kinds of timber flat, at an exceedingly ſmall expence. In 1802 he took out a patent for the invention, which he deſcribes in his ſpecification to conſiſt in the following particulars. "The cutting tools employed to reduce the wood, inſtead of being worked by hand are to be fixed on frames, ſome of which are moved in a rotatory direction round an upright ſhaft, and others have a ſhaft lying in a horizontal poſition like a common lathe. In other inſtances, the tools are fixed on frames, which ſlide in ſtationed grooves to be driven alſo by machinery. The principal points on which the merits of the invention reſt are, 1. The materials to be wrought are made to ſlide in contact with the tool, inſtead of the tool being carried by the hand over the work in the uſual way. 2. The tool is made to travel acroſs the work in a ſquare or oblique direction, except in caſes where it may be neceſſary to fix the tool in an immoveable ſtation, and cauſe the work to fall in contact with it by a motion. 3. Inſtead of common tools, bent knives, ſpoke ſhaves, or deep cutting gouges, are uſed for cutting off the rougheſt parts, and planes of various ſhapes and conſtructions, as the work may require, are applied to follow the former in ſucceſſion, under the ſame operation, and which latter I call finiſhers. 4. Theſe are fixed on frames which move in caſes, like thoſe on which the ſaws are fixed in a ſawing-mill, and in other inſtances theſe frames are fixed on a rotatory upright ſhaft turning on a ſtep, and carrying the frame round in a direction ſimilar to the upper millſtone for grinding corn, and ſometimes the frames turn on a horizontal ſhaft, reſembling the mandrel of a common turning lathe. The different planes, tools, &c. are fixed in the frames, ſo as to fall ſucceſſively in contact with the wood or other materials to be cut, ſo that the cutter or tool calculated to take the rough and prominent part operates firſt, and thoſe that follow muſt be ſo regulated as to reduce the material down to the line intended for the ſurface. Theſe cutter frames muſt alſo have the property of being regulated by a ſcrew, or otherwiſe, ſo as to approach nearer the work, or recede at pleaſure, in order that a deeper or ſhallower cut may be taken at diſcretion, or that the machine may repeat its action, without raiſing or depreſſing the material on which they act. 5. When an upright ſhaft is uſed, the pivot is to turn in oil, and it may be raiſed or depreſſed at pleaſure, by means of a greater or leſs quantity of the ſaid fluid being confined between the end of the ſhaft and the bottom of the ſtep. 6. The materials to be cut muſt be firmly fixed on a frame, ſimilar to thoſe in ſawing-mills, on which the timber is carried to the ſaws. Theſe frames muſt be moved in a ſteady progreſſive manner as the cutter frame turns round, either by the ſame power which moves the latter, or otherwiſe, as may be found to anſwer beſt in practice. 7. The motion of the cutter frames muſt be under the controul of a regulator, ſo that the velocity of the tool, in paſſing over the work, may be made quicker or ſlower as ſuch work may reſpectively require, to cauſe the cutter to act properly to the beſt advantage." For this purpoſe Mr. Bramah propoſes to uſe what he calls a univerſal regulator of velocity, and which he deſcribes as follows: "I take any number of cog-wheels, of different diameter, with teeth that will exactly fit each other through the whole; ſuppoſe ten, or any other number, but for an example ſay ten, the ſmalleſt of which ſhall not exceed one inch in diameter, and the largeſt ſuppoſe ten inches in diameter, and all the reſt to mount by regular gradation in their diameters from one to ten. I fix theſe ten wheels, faſt and immoveable, on an axis perfectly true, ſo as to form a cone of wheels; I then take ten other wheels, exactly the ſame in all reſpects as the former, and fix them on another axis, alſo perfectly true, and the wheels in perfect gradation alſo; but theſe latter wheels I do not fix faſt on their axes, like the former, but leave them all looſe, ſo as to turn upon the ſaid axes, contrary to the former, which are all fixed. All theſe latter wheels I have the power of locking, by a pin or otherwiſe, ſo that I can at diſcretion lock or unite any ſingle wheel at pleaſure to the axis. I then place the two axes parallel to each other, with the wheels which form the two cones as above deſcribed, in reverſe poſition, ſo that the large wheel at one end of the cone may lock its teeth into the ſmalleſt one in the cone oppoſite, and likewiſe *vice verſâ*. Then ſuppoſe the axis, on which the wheels are permanently fixed, to be turned about all the wheels on the other axis will be carried round with velocities correſpondent to their diameters and thoſe of the former, but their axes will not move. Then lock the largeſt wheel on the looſe axis, and by turning about the faſtened axis, as before, it muſt take ten revolutions, while the oppoſite wheel performs but one; then by unlocking the largeſt wheel, and locking the ſmalleſt one at the contrary end of the cone in its ſtead, and turning as before, the faſtened axis will then turn the oppoſite ten times, while itſelf only revolves once. Thus the axes or ſhafts of theſe cones, or conical combinations of wheels, may turn each other reciprocally, as one to ten, and ten to one, which collectively produces a change in velocity, under an uniform action of the primum mobile, as ten to a hundred; for when the ſmall wheel on the looſe axis is locked, and the faſt one makes ten revolutions, the former will make one hundred; and by adding to the number of thoſe wheels and extending the cones, which may be done *ad infinitum*, velocities may be likewiſe infinitely varied by this ſimple contrivance: A may turn B with a ſpeed equal to thouſands or millions of times its own motion; and by changing a pin and locking a different wheel, as above deſcribed, B will turn A in the ſame proportion, and their power will be transferred to each, in proportion as their velocities reciprocally. Here is an univerſal regulator at once for both power and velocity. In ſome inſtances I produce a like effect, by the ſame neceſſary number of wheels made to correſpond in conical order, but inſtead of being all conſtantly mounted on the axes or ſhafts, as above deſcribed, they will reciprocally be changed from one axis to the other, in ſingle pairs, to match according to the ſpeed or power wanted, juſt as in the former inſtance. This method will have, in all reſpects, the ſame effect, but not ſo convenient as when the wheels are all fixed."

The utility of Mr. Bramah's machine, not leſs than its ingenuity, has induced us to procure drawings of one of them, which he has in conſtant uſe in his factory at Pimlico. It is upon exactly the ſame conſtruction as one he made for the royal arſenal at Woolwich, by which all the timber for gun-carriages, and other ſimilar articles, is now planed at a trifling expence, compared with the old method of planing by hand labour. See *Plates* I. and II. *Planing Machine*, where *fig.* 1. is a plan of the whole machine, and *fig.* 2. an elevation thereof; A *a* is a vertical axis, put in motion by a ſteam-engine, the power being communicated to it by a pair of bevelled wheels B, one fixed on the vertical ſhaft, and the other at the extremity of a horizontal ſpindle C, *fig.* 1; ſee alſo *fig.* 8. *Plate* II. which has a live and dead pulley upon it at *c*, for the reception of an endleſs ſtrap, by which the machine is driven. The ſhaft *a* A is for the purpoſe of carrying an iron wheel 33, ſhewn ſeparate in *fig.* 3; it has the cutters fixed at the different points 7, 7, 7, 7, of its circumference;

theſe are ſix in number at each ſide, and are formed with cutting edges ſimilar to gouges or ſcoops (ſee *fig.* 7.); at the two oppoſite points, 4 and 5, it has ſmall planes fixed in its rim, as ſhewn ſeparate in *figs.* 4 and 5: when this wheel revolves, its cuttters will cut away all which projects above the plane of their motion; the wood is carried under them with a progreſſive motion, upon two moveable carriages E E and E E, one at each ſide of the wheel, and moving in oppoſite directions; they traverſe upon iron beds, or railways F, F, which are more than double the length of the carriages: theſe are ſupported on iron legs, from a foundation of maſonry, and well united together by croſs pieces D, D, to keep them always in one plane, for upon this circumſtance the truth of the planing depends. The pieces of wood to be planed are fixed down upon the carriages at G, G, and held firmly by ſcrew-clamps with proper contrivances; the machine is then put in motion, and at the ſame time that the wheel is revolving the carriages are both drawn in oppoſite directions beneath its cutters, which ſoon clears away the wood to a perfect plane, by making ſucceſſive ſtrokes obliquely acroſs the wood, and as the carriages advance theſe ſtrokes proceed in ſucceſſion from one end of the piece to the other. The gouges 7, 7, act firſt to chop, or hew away the wood roughly, but to a flat ſurface, and then the planes 4, 5, follow and reduce it to a ſmooth plane: this is accompliſhed by their being placed rather nearer the centre, ſo that they revolve in a rather ſmaller radius, and thus act upon the wood after the gouges have finiſhed. We ſhall now enter more minutely into the details of the machinery: the two carriages E, E, are put in motion alternately, by means of an endleſs chain H H, which is extended between two horizontal wheels K, I; the centre pin of the latter is fixed in a piece of wood *d*, fitted in a groove formed between the two adjacent rails F, F, on which the carriages run; the ſlider has a ſcrew *b*, by which it is forced outward, and thus ſtrains the chain between the two wheels ſo tight, that when the wheel K is turned round, it will draw the chain, which being connected with the carriages beneath, gives them both a progreſſive motion. The wheel K is fixed upon a ſhort vertical axis, upon the lower end of which is a pinion L, having its teeth engaged with a rack M, attached to the piſton-rod of a cylinder 10, ſituated horizontally on the ground (ſee alſo *fig.* 10. *Plate* II.): the piſton-rod, M, is fitted through a ſtuffing-box, *e*, at the end of the cylinder, and the piſton, *f*, is fitted accurately to the chamber with leathers, to make it perfectly water-tight: the cylinder is bolted faſt down upon the floor framing, as ſhewn in both figures, and pipes *g*, *h*, enter into it at each end, for the purpoſe of introducing or returning water, which acts upon the piſton *f*, to give it an advancing or retrograde motion, upon the hydroſtatic principle invented by Mr. Bramah, and deſcribed at the end of our article MACHINERY; ſee alſo PRESS, *Hydroſtatic*. The ſteam-engine which gives power to the whole machine alſo works a ſmall forcing pump, or injector, which is conſtantly pumping water into an air-veſſel, under a great preſſure: from this ſmall copper pipes are conducted to the machine, to operate, when required, either in the cylinder 10, or in another, which is the ſtep, or ſupport of the main vertical ſhaft, and gives the means of raiſing or lowering it with the wheels and cutters all together, to cauſe them to reduce the wood upon the bench to any required thickneſs. The admiſſion of the water into theſe cylinders is regulated by cocks, ſituated at one ſide of the machine, in a poſition where a perſon can, at the ſame time, manage them, and have a complete view of all the machine, to watch its operation. The relative poſition of theſe cocks is ſhewn in *fig.* 8, where that for the ſervice of the cylinder is marked N, and the other for regulating the thickneſs is marked O, and *i* is the pipe leading from it to the bottom of the cylinder 13; the cocks themſelves are ſhewn on a large ſcale in *figs.* 11 and 12: the entry pipe, which brings the water from the injector, is here plainly ſhewn, with two branches leading to the cocks. From the cock N, a paſſage directly oppoſite to the entry leads to the waſte, or eſcape-pipe; and on the two oppoſite ſides, at right angles to the former, are pipes *g* and *h*, leading to the front and back of the cylinder: the cock itſelf has two curved paſſages through it, which will make communication with any two adjacent pipes of the four; thus, as it ſtands in the figure, the water from the entry paſſes to the back of the cylinder, whilſt the water contained in the front end is at liberty to eſcape at the waſte pipe. In this ſituation the piſton is moved towards the front end of the cylinder, and turning round the pinion and wheel K, (*figs.* 1 and 2.) moves both carriages in one direction: now by turning the cock N a quarter of a revolution in either direction, the ſame paſſages make a different communication, *viz.* from the entry to the front of the cylinder, and from the back to the waſte; this throws the action upon the front ſide of the piſton, drawing it to the back end of the cylinder, and moving the carriages in an oppoſite direction. By turning the cock only $\frac{1}{8}$th inſtead of $\frac{1}{4}$th, all the four paſſages are cloſe ſtopped, and no motion takes place. The other cock, O, is more ſimple; thus, the entry is on one ſide, the pipe *i* at right angles to it, and the waſte oppoſite the latter; the paſſage in the turning part of the cock is made diametrically through it, and another at right angles into it. In the poſition of the drawing, the pipe, *i*, is open to the waſte, and permits the water in the cylinder 13 (*fig.* 8.) to eſcape; but when the cock is turned round one-fourth, to bring the ſhort paſſage oppoſite the pipe *i*, a freſh ſupply of water will be admitted from the entry into the cylinder 13, or, by turning a little farther, all of them are ſhut. The cylinder marked 13 (*fig.* 8.) is fixed by ſcrews in the middle of one of the croſs bars D; it is accurately bored withinſide, and fitted with a piſton P, (ſee alſo *fig.* 13.) which is packed with leather cups, ſo that no leakage can take place by the ſide of it; in the upper ſide of the piſton is a perforation for the reception of a ſteel pivot, which is fixed in the lower end of the great vertical ſpindle A, and thus ſupports its weight as it revolves; the upper end, *a*, of the great ſpindle is fitted through the centre of the cog-wheel, B, with a fillet, ſo that it has free liberty to riſe and fall, but cannot turn round without the wheel; the wheel itſelf is ſupported by means of a cone formed on the lower part of it, and fitted into a ſocket ſupported at the top of four iron ſtandards Q, Q, which are erected from the iron framing below, and thus they ſuſtain the axis and wheel very firmly from the ſame frame as the rails F, F, which ſupport the carriages. At the top of the vertical ſpindle a ſhackle, *a*, is fitted, by a pin with a head, inſerted into the end of the axis, and retained by a croſs pin; by this means the ſhackle is united to the ſpindle, to riſe and fall with it, but not to revolve with it; a chain is attached to the ſhackle, and paſſes over a pulley, as ſhewn at *m*, in *fig.* 2, and thence to a ſmall pulley *n*; to this is attached a larger wheel, *o*, from which a chain is carried, to ſuſpend a heavy wooden ruler *p*, ſituated at ſome diſtance from the machine, and ſliding in a groove; it has diviſions ſhewing inches and parts graduated upon it, which are determined by an index fixed to the wood of the groove. On this ſcale, thoſe diviſions which are marked inches are three times that length, becauſe the wheels *n* and *o* are as three to one in diameter:

meter : this ſcale ſhews the thickneſs to which the machine will reduce the wood upon the carriages, the index being ſo adjuſted that it ſtands at zero of the ſcale when the wheel 3 3 is lowered down till its cutter cuts the ſurface of the carriage ; then by turning the cock N, the water is very gradually admitted into the cylinder 13, and elevates the piſton P, the ſhaft, and wheel altogether, to any required height above the bench, which is ſhewn in inches and parts by the ſcale to very great accuracy ; for by the cock being very partially opened, the wheel riſes ſo ſlowly, that it can be adjuſted to the greateſt nicety. The wheels *n* and *o* are ſupported in the floor above the room, as is alſo the frame for the ſupport of the axis, C, of the live and dead pulley *c* ; the endleſs ſtrap of this pulley is guided through an eye at the end of an iron rod *s*, *fig.* 8, which is joined to a lever T, coming down in reach of the attendant, who alſo manages the cocks N, O.

The conſtruction of the cutters is ſhewn in *fig.* 7 : here 3 is a ſection of a part of the rim of the wheel, and *t* an iron clamp ſcrewed faſt down upon it, as ſhewn in *fig.* 3 ; the clamp has a vertical mortiſe through it for the reception of the ſtem of the gouge cutter 7, which is fixed faſt therein by a wedge piece and ſcrew *v* : by this means they can all be adjuſted till their edges come exactly into one plane, though not quite ſo deep as the faces of the planes : theſe are made, as ſhewn in *figs.* 4 and 5, in iron, being received into an opening in the rim of the wheel, and held faſt by two bolts, *w*, *w*, with keys above the ſurface of the wheel to keep them faſt ; the plane iron, *x*, is double, and fixed into its place by an iron wedge *y*, formed ſimilar to that of a carpenter's plane.

It only now remains for us to explain the conſtruction of the dogs or claws for holding the work faſt down upon the benches E, E ; theſe are of two kinds, ſome fixed on the outſides of the carriage, and others in the middle, which draw up by ſcrews to hold the wood faſt ; the carriage is compoſed of two large beams E, E, *fig.* 9, which is a croſs ſection of it ; theſe are united by proper croſs pieces, and run upon the rails F, F, with metal pieces fixed on the lower ſides of them. There are alſo ſeveral caſt-iron frames fixed acroſs, as ſhewn by the dark ſhaded parts *k* ; each conſiſts of two cheeks, all formed from one piece, and leaving a groove between them ; in this groove a long ſcrew, *l*, is fitted by a collar at one end, and operates upon a ſlider, 8, fitted into the groove ; a dog marked *z*, and bent ſomething like an S, is attached to this ſlider, and projects above the bench, having a ſharp point which penetrates the wood 2 G, and forces it againſt the other claws, *r*, *r*, fixed on the outſides. When the wood, as G, *fig.* 9, is of ſmall ſize, another ſmall claw, 9, is applied ; this is ſcrewed into a nut of braſs, which is fitted into the groove, then a ſecond piece of wood, 2, is applied between it and the dog *z*, to tranſmit the force of the ſcrew, *l*, to the other one at 9 : the outſide claws, *r*, are formed on the top of ſquare ſtems, which are fitted through clamps affixed to the ſides of the carriages, as ſhewn in *fig.* 6, and provided with clamp ſcrews, by which they can be fixed at any required height. The dogs *z* are very ſimply attached to the nut 8, by being applied upon the flat top ſurface of it, and one point enters into a ſmall hole made in the fore part of the nut 8 ; by this means it is ſimply hooked into its place, and when the ſcrew is turned, it cannot get looſe ; another advantage is, that the clamp may be reverſed, or turned the other way, and then the ſcrew can be employed to hold the wood between *z*, and the claws, *r*, of the oppoſite ſide of the carriage. By theſe means the bench will hold a large piece of wood of the full width of the bench, or by introducing one of the clamps, 9, between each piece, it will hold as many narrow ones as will make up the width, and they will be all planed together to one ſurface.

The endleſs chain H, which gives motion to the carriages, is connected with them by means of a piece of wood H, *fig.* 9, projecting down from it, and divided into two halves, between which the chain can be clamped or jambed faſt when they are drawn together by a ſcrew 6 ; therefore, by relieving this ſcrew, the two halves open ſo much, as to permit the chain to ſlide freely between them ; in this caſe the carriage will ſtand ſtill. This expedient is uſed when it is required to have one carriage diſengaged, for, in general, both are uſed together, in the following manner ; ſuppoſe both carriages at the ends of their reſpective rails, the wood is laid upon them, and by the ſcrew 6, which is turned with a winch, it is clamped faſt on the chain. If the wood is winding, or irregular, it is made up at firſt by wedges, till its upper ſurface is parallel to the bench, and it is then fixed by the ſcrews *l* ; the carriages are then engaged with the chain, by turning the handle of the ſcrew 6, which for that purpoſe comes to the outſide. Next the cock O is turned one way or the other, to raiſe or lower the cutter, till the gauge, *p*, ſhews it to be at the thickneſs the ſtuff is to be planed to. All being thus prepared, the handle of the lever, T, is drawn ; this draws the ſtrap upon the live pulley *c*, and puts the machine in motion, and having acquired its full velocity, the ſame perſon turns the other cock N, and gently opens it ; this puts the carriages in motion, and he can, by regulating the handle of the cock, give it any velocity he wiſhes ; he can bring it up very quick, till the work comes under the cutters, and then move it very ſlowly, if much wood is to be reduced, or quicker when but little is to be taken off. In this manner the planing is performed from one end of the piece to the other, and the ſucceſſive ſtrokes of the cutters and planes follow each other ſo cloſely, as to leave an even ſurface, and with only ſuch very ſlight ſcores acroſs it, that the leaſt ſhaving of a ſmoothing plane afterwards finiſhes it, from the rougheſt and moſt irregular timber which can be found.

In 1803, Mr. Bevans obtained a patent for a machine which we have ſeen at work for planing (or *ſticking*, as the joiners term it) all kinds of mouldings or rebates, and ploughing grooves, as well as forming flat ſurfaces of ſmall breadth, which it does with very little labour : in this machine, theſe operations are performed by the planes commonly uſed for ſimilar purpoſes, with only ſuch alterations as are neceſſary to adapt them to the machinery by which they are put in motion with mechanical power inſtead of human labour ; they are to be uſed either ſingly, or combined together in any number, according to the width of the boards to be worked at once, and the nature of the work to be done, ſo as to plane up at one operation ſuch moulding as joiners work up by uſing ſeveral planes ſucceſſively for the different parts ; this is effected by a kind of frame or box, which admits of fixing any number of planes in it, ſide by ſide, and at any diſtance aſunder, to form the compound moulding required. The work is fixed faſt on a bench, and the box of planes is made to paſs over it, in the direction of its length, by a connecting rod communicating at one end with the box or frame containing the planes, and at the other end with machinery capable of affording a reciprocating motion.

This machinery conſiſts of a crank, whoſe radius muſt be nearly half the length of the required ſtroke, and muſt be regulated accordingly : this regulation is effected by the arm of the crank paſſing through a mortiſe in a ſtrong box, fixed on an axis, and ſliding in the ſaid box to any required length, where it muſt be fixed by ſtrong ſcrews, the axis being turned by manual exertion, by horſes, ſteam, water, or any other power, and having its motion regulated by a fly-wheel.

The planes are loaded, to keep them in contact with their work, by a long beam of wood, ſet up on end upon the ſides of the box, and connected therewith by being divided into two cheeks, which at the lower ſides are formed to an arc of a circle, and united to the box by chains, in the ſame manner as the beams of ſteam-engines are connected with their piſton-rods. The upper part of the beam is made to paſs always through one point by ſliding between friction-wheels, or otherwiſe in a tube hung on two pivots perpendicularly over the centre of the work, and at ſuch heights as may be moſt convenient for the length of the ſtroke required: the connecting-rod from the crank before mentioned is jointed to the upright beam, near its lower end, and by this means the motion is given to the box of planes, the chains and arches at the bottom allowing it in all poſitions to preſerve the plane horizontal. To guide the box of planes in a rectilinear motion, and alſo to bear them off when they have been reduced to the depth required, fences are uſed, which are irons ſliding perpendicularly in tubes or ſockets in the box or frame, and clipping a tongue, or ruler fixed in the direction of the required ſtroke, in the frame ſupporting the bench.

PLANISPHERE, a projection of the ſphere, and the ſeveral circles thereof, on a plane; as upon paper, or the like.

In this ſenſe, maps of the heavens and the earth, in which are exhibited the meridians, and other circles of the ſphere, are called planiſpheres. See Projection.

Planisphere is ſometimes alſo conſidered as an aſtronomical inſtrument, uſed in obſerving the motions of the heavenly bodies; conſiſting of a projection of the celeſtial ſphere upon a plane, repreſenting the ſtars, conſtellations, &c. in their proper ſituations, diſtances, &c. Such is the aſtrolabe, which is a common name for all ſuch projections.

In all planiſpheres, the eye is ſuppoſed to be a point viewing all the circles of the ſphere, and referring them to a plane on which the ſphere is as it were flattened. This plane is called the *plane of the projection*.

A perſpective plane is only a plane of projection placed between the eye and the object, ſo as to contain all the points which the ſeveral rays drawn from the object to the eye impreſs thereon. But in planiſpheres or aſtrolabes, the plane of the projection is placed beyond the object, which is the ſphere. The plane of the projection is always one of the circles of the ſphere.

Among the infinite number of planiſpheres which the different planes of projection, and the different poſitions of the eye, would furniſh, there are two or three that have been preferred to the reſt. Such are that of Ptolemy, where the plane of projection is parallel to the equator; that of Gemma Friſius, where the plane of projection is the colure, or ſolſtitial meridian, and the eye the pole of the meridian; that of John de Royas, a Spaniard, whoſe plane of projection is a meridian, and the eye placed in the axis of that meridian, at an infinite diſtance. This laſt is called the analemma.

The common defect of all theſe projections is, that they diſtort and alter the figure of the conſtellations, ſo that it is not eaſy to compare them with the heavens; and that the degrees in ſome places are ſo ſmall, that they afford no room for operation.

All theſe faults M. de la Hire has provided againſt in a new projection, or planiſphere; where it is propoſed the eye ſhall be ſo placed, as that the diviſions of the circles projected ſhall be ſenſibly equal in every part of the inſtrument. The plane of his projection is that of a meridian.

Planisphere, *Nautical.* See Nautical.

PLANITZ, in *Geography*, a town of Saxony, in the circle of Erzgebirg; three miles S. of Zwickau.

PLANK, a general name for all timber, excepting fir, which is from one inch and a half to four inches thick: if of leſs dimenſions it is called *board*.

Plank, *Garboard.* See Garboard.

Plank-*Hook*, is a pole with an iron-hook at its end, with which the navigators ſhift their runs or wheeling-planks, as occaſion requires.

Plank-*Piling*, the ſame with *Camp-ſheeting;* which ſee.

Plank-*Sheers*, or *Plan-Sheers*, the pieces of plank wrought horizontally over the heads of the timbers of the forecaſtle, quarter-deck, and round-houſe, for the purpoſe of covering the top of the ſide; hence ſometimes called *covering-boards*.

PLANKENBERG, in *Geography*, a town of Auſtria; four miles S.S.W. of Talla.

PLANKENSTEIN, a town of the duchy of Stiria; four miles S. of Windiſch Weiſtritz.

PLANKENWARD, a town of the duchy of Stiria; eight miles W. of Gratz.

PLANKING, in *Ship Building*, covering the timbers of a ſhip with plank; ſometimes quaintly called *ſkinning*.

PLANO-*Concave Glaſs*, or *Lens*. See Lens.

Plano-*Convex Glaſs*, or *Lens*. See Lens.

PLANSCHWITZ, in *Geography*, a town of Saxony, in the Vogtland; three miles W. of Oelſnitz.

PLANT, in *Botany*, *Gardening*, &c. See Plants.

Plant, *Burning thorny*, a ſpecies of *Euphorbia;* which ſee.

Plant, *Egg*, a ſpecies of *Solanum;* which ſee.

Plant, *Ice*. See Mesembryanthemum.

Plant, *Paraſitical*. See Parasite.

Plant, *Senſitive*, is the Engliſh name of a diſtinct genus of plants, called by botaniſts *Mimoſa;* which ſee.

Plant, *Baſtard ſenſitive*. See Æschynomene.

Plant, *To*, in *Military Language*, is to place or fix, as, *e.g.* to plant a ſtandard. It likewiſe ſignifies to arrange different pieces of ordnance for the purpoſe of doing execution againſt the enemy or his works; as, *e.g.* to plant a battery.

PLANTA, in *Anatomy*, the loweſt part, or ſole of the foot of a man, comprehended between the tarſus and the toes.

PLANTAGENET, in *Hiſtory*, an addition, or ſurname, borne by many of our ancient kings.

The term plantagenet has given infinite perplexity to the critics and antiquaries, who could never ſettle its origin and etymology.

It is allowed that it firſt belonged to the houſe of Anjou, and was brought to the throne of England by Henry II. where his male poſterity preſerved it till the time of Henry VII., a ſpace of above four hundred years.

It is diſputed, who it was that firſt bore the name. Moſt of our Engliſh authors conclude, that our Henry II. inherited it from his father Geoffrey V., earl of Anjou, ſon of Fulk V., king of Jeruſalem, who died in 1144. This Geoffrey they will have the firſt of the name; and our Henry II. the iſſue of Geoffrey, by Maud, only daughter of Henry I. the ſecond.

Yet Manege will not allow Geoffrey to have borne the name; and adds, that, in effect, the old annaliſt of Anjou, J. Bourdigne, never calls him ſo. The firſt, Manege adds, to whom he gives the appellation, is Geoffrey, third ſon of this Geoffrey V.

Yet muſt the name be much more ancient than either of theſe princes, if what Skinner ſays of its origin and etymology be true. That author tells us, that the houſe of Anjeu derived the name from a prince thereof, who, having killed his brother to enjoy his principality, took to repentance, and made a voyage to the Holy Land to expiate his crime; diſciplining himſelf every night with a rod made of the plant genêt, geniſta, broom; whence he became nicknamed *Planta-genêt.*

Now it is certain that our Geoffrey made the tour of Jeruſalem; but then he did not kill his brother, nor did he go thither out of penance, but to aſſiſt king Amauris his brother. Who then ſhould this prince of the houſe of Anjou be? Was it Fulk IV? It is true he diſpoſſeſſed his elder brother Geoffrey, and put him in priſon; but he did not kill him; nay, Bourdigne obſerves, he was even releaſed from the ſame priſon by his ſon Geoffrey V., already mentioned.

Farther; this Fulk did make a journey to Jeruſalem; and that, too, partly out of a penitental view: we are aſſured, by Bourdigne, he did it out of apprehenſion of the judgments of God, and eternal damnation, for the great effuſion of Chriſtian blood in the many mortal battles he had been in. The annaliſt alſo adds, that he made a ſecond voyage; but it was to return God thanks for his mercies, &c.; to which we may add, that Fulk was never called Plantagenet; ſo that what Skinner advances appears to be a fable.

There is another common opinion, which appears no better founded; and it is this: that the name Plantagenet was common to all the princes of the houſe of Anjou after Geoffrey V., whereas, in fact, the name was only given to a few, and that, as it ſhould ſeem, to diſtinguiſh them from the reſt. Thus Bourdigne never applies it to any but the third ſon of Geoffrey V. and diſtinguiſhes him, by this appellation, from the other princes of the ſame family. Though it is certain that it was likewiſe given to the elder brother, Henry of England, as before obſerved.

PLANTAGINELLA, in *Botany*, is Vaillant's name for the *Limoſella*; ſee that article.

PLANTAGINES, the ſecond order of Juſſieu's ſeventh claſs, for the characters of which claſs ſee NYCTAGINES. The *Plantagines*, or *Plantagineæ*, as Juſſieu now terms them, in which he is followed by Mr. Brown, Prodr. Nov. Holl. v. 1. 423, are thus defined.

Calyx moſtly in four deep ſegments. *Tube* petal-like, contracted at the ſummit, and generally four-cleft, reſembling a *corolla*, but withering and not deciduous, inferior. (This "*tube*" is the Linnæan *corolla*.) *Stamens* four; their filaments long, prominent, inferted into the bottom of the "tube." *Germen* ſolitary; *ſtyle* one; *ſtigma* ſimple. *Capſule* divided circularly, of one or two cells, with one or more ſeeds in each cell. *Periſperm* (or *albumen*) none. *Plants* herbaceous. *Sexes* ſometimes in diſtinct individuals.

Juſſieu's genera of this order are *Pſyllium*, *Plantago*, and *Littorella*. The two firſt are combined by Linnæus, as well as by Decandolle and Brown. The latter author deſcribes an albumen of the ſhape of the ſeed, and of a denſely fleſhy texture. He remarks that the analogy between the ſuppoſed *corolla* of the *Plantagineæ* and the membranous tube, which connects the *ſtamens*, in the neighbouring order of *Amaranthaceæ*, or *Amaranthi*, is weakened by the preſence of the ſame part in the female flower of *Littorella*, a monoecious genus. We would obſerve however, though by no means inclined to invalidate the opinion of the part in queſtion being a real *corolla*, that barren filaments are often found in female flowers, and therefore any other organ relating to the *ſtamens*, may likewiſe be preſent in ſuch, while the *ſtamens* themſelves are abſent. See LITTORELLA and PLANTAGO.

PLANTAGO, the herb Plantain, ſeems moſt probably to have been ſo named in ancient times, either from its reſemblance to the ſole of the foot, *planta*, in flatneſs, breadth, and lines or furrows; or from the depreſſed trodden appearance of ſome of the moſt common ſpecies, particularly *P. media.* Such is nearly the explanation of Ambroſinus, Ray, and the lexicographers. Linnæus, in Phil. Bot. 167, has "*Plantago, planta tangenda.*" "A bold etymology," ſays De Theis, who, nevertheleſs, leaves as he finds this derivation, without ſearching further. Linn. Gen. 57. Schreb. 77. Willd. Sp. Pl. v. 1. 641. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 182. Prodr. Fl. Græc. Sibth. v. 1. 99. Brown. Prodr. Nov. Holl. v. 1. 424. Purſh v. 1. 98. Ait. Hort. Kew. v. 1. 250. Juſſ. 90. Tourn. t. 48. Lamarck Illuſtr. t. 85. Gærtn. t. 51. (Coronopus; Tourn. t. 49. Pſyllium; Tourn. t. 49. Juſſ. 90.)—Claſs and order, *Tetrandria Monogynia.* Nat. Ord. *Plantagines*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in four deep erect ſegments, ſhort, permanent. *Cor.* of one petal, membranous, permanent, withering; tube ſwelling in the middle; limb depreſſed, in four deep, ovate, acute ſegments. *Stam.* Filaments four, capillary, erect, extremely long, inſerted into the tube, alternate with the ſegments of the limb; *Brown;* anthers rather oblong, moſtly beaked or creſted, incumbent. *Piſt.* Germen ſuperior, ovate; ſtyle thread-ſhaped, half the length of the ſtamens, ſtigma ſimple, acute. *Peric.* Capſule ovate, ſomewhat membranous, of two or four cells, burſting by a tranſverſe circular fiſſure, the partition at length becoming unconnected. *Seeds* ſeveral, oblong, convex on one ſide, concave on the other.

Obſ. In ſome ſpecies the calyx is equal, in others unequal. Mr. Brown remarks that *P. Coronopus* has four cells to the capſule, with one ſeed in each cell. Gærtner, without mentioning the number of cells, ſays there are four ſeeds in each cell, in that ſpecies. Tournefort made *Coronopus* a diſtinct genus, merely on account of the deep ſegments of the foliage. It is rather to be wiſhed that *Pſyllium* of authors could have been retained, as there are ſeveral ſpecies of that ſuppoſed genus, and their branched leafy habit is very different from what is uſual in *Plantago.* Juſſieu thought to diſtinguiſh *Pſyllium* by having ſolitary ſeeds, but the ſame is the caſe with many indubitable ſpecies of *Plantago*, as *P. Bellardi*, *cretica*, *media*, and others. For the difficulties attending the true nature of the corolla, ſee PLANTAGINES.

Eſſ. Ch. Calyx four-cleft. Corolla four-cleft, inferior, membranous; its limb reflexed. Stamens very long. Capſule with two cells, burſting all round.

The fourteenth edition of Linn. Syſt. Veg. enumerates twenty-four ſpecies of *Plantago;* Willdenow has thirty-three, to which one is to be added from the Prodr. Fl. Græc., four from Mr. Brown's Prodr. Nov. Holl., and five from Mr. Purſh's American Flora. The genus is divided into two very unequal ſections, of each of which we ſhall give ſome examples, particularly mentioning the five Britiſh ſpecies. The new ones all belong to the firſt ſection.

Sect. 1. *Stem none. Flower-ſtalks naked.* Thirty-ſix ſpecies in all.

P. *major.* Greater Plantain. Linn. Sp. Pl. 163. Willd. n. 1. Curt. Lond. faſc. 2. t. 11. Engl. Bot. t. 1558. Fl. Dan. t. 461. Camer. Epit. 261. (P. media; Matth. Valgr. v. 1. 435. P. latifolia; Ger. Em. 419.)—Leaves ovate, ſmoothiſh, ſomewhat toothed, with longiſh footſtalks. Stalk round. Flowers imbricated. Seeds numerous.

merous.—Common every where throughout Europe, as well as in North America, flowering at almoſt all ſeaſons, in mild weather. *Root* perennial, of many long fibres. *Leaves* radical, ſeveral, upright or ſpreading, on channelled ribbed *footſtalks*, ovate, broad, toothed or waved, nearly ſmooth, with ſeven or nine longitudinal ribs. *Stalks* ſeveral, erect, longer than the leaves, each bearing a denſe cylindrical *ſpike*, of innumerable crowded, ſmall, whitiſh *flowers*, with purple *anthers*. *Stigma* downy. *Capſule* elliptical, ſmall, each cell containing ſeveral *ſeeds*, which are the food of ſmall birds, and are often given to thoſe kept in cages. This ſpecies is ſubject to many varieties, one of which we ſuſpect to be *P. craſſa*, Willd. n. 2.

P. *aſiatica*, Linn. Sp. Pl. 163, has the appearance of *major*, but is more ſlender, with ſcattered *flowers* and angular *ſtalks*.—*P. maxima*, Willd. n. 3. Jacq. Ic. Rar. t. 26, is intermediate between the foregoing and the following.

P. *media*. Hoary Plantain. Linn. Sp. Pl. 163. Willd. n. 5. Curt. Lond. faſc. 4. t. 14. Engl. Bot. t. 1559. Fl. Dan. t. 581. Camer. Epit. 262. (P. major ; Matth. Valgr. v. 1. 436. P. incana ; Ger. Em. 419.)—Leaves ovate, downy, depreſſed, with very ſhort footſtalks. Stalk round. Spike cylindrical. Seeds ſolitary.—Common on open hills and paſtures, where the ſoil is chalky or gravelly, flowering throughout ſummer. The broad depreſſed *leaves* are very conſpicuous, and conſidered as a great blemiſh by thoſe who are curious about their graſs-plats. A ſingle drop of oil of vitriol on the crown of each root is ſaid to prove the beſt and moſt certain mode of deſtroying theſe intruders. The *ſpikes* are much thicker and ſhorter than thoſe of *major*. The white *corolla*, pink *ſtamens*, and yellow *anthers*, make a far from inelegant appearance.

P. *lanceolata*. Ribwort Plantain. Linn. Sp. Pl. 164. Curt. Lond. faſc. 2. t. 10. Engl. Bot. t. 507. Mart. Ruſt. t. 67. (P. longa ; Matth. Valgr. v. 1. 437. P. quinquenervia ; Ger. Em. 422.)—Leaves lanceolate, entire, acute at each end. Spike ovate. Stalk angular.—Extremely frequent throughout Europe, in paſtures and waſte ground, flowering in ſummer. The more elongated, erect, narrower, greener *leaves*, with three or five ribs, and the ſhort *ſpike*, the *calyx* of whoſe *flowers* is black, *corolla* browniſh, and *anthers* white, mark the plant ſufficiently. The entire *leaves* afford a leſs ambiguous ſpecific diſtinction than the naked *ſpike*, by which Linnæus meant to diſcriminate between this and *P. Lagopus* ; for the *lanceolata* has a bracteated, though not a hairy *ſpike*, while *Lagopus* has a hairy one without *bracteas*.

P. *Lagopus*. Hare's foot Plantain. Linn. Sp. Pl. 165. Willd. n. 10. Ait. n. 10. Sm. Fl. Græc. Sibth. t. 144.—Leaves lanceolate, five-ribbed, diſtantly toothed. Spike ovate, hairy. Stalk round, clothed with upright hairs.—Native of the ſouth of Europe, in dry open places ; very common in Greece and the Archipelago.—*Root* perennial. Habit and ſize like the laſt, but the leaves are diſtinguiſhed by their neat, prominent, more or leſs diſtant teeth. The *ſpikes* are ſhorter, rounder, hairy and pale. *Anthers* more obtuſe.

P. *albicans*. Woolly Plantain. Linn. Sp. Pl. 165. Willd. n. 13. Ait. n. 12. Sm. Fl. Græc. Sibth. t. 145. (Holoſteum ſalamanticum ; Ger. Em. 423.)—Leaves lanceolate, oblique, waved, villous. Spike cylindrical, rather lax. Stalk round, longer than the leaves.—Native of Spain, the ſouth of France, the Peloponneſus, and ſome of the Greek iſlands, but not common. It is perennial, flowering in ſummer. The divided leafy crown of the *root* ſometimes aſſumes the appearance of ſhort ſtems. The *leaves* are long and narrow, ſpreading in an arched manner, not depreſſed ; their ſurface glaucous, beſprinkled with fine ſoft hairs. *Stalks* very hairy, eſpecially when they firſt ſpring forth. *Spikes* long and ſlender, the *flowers* rather diſtant. *Bracteas* and *calyx* green, edged with white, hairy at the back. *Corolla* brown. *Stamens* red. *Anthers* yellow, with a ſmall ſharp beak. *Style* hairy.

P. *alpina*. Alpine Plantain. Linn. Sp. Pl. 165. Willd. n. 15. Ait. n. 14. Jacq. Hort. Vind. v. 2. 58. t. 125.—Leaves linear, flat. Stalk round, hairy. Spike oblong, erect.—Native of the Alps of Switzerland and Auſtria. Dr. Sibthorp found it about the ſummit of the Bithynian Olympus. The *root* is perennial. *Leaves* long and narrow, with taper points ; the edges often fringed. *Stalks* hairy. *Spike* rather cylindrical than ovate. *Anthers* yellow, with a blunt beak. *Style* hairy. The Plantain noirâtre of Reynier, an alpine plant, with a ſhort ovate dark *ſpike*, often miſtaken for this, ſeems rather, as profeſſor Schrader has hinted to us, a variety of *lanceolata*.

P. *Bellardi*. Bellardian Plantain. Allion. Pedem. v. 1. 82. t. 85. f. 3. Willd. n. 16. Ait. n. 15. Sm. Fl. Græc. Sibth. t. 146. (Holoſteum, ſive Leontopodium creticum alterum ; Ger. Em. 424.)—Leaves linear-lanceolate, hairy, flat. Stalk round, villous. Spike cylindrical. Bracteas pointed.—Found in Spain, Italy, Barbary, and on the ſummit of the Bithynian Olympus, as ſoon as it is clear of ſnow. The *root* is annual, erroneouſly marked perennial in Prodr. Fl. Græc. *Leaves* numerous, ſpreading, either quite entire, or toothed near the point. *Stalks* rigid, erect or aſcending, two or three inches long, numerous, clothed with horizontal hairs. *Spike* thick, hairy, with prominent pointed *bracteas*. *Corolla* tawny, taper-pointed. *Anthers* yellow, with a pale two-lobed creſt as large as their cells.

P. *cretica*. Cretan Plantain. Linn. Sp. Pl. 165. Willd. n. 17. Ait. n. 16. Sm. Fl. Græc. Sibth. t. 147. (Holoſteum, ſive Leontopodium creticum ; Ger. Em. 424.)—Leaves linear, flat, hairy. Stalk woolly, very ſhort. Head of flowers roundiſh, drooping.—Native of Crete and Cyprus. A ſmall annual ſpecies, remarkable for its numerous, ſhort, deflexed, very hairy *ſtalks*. The *flowers* form a head, not a ſpike. The *corolla* is yellow, with a purple eye, its ſegments broader and ſhorter than in the laſt. *Anthers* ſimilar to *P. Bellardi*, except that their creſt appears to conſiſt of one lobe only.

P. *maritima*. Sea Plantain. Linn. Sp. Pl. 165. Willd. n. 19. Ait. n. 17. Purſh n. 10. Sm. Fl. Græc. Sibth. t. 148. Engl. Bot. t. 175. (Coronopus ; Ger. Em. 425. C. ſylveſtris ; Matth. Valgr. v. 1. 449. P. marina ; Ger. Em. 423.)—Leaves linear, channelled, nearly entire. Spike cylindrical, cloſe. Stalk round, longer than the leaves.—Native of muddy ſea-ſhores in Europe and North America, as well as of mountain rocks.—*Root* long, perennial. *Herb* extremely various in ſize and luxuriance. *Leaves* copious, ſpreading, linear, channelled, dark green, rather fleſhy, occaſionally hairy ; their margins either quite entire, or ſometimes beſet with a few irregular teeth. On mountains they are generally narroweſt and moſt entire. *Flower-ſtalks* few, aſcending, about twice as long as the foliage, rather hairy. *Spike* ſlender, of numerous crowded or imbricated *flowers*. *Corolla* whitiſh. *Anthers* with a little ſharp beak. *Style* downy. The ſtructure of the *flowers* moſt agrees with *P. albicans*. The ripe *fruit* we have never examined. This ſpecies being, like the Thrift, *Statice Armeria*, found on the loftieſt mountains, as well as on the ſea-ſhore, its ſmall alpine varieties have been taken for *alpina*,

alpina, or confounded with *ſubulata*, neither of which are really known to be natives of Britain.

P. *ſubulata*. Awl-leaved Plantain. Linn. Sp. Pl. 166. Willd. n. 20. Ait. n. 18. (Serpentina omnium minima; Lob. Ic. 439. f. 2. Coronopus ſive Serpentina minima; Ger. Em. 426.)—Leaves awl-ſhaped, triangular, ſtriated, rough-edged. Stalk round.—Native of the Swiſs alps and the Bithynian Olympus, as well as of the coaſts of the Mediterranean. Gerarde might have it in his garden, but we have never ſeen a garden ſpecimen of this ſpecies. Its *root* is perennial, running down in one great cylindrical body to the depth of a foot, or more, and divided at the crown into many ſhort leafy tufts. The *leaves* are very copious, from one to three inches long, readily known by their narrow, linear, acute, triangular form, and rough edges. *Flower-ſtalks* rather ſtout, hairy, not numerous. *Spikes* cylindrical, not always perfectly cloſe, various in length, and number of *flowers*, which ſeem to reſemble thoſe of *P. maritima*, but we have not been able to inveſtigate their *anthers*. The *bracteas* are hairy, as long, or longer, than the *calyx*.

P. *gentianoides*. Gentian-leaved Plantain. Prodr. Fl. Græc. n. 355.—Very ſmooth. Leaves ovate, three-ribbed, ſomewhat waved. Stalk round. Bracteas ovate, naked, ſhorter than the calyx.—Gathered by Dr. Sibthorp on mount Olympus, with the preceding. *Root* perennial, thick. *Leaves* very like *Gentiana acaulis*. *Stalks* three or four inches high, quite ſmooth and naked. *Spike* cylindrical, ſlender, ſcarcely an inch long, perfectly ſmooth in every part. *Bracteas*, as well as the *calyx*, obtuſe and pointleſs.

P. *varia*. Variable New-Holland Plantain. Brown n. 1.—Hairy. Leaves lanceolate, three-ribbed, toothed; woolly, as well as the ſtalks, at the bottom. Spike many-flowered.—Native of various parts of New Holland without the tropic. *Brown*. It was ſent us from Port Jackſon, in 1793, by Dr. White. The *leaves* are three or four inches long, from half an inch to an inch wide, moſt tapering towards the baſe, or *footſtalk*, which laſt is variable in length; both ſides are clothed with denſe ſhort pubeſcence, and marked with three, occaſionally five, longitudinal ribs; margin often beſet with diſtant, very large and dilated, almoſt ovate, teeth, ſometimes with obſolete ones, or none at all. *Flower-ſtalks* taller than the leaves, at leaſt when full-grown, hairy, round, woolly at the baſe. *Spike* cylindrical, hairy, of rather numerous, but ſometimes diſtant, *flowers*. *Bracteas* ovate, concave, rather ſmaller than the *calyx*. Segments of the *corolla* rounded, or broad-ovate. *Style* nearly ſmooth. This ſpecies ſeems in many points akin to *albicans*, and to *Serraria* and its allies, but very diſtinct, as a ſpecies, from all of them.

P. *debilis*. Weak New-Holland Plantain. Br. n. 2.—Leaves lanceolate, toothed or entire, three-ribbed, flaccid; beardleſs, as well as the thread-ſhaped flower-ſtalk, at the baſe. Lower flowers of the ſpike ſcattered.—Found by Mr. Brown at Port Jackſon, New South Wales. Nearly akin to the foregoing.

P. *hiſpida*. Hiſpid New-Holland Plantain. Br. n. 3. —"Hairy and hoary. Leaves linear-lanceolate, toothed; beardleſs, as well as the flower-ſtalk, at their baſe. Spike of many imbricated flowers."—Native of the ſouth coaſt of New Holland. *Br.*

P. *carnoſa*. Fleſhy New-Holland Plantain. Br. n. 4.—"Very ſmooth. Leaves lanceolate, deeply toothed, ſomewhat fleſhy; naked, as well as the flower-ſtalk, at their baſe. Flowers from one to three."—Native of the iſland of Van Diemen. *Br.*

P. *Serraria*. Saw-leaved Plantain. Linn. Sp. Pl. 166. Willd. n. 23. Ait. n. 20. (P. apula laciniata bulboſa; Column. Ecphr. v. 1. 258. t. 259. P. anguſtifolia ſerrata hiſpanica; Barrel. Ic. t. 749.)—Leaves lanceolate, five-ribbed, with awl-ſhaped tooth-like ſerratures. Stalk round. Spike elongated, ſlender, cylindrical, imbricated. Bracteas taper-pointed.—Native of Italy, Barbary, Zante, and various parts of the Mediterranean and Archipelago. *Root* perennial, thick, ſo as to aſſume a bulbous aſpect. *Leaves* numerous, acute, hairy, diſtinguiſhed by their long, parallel, almoſt pectinate, teeth, in which they eſſentially differ from the broad rounded imbricated teeth of *P. macrorrhiza* of Vahl, Willd. n. 22. The *ſpikes* alſo are very much longer and more ſlender than thoſe of that ſpecies, compoſed of innumerable crowded *flowers*, and longiſh taper-pointed *bracteas*.

P. *Coronopus*. Buck's-horn Plantain. Linn. Sp. Pl. 166. Willd. n. 24. Ait. n. 21. Fl. Dan. t. 272. Engl. Bot. t. 892. (Coronopus; Matth. Valgr. v. 1. 448. Cornu cervinum; Ger. Em. 427.)—Leaves linear, in many pinnate ſegments. Stalk round. Anthers with a lanceolate creſt. Capſule of four cells. Common in gravelly ſoils, and on ſandy ſea-ſhores, throughout Europe. It is annual, flowering with us all ſummer long, and conſpicuous for its depreſſed pinnatifid *leaves*, ſpreading, cloſe to the ground, in a ſtar-like form, whence originated one of its names, Star of the Earth. Some of the ſtarved maritime varieties have more fleſhy, and nearly undivided, *leaves*. *Spikes* various in length, pale. *Bracteas* pointed. *Anthers* tipped with a lanceolate membrane, or creſt, akin to what is ſeen in *P. cretica*, Willd. n. 17. *Style* long, very hairy.

P. *Cornuti*, Jacq. Miſc. v. 2. 351. Ic. Rar. t. 27. Willd. n. 26. Ait. n. 23, appears to us but a luxuriant variety of the laſt; its *ſtamens* indeed are ſhorter, and *ſtyle* rather longer; but there is hardly a diſtinct ſpecific character to be diſcerned. It is pity that Jacquin did not examine the cells of the *capſule*. He merely ſays "fructus congenerum," which conveys nothing, in this caſe, that we want to know. If he had ſpecified that the part in queſtion agreed with all the reſt of the genus, except *Coronopus*, it would have been deciſive.

P. *Loeflingii*. Narrow Annual Plantain. Linn. Sp. Pl. 166. Willd. n. 25. Ait. n. 22. Jacq. Hort. Vind. v. 2. t. 126.—Leaves linear, with ſlender diſtant teeth. Stalk round. Spike ovate. Bracteas obtuſe, with an orbicular membranous border.—Native of hills, and the borders of fields, in Spain and the ſouth of France. No ſpecies is more diſtinct, or has been more miſtaken, owing to Hudſon and Linnæus having referred to this the toothed variety of *P. maritima*, figured in Petiver's Engliſh Herbal, t. 4. f. 9, and Ger. Em. 423. The *root* of *P. Loeflingii* is ſmall, tapering and annual. *Plant* extremely variable in luxuriance. *Leaves* upright or ſpreading, linear, acute, very narrow, beſet with fine, diſtant, taper teeth. *Stalks* ſpreading, thread-ſhaped, hairy, uſually ſhorter than the foliage. *Spike* of few flowers, ovate, or almoſt capitate. *Bracteas* orbicular, concave, pointleſs, formed of a broad membrane, with a thick green keel. The *anthers* ſeem to have a membranous tip, but we have not ſeen them freſh, and Jacquin's figure has no diſſected or magnified parts. He deſcribes the *capſule* very accurately, of two cells, with one *ſeed* in each.

Sect. 2. *With a leafy ſtem.* Seven reputed ſpecies.

P. *amplexicaulis*, the firſt of theſe, Cavan. Ic. t. 125, appears a very doubtful ſpecies, perhaps allied to *albicans*, and certainly not more truly cauleſcent than ſome appearances of that plant. It is perhaps P. anguſtifolia lanuginoſa incana, Barrel. Ic. t. 750; a ſpecimen of which, from the ſouth of France, we have referred to *albicans*.

P. *Pſyllium*. Flea-bane Plantain. Linn. Sp. Pl. 167. Willd. n. 28. Ait. n. 25. Sm. Fl. Græc. Sibth. t. 149. Ehrh. Pl. Off. 271.—Stem branched, herbaceous. Leaves ſomewhat toothed, recurved. Heads leafleſs. Bracteas uniform, lanceolate, obtuſe.—Native of cultivated fields, vineyards, &c. in the ſouth of Europe, very common in Greece, being doubtleſs the real ψυλλιον of Dioſcorides. The *root* is annual. *Stem* round, downy, glutinous, leafy; if ſlightly branched, erect; if much ſubdivided, decumbent. *Leaves* oppoſite, ſeſſile, an inch or inch and half long, ſpreading, rather curved downward, linear-lanceolate, narrow, acute, flat, rough; tapering and entire at the baſe; ſparingly but ſtrongly toothed upwards. *Flower-ſtalks* axillary, ſolitary, round, rough, about the length of the leaves. *Heads* ovate, ſolitary, of ſeveral crowded *flowers*. *Bracteas* ovato-lanceolate, concave, blunt, rough at the keel, all uniform, and nearly of equal ſize. *Calyx* about as long as the bracteas, rough, obtuſe. *Corolla* pale browniſh-yellow, with pointed ſegments. *Anthers* with a ſhort membranous point. *Style* hairy. *Capſule* obtuſe, compreſſed, its circular fiſſure near the baſe. *Seeds* ſolitary in each cell. P. *Pſyllium*, Bulliard t. 363, in its large leafy *bracteas* and entire *leaves*, agrees beſt with *indica* of Linnæus.

P. *Cynops*. Shrubby Plantain. Linn. Sp. Pl. 167. Willd. n. 32. Ait. n. 29. (Pſyllium majus ſupinum; Bauh. Hiſt. v. 3. 513. Pſ. ſempervirens; Ger. Em. 587. Pſ. alterum; Matth. Valgr. v. 2. 414.)—Stem branched, ſhrubby. Leaves entire, thread-ſhaped, ſtraight. Bracteas orbicular, with linear points, much longer than the flowers.—Native of Provence, Italy, Switzerland and Bithynia. The *ſtem* is ſhrubby, and certainly perennial in our gardens, or rather greenhouſes. *Branches* and *heads* purpliſh; the latter diſtinguiſhed by their rounded membranous-edged *bracteas*, with linear rough points.

The cuts of old authors, given for the true *Pſyllium*, as Ger. Em. 587. f. 1. Matth. Valgr. v. 2. 413, and the modern plate of Bulliard, t. 363, having large *bracteas* under the heads of *flowers*, bear ſome reſemblance to *P. Cynops*, but better agree with the *indica*, Linn. Sp. Pl. 167, and are poſſibly, like that, but varieties of *Pſyllium*. The *afra*, Linn. Sp. Pl. 168, appears to us much more clearly a luxuriant, biennial, and ſomewhat ſhrubby, variety of *Pſyllium*, with which it preciſely agrees in every thing, but the more ſtout and ſhrubby habit of the *ſtem*.

P. *ſquarroſa*. Leafy-ſpiked Plantain. Willd. n. 29. Ait. n. 26. (P. ægyptiaca; Jacq. Ic. Rar. t. 28.)—Stem herbaceous, branched, diffuſe. Leaves linear, entire. Heads oblong. Bracteas leafy, elongated, rough.—Native of Egypt. This is a very diſtinct annual ſpecies, whoſe long recurved *bracteas* are rough to the edge, ſcarcely at all membranous. The *ſtyle* is rough, much longer and thicker, and perhaps more perfect, in ſome flowers than in others.

PLANTAGO *Lanceolata*, ribwort plantain or ribgraſs, in *Agriculture*, has a perennial root, which, when old, appears as if bitten off at the end. The leaves are all from the root, truly lanceolate, diſtinguiſhed by five (ſometimes three or ſeven) prominent ribs, pointed, entire, or ſometimes having a few teeth near the baſe. According to Withering, in maritime ſituations they are toothed all along the edges. They are of a dark green, moſtly hairy beneath, taper at the baſe into a long flat footſtalk, ribbed like the leaf itſelf, and at their inſertion are inveſted with long white woolly hair ſpringing from the crown of the root. The ſcapes or flowering-ſtalks upright, longer than the leaves, from among which they ſpring; they are clothed at the baſe with the ſame kind of hair, and upwards are ſmoothiſh, round, with five deep furrows, ſlightly twiſted, and terminated by a ſhort ovate ſpike, imbricated with black ſcales, and enlivened with the prominent cream-coloured anthers, in its more advanced ſtate. A ſpike will ſometimes contain one hundred and thirty ſmall flowers crowded cloſe together, with an ovate pointed ſcale or bractea at the baſe of each. The capſule contains two oblong ſhining ſeeds, of an amber colour, in each cell. The ſtalks continue to grow after the flowering is over, and ſometimes ſhoot out to the length of two feet more. When it grows in meadows, the leaves are erect and drawn up: but in a dry barren ſoil they are ſhorter, broader, and more ſpread on the ground. It grows ſpontaneouſly in dry paſtures and other places, where it is often left untouched by cattle, to feed ſmall birds with the copious produce of its ſeeds. It has often been conſidered as a weed, occupying the room of graſſes, and other uſeful herbs; but has lately been introduced into culture as a good food for ſheep, or to be made into hay for cattle in general. Haller has attributed the richneſs of the milk in the alpine dairies, in ſome meaſure, to this plant. And it has been remarked by Linnæus, that it has been eaten by horſes, ſheep, and goats, but that cows refuſe it. Sheep, however, will eat it either green or dried, provided it be well gotten; but it does not anſwer for paſturage, without a mixture of clover or graſſes, according to ſome cultivators. Withering ſuggeſts that the total abſence of this plant, in marſhy lands, is a certain criterion of their wretched quality. In proportion as ſuch ſoils are improved by draining, it will flouriſh and abound. But others have ſuggeſted, that in this climate the produce of this plant is not a criterion of excellence in ſoil, but merely of its dryneſs. But though botaniſts do not ſpeak favourably of this plant as a paſture or meadow herb, practical farmers hold it in a degree of eſteem. And it has been aſſerted by Mr. Zappa of Milan, that it grows ſpontaneouſly in every meadow of Lombardy, eſpecially in thoſe which are irrigated; that it vegetates early, flowers at the beginning of May, ripens in five weeks, and is cut with the *poa trivialis*; that the height of the leaves is about one foot, and of the ſtalk a foot and a half; that it multiplies itſelf much by the ſeed and a little by the roots, which it continues for ſome time to reproduce; that it is eaten heartily by every ſort of cattle, and in particular by the cows in graſs, and the cows like it moſt in May, having great influence on the milk; that the hay is eaten more voraciouſly by cows, and has on them great influence in the fleſh; in ſhort, that it is one of the beſt plants either for the milk or the fleſh. Where kept well fed down by ſtock, there can be no doubt of its being a good and nouriſhing plant for both cattle and ſheep ſtock.

And Mr. Young ſtates, that he had long before recommended this plant for laying land to graſs, and ſowed it on his own farm. At the ſame time he thinks it extravagant to propoſe dandelion and ſorrel as plants proper for a cow paſture; and conjectures that thoſe plants being found among good ones, have qualities given them which do not properly belong to them; he is likewiſe inclined to make the ſame conjecture in reſpect to narrow-leaved plantain, ribwort, or rib-graſs, and ſhould even have preferred dandelion and ſorrel to it: but he is cautious of oppoſing theory to practice. But Dr. Anderſon contends that narrow-leaved plantain or rib-graſs is well liked by horſes and cattle, and yields a very good crop upon rich ground tending to dampneſs, if it is at the ſame time ſoft and ſpongy; but that upon any ſoil which has a tendency to bind, or upon dry ground, it furniſhes a very ſcanty crop. And it has been made uſe of in ſome parts of Yorkſhire as a ſummer graſs. As an article of paſturage for cattle and ſheep, it is there in high eſteem; it is not, however, well eaten by horſes; and as an article of hay it is held to be detrimental to the crop; retaining its ſap an unuſual length of time; and when fully dry falls into a ſmall compaſs, or is broken into fragments, and left behind in the field. One advantage of this plant is, that its ſeeds may be eaſily procured genuine. A ſmall proportion of it may be eligible: it has now ſtood the teſt of twenty years eſtabliſhed practice, and ſeems to be ſtill in good eſtimation even among farmers that are the moſt attentive in graſs huſbandry. It has been ſtated by Mr. Marſhall that he made a trial of it in Norfolk, as a ſubſtitute for clover, but gained no credit from the experiment: on which it has been obſerved that the fact is, horſes do not affect it, and they are the principal conſumers of the clover crop in that county. It is a plant that varies much in ſize as well as in the breadth of the leaves, &c. The narrow leaves have only three ribs. The ſpike is ſometimes ſurrounded by large leaves, inſtead of the uſual ſmall bracteas: it ſometimes becomes an abortive panicle: and it is found with two or three heads. Its qualities ſeem to be nearly the ſame with thoſe of the following; and it is more uſed than that by the common people in ſome places.

It is probable that the ſort which has been termed graſs-leaved plantain (*tenuifolia*) by Dr. Anderſon, is only a variety of this. See Rib Grass.

Plantago, *Major*, the great plantain. This affords more ſeeds than the former, and is perennial. The root when old is the thickneſs of the thumb, præmorſe or ſtumped, laying ſtrong hold of the earth by its fibres, which ſtrike deeply, and are whitiſh. The leaves petioled, ſeven-ribbed, or ſometimes nine-ribbed, ſmooth, but ſomewhat hairy when young, about a hand in length, often remotely toothed about the edge. The petioles long, convex on the under ſide, concave above, each forming a kind of ſheath at its baſe. The ſcapes upright, pubeſcent, longer than the leaves. The ſpikes cylindrical, very long, linear, compoſed of many cloſely imbricate flowers, under each of which is a lanceolate concave bractea. This is likewiſe a plant, according to Mr. Zappa, that may be uſeful as a cattle food. It grows not only along the roads, near dunghills, in damp and fat places, but in irrigated meadows alſo of every diſtrict in Lombardy, though more near the borders than in the centre of them; it vegetates later than the above, flowering towards the end of May; the leaf is ſix inches long, and the ſtalk almoſt a foot high; notwithſtanding it is not tender, every ſort of cattle like it, and cows are as fond of it as of the above ſort. It has alſo been noticed by Mr. Curtis that cattle in general appear very ready to eat the leaves. Sheep, goats, and ſwine, alſo eat it well. But it is not in ſo much eſteem among the farmers as the narrow-leaved ſort. See Rib Grass.

Plantago, in the *Materia Medica*. The leaves of the plantago major, common great plantain, or weybread, have a weak herbaceous ſmell, and an auſtere bitteriſh ſubſaline taſte, and their qualities are ſaid to be refrigerant, attenuating, ſubſtyptic, and diuretic. Plantago was formerly reckoned among the moſt efficacious of vulnerary herbs; and by the peaſants the leaves are now commonly applied to freſh wounds, and cutaneous ſores. Inwardly they have been uſed in phthiſical complaints, ſpitting of blood, and in various fluxes, both alvine and hæmorrhagic. The ſeeds, however, ſeem to be better adapted to relieve pulmonary diſeaſes than the leaves, as they are extremely mucilaginous. The roots have alſo been recommended for the cure of certain intermittents, and from the experience of Bergius, not undeſervedly. An ounce or two of the expreſſed juice, or the like quantity of a ſtrong infuſion of plantain, may be given for a doſe; in agues the doſe ſhould be double this quantity, and taken at the commencement of the fit. Plantain has been alleged to be a cure for the bite of the rattle-ſnake; but for this there is probably little foundation, although it is one of the principal ingredients in the remedy of the Negro Cæſar, for the diſcovery of which he received a conſiderable reward from the aſſembly of South Carolina. Woodv. Med. Bot.

PLANTAIN, or Plantane, in *Botany*, &c. See Plantago.

Plantain, *Water*. See Alisma.

Plantain, *Leſſer Water*. See Limosella.

Plantain *Shot*. See Canna.

Plantain, *Star-headed Water*, *Damaſonium*, is a ſpecies of the *Aliſma*; which ſee.

Plantain-*Tree*. See Musa.

Plantain *Iſland*, in *Geography*, a ſmall iſland in the Atlantic, near the coaſt of Africa N. lat. 7° 54′. W. long. 12° 18′.

PLANTANOCEPHALUS, in *Botany*. See Cephalanthus.

PLANTARIS, in *Anatomy*, a ſmall muſcle ſituated in the calf of the leg. See Gastrocnemius.

PLANTATION, in the *Iſlands and Continent of America*, a ſpot of ground which ſome planter, or perſon arrived in a new colony, cultivates and tills for his own uſe.

Plantations, or colonies in diſtant countries, are either ſuch where the lands are claimed by right of occupancy only, by finding them deſart and uncultivated, and peopling them from the mother country; or where, when already cultivated, they have been either gained by conqueſt, or ceded to us by treaties. See Colony.

But there is a difference between theſe two ſpecies of colonies, with reſpect to the laws by which they are bound. For it hath been held (Salk. 411. 666.) that if the uninhabited country be diſcovered and planted by Engliſh ſubjects, all the Engliſh laws then in being, which are the birthright of every ſubject, are immediately there in force. But this muſt be underſtood with very many and very great reſtrictions. Such coloniſts carry with them only ſo much of the Engliſh law as is applicable to their own ſituation, and the condition of an infant colony; ſuch, for inſtance, as the general rules of inheritance, and of protection from perſonal injuries. But in conquered or ceded countries, that have already laws of their own, the king may indeed alter and change thoſe laws; but, till he actually does change them, the ancient laws of the country remain, unleſs ſuch as are againſt the law of God, as in the caſe of an infidel country. 7 Rep. 17. Calvin's caſe. Show. Parl. cap. 31. See Charter-*Governments*.

Plantations *and Trade*, *Board of*. See Board.

Plantation, in *Gardening*, a certain collection of different kinds of trees or ſhrubs, which are cultivated either in nurſery grounds or other places, in order to be raiſed and protected to proper and ſuitable ſtates of growth for being afterwards planted out in particular ſituations; or which are planted out for ornamental or other purpoſes, generally in the way of beautifying portions of ground or particular ſpots ſurrounding or lying about country reſidences, &c. The former are commonly denominated nurſery plantations.

As moſt plantations of the latter ſort, beſides the ornament which they give, afford conſiderable improvement to the places where they are formed, they ſhould, of courſe, be more fully attended to and regarded, in all caſes and ſituations wherever there is any ſort of want or deficiency of either variety or beauty. This is ſtill further deſireable, as they have alſo an excellent effect in all ſuch ſituations, by giving an idea of grandeur to them, and at the ſame time an air of cultivation and fertility.

In the forming of theſe, as well as other kinds of plantations, it is conſtantly neceſſary to ſelect and provide the plants with a view to the nature of the ſoils, and the peculiarity of the expoſures in which they are to be placed.

The plants, for the moſt part, after being firſt raiſed from the ſeeds, or by ſome other proper means, and having a little growth, are tranſplanted or removed into nurſery grounds or plantations, where they remain for two, three, or more years, according to their different natures, and the uſes for which they are intended; when they are, in general, ready, and in the beſt order for being planted out in different ſorts of plantations, as larger plants are commonly found not to ſucceed ſo well. Larger plants may, however, be occaſionally found neceſſary, eſpecially in particular caſes of ornamental planting, and for producing blinds, covers, and ſhades, in ſome peculiar ſituations; but for all common purpoſes, in almoſt all caſes of this ſort of work, young plants, which have been raiſed in, and procured from, the nurſery plantations, and which are from about two or three to five or ſix feet in their growth, are moſtly in the beſt and moſt proper ſtates to be employed, and eſpecially in all ſituations where timber is in any way an object. The plants ſhould alſo be choſen as nearly of equal growth as poſſible for the ſame plantation.

For all ordinary purpoſes of planting, a ſmall portion of ground will be quite ſufficient for raiſing the young plants; but in all nurſery grounds of any extent, there are moſtly pretty large tracts ſet apart for the purpoſe of receiving plantations of theſe kinds, where a great many different ſorts of trees and ſhrubs of various growths are kept, being ſet out in rows at different diſtances, according to their ages and other circumſtances. See NURSERY.

The young plants in all theſe nurſery plantations ſhould be kept clean and free from every ſort of obſtruction, by digging or hoeing frequently between the different rows, until they become of ſufficient growth for being ſet out in other ſituations.

In regard to the preparation of the ground before the making of the plantations, in all thoſe of the nurſery kind it is conſtantly dug or trenched over with the ſpade; and this is likewiſe ſometimes the caſe in forming thoſe of the ornamental or other deſcriptions; though frequently the plants are put in without, ſimply by digging ſeparate holes at ſuitable diſtances for the reception of each; or by forming ſlits or crevices for them by the point of the ſpade. The more fully, however, the land can be prepared previouſly to the plants being introduced, the better they will commonly ſucceed. Plantations are alſo occaſionally raiſed by ſowing the ſeeds of the different ſorts of plants, either in ſmall drills, or over the whole ſurface of the ground, after being made ready in the above manner, or without undergoing any ſuch preparation, but in the latter caſe the plants ſeldom thrive ſo well.

In preparing the land for nurſery plantations, a little manure is not unfrequently had recourſe to in digging it over; but for thoſe other kinds this is very rarely neceſſary.

In making all theſe ſorts of plantations, the moſt proper times for performing the buſineſs is in mild dry periods, either in the autumnal, or very early ſpring ſeaſons.

In the forming of every ſort of plantation where any kind of ornament is intended, as great a variety as poſſible of different ſorts of hardy trees and ſhrubs ſhould conſtantly be had recourſe to, ſuch as thoſe of the middling and more tall growths of both the kinds, which in the former or thoſe of the tree ſorts are uſually the oak, elm, aſh, beech, cheſnut, hornbeam, birch, alder, maple, ſycamore, plane, poplar, lime, walnut, wild cherry, mountain-aſh, larch, willow, hazel, &c.; and in the latter, or ſhrubby ſort, the pine, firs, cedar of Lebanon, holly, bay, laurel, yew, ever-green oak, box-tree, and ſome others. See DECIDUOUS, EVER-GREEN, and FOREST *Trees*.

In regard to the general diſpoſition of the plants, the deciduous and ever-green kinds may be planted in ſeparate compartments, or in mixture, and ſometimes the tree kinds by themſelves, ſome in running varying plantations, towards the boundaries of lawns, parks, paddocks, &c., others in avenues, groves, thickets, and clumps, variouſly diſpoſed in different parts; and ſometimes the trees and ſhrubs together, forming ſhrubberies, wilderneſſes, ſhady walks, and wood-works; placing thoſe of taller growth backward, and the lower in front; bordering the whole with the moſt beautiful flowering ſhrubs and ſhowy ever-greens, eſpecially next the principal walks and lawns, varying the form of all the ſeveral compartments, ſometimes by moderate ſweeps and curves outward and inward, of different dimenſions, other parts in long eaſy bends, varied projections and breaks, ſo as to diverſify the ſcene in imitation of natural plantations. The proper diſtances, in planting, may be from five or ten to fifteen or twenty feet: for example, the tall trees deſigned for continued plantations may be from ten to fifteen or twenty feet, varying the diſtance in different parts, according to light and ſhade, &c.; and thoſe in groves, where open, may be fifteen or twenty feet diſtance, and where cloſe ten or twelve; for thickets, five or ſix feet, or cloſer in particular places where a very dark ſhade or thick coverture of wood is required; and in clumps of trees, from five or ten to twenty feet between the trees in each clump, varying the diſtance occaſionally, according to growth, as alſo the ſorts and numbers of trees in each, from two or three, to five, ten, or more. The form of the clumps may ſometimes be triangular, at other times quadrangular, pentangular, &c., and ſome in curves, others in ſtraight lines, to cauſe the greater variety. And in ſhrubbery clumps, and wilderneſs compartments, where the trees and ſhrubs are employed promiſcuouſly, they may be planted from five to ten feet diſtance; the taller growths being placed backward eight or ten feet aſunder, placing the lower plants gradually forward according to their gradations, to the loweſt in front, as above, at four or five feet diſtance: and if the trees and ſhrubs of the plantations in general are diſpoſed ſomewhat in the quincunx way, they appear to the greater advantage, and produce a better effect in ſome inſtances.

Before the making of any of theſe ſorts of plantations, the grounds ſhould, in all caſes, be well incloſed in ſome manner or other, and the plants be afterwards kept properly cleaned, pruned, and thinned out, ſo as to take their full growths.

Mr. Loudon, in his Treatiſe on Country Reſidences, after noticing the great variety which exiſts in trees, ſhrubs, and all ſorts of wood, both in reſpect to beauty and utility, remarks, that all ornamental plantations may be divided into two kinds; namely, thoſe whoſe *grandeur* is the effect to be produced, and thoſe whoſe *variety* or *beauty* is the principal object. And it is aſſerted, that as grandeur depends more upon the whole than upon the parts, it may be produced where only one kind of tree is employed or made uſe of;

but that as variety depends upon the parts alone, many different kinds are neceſſary. This, it is contended, has given riſe to a moſt erroneous opinion and very pernicious practice among landſcape gardeners and planters. Imagining that variety is produced by mixture, their rule is to mix as many kinds together as they poſſibly can, and never to let two trees of the ſame ſpecies be ſeen at once. This is ſaid to be their recipe for variety in plantations; which they follow, as far as poſſible, in every arrangement of vegetables, from the parterre to the foreſt. But inſtead of affording variety, it is maintained that it, on the contrary, produces the moſt diſtracting incongruity. The eye, in examining the parts, finds no connection—no harmony—no relief—no repoſe of effect—no difference of compoſition, or change of character; or, if the ſurface of ſuch a plantation be looked upon from a diſtance, it is on account of the indiſcriminate mixture of forms, more dull and monotonous than if only one ſpecies of tree had been uſed. Its outline againſt the ſky is a mere unvaried zig-zag line; which, except in artificial plantations, is not to be found in the whole range of nature. It is further ſuppoſed, that this mixture is evidently produced by their ignorance of that which conſtitutes variety; for it does not, as they imagine, conſiſt in the diverſity of ſeparate parts, but "in the diverſity of their effects when combined together; in a difference of compoſition and character:" very different from the other is the effect of ſuch a variety; it relieves the eye and intereſts the mind, without fatiguing either.

Therefore, in forming a plantation with a view to variety, inſtead of ſelecting ſuch trees and ſhrubs as are of oppoſite character, thoſe differing in the ſlighteſt degree are in general much better adapted to the purpoſe. The upright ſpiry *form* of the larch, mixes very ill with the round head of the oak. But by chooſing trees of intermediate forms, and placing them in the interval between theſe extremes, a natural connection and gradation will be produced. By this means, with the ſtore of trees and ſhrubs which we poſſeſs, an endleſs ſource of variety in woody ſcenery may be had from the forms of trees and their modes of growth, independently of any other material of landſcape.

But there is another ſource of variety which ariſes from grouping, or the manner in which trees are diſpoſed, more than from the number of diſtinct ſpecies. And this is chiefly applicable to extenſive plantations where the general character is grandeur, as woods, groves, and foreſts. It is produced by mixing together tall and low growths; planting irregularly, ſometimes very cloſe, at other times very wide; by pruning ſo as to expoſe trunks, ſtems, or branches, in ſome places, and to conceal them in others, &c. Much of the effect alſo depends on the diverſity of age in the low growths, as well as the difference of magnitude and accidental form of the trees. This kind of variety, it is ſuppoſed, exiſts in the greateſt perfection in natural foreſts; and the true way to ſtudy its principles is, to obſerve in them the effects of time, accident, the browſing of cattle, the felling of timber, and other circumſtances. By this means we ſhall, it is imagined, be enabled to transfer the ſame effects, ſometimes by different and ſometimes by ſimilar methods, to artificial plantations. Natural foreſts cannot be too ſtrongly recommended to the examination of the ornamental planter. Almoſt every other operation of planting is mechanical; it is in this mode of grouping, and following the principles of nature, that the man of taſte will be diſtinguiſhed from the mere gardener. The effect of putting in practice the principles to be derived from ſuch a ſtudy may be ſeen, it is ſaid, in Mr. Price's woods at Foxley, which no man of taſte ever, it is ſuppoſed, ſaw without being filled with wonder and delight.

A ſtill further ſource of variety, which is independent of the modes of growth or the manner of diſpoſition, is in the *colour*. Therefore, in order to aſſiſt in the arrangement of a numerous collection of trees and ſhrubs, a knowledge of the harmony of tints is eſſentially neceſſary to the planter, and of very conſiderable importance to his ſucceſs in the buſineſs.

It may be thought, that the different tints of green in trees are diſtinctions too minute to be attended to for this purpoſe; but reflection and experience ſhew that they are of material conſequence in this ſort of ſcenery. Imagine, ſays the writer, two woods of equal and conſiderable extent,—the one compoſed of the yellow green of the weeping willow, the other of the dark green of the oak: how different muſt be the impreſſion received from each, though the general form and compoſition of both, at a diſtance, would appear in ſome meaſure the ſame! It is evident, that the effect of the different greens muſt be much more conſpicuous in ſcenes intended to be more minutely examined by the eye: how different even the green of the gooſebery-buſh and currant-tree when oppoſed to each other!

It it remarked, that the tints of trees may be conſidered in reſpect to their harmony with one another—with external ſcenery—their gradation—and their particular effects. The harmony of tints is ſuppoſed, in general, to be derived from the reſpective agreement, diſagreement, and deſtruction of particular kinds when mixed together; and that theſe harmonies, diſcords, and privations, will remain true, although the colours ſhould not be bright. The ſlighteſt tinge will have the effect. When weak colours that agree are placed near each other, they ſupport and give ſpirit to one another. A hawthorn hedge, among the green of paſture fields, has, it is aſſerted, the ſame dull green appearance; but when oppoſed to the brown of a ploughed field, it appears with peculiar ſpirit and force. And again, the ploughed field, were it not contraſted with the hedge or ſome object of a ſimilar colour, would appear dark and colourleſs; but oppoſed to the hedge, it appears of a rich brown. A Huntingdon willow, obſerved alone, it is maintained, appears green like any other tree; but, contraſted with an oak or a cheſnut, it approaches to white; and the oak again, by the contraſt, appears much darker than before. If plantations were arranged agreeably to theſe principles, the colours would, it is believed, at all times appear ſtriking and forcible; but from the oppoſite conduct, that of mixing all colours together, they are *annihilated, and their ſeparate effects deſtroyed*. In conſequence of this, it is frequently ſaid that *trees have no colour but green, except in autumn*, and that attention to theſe principles in their arrangement is frivolous. But nothing can ſhew greater ignorance of nature. Green is indeed the predominant colour of trees; but it is only in one or two of the ſummer months that it nearly abſorbs every other colour. All trees have their peculiar autumn and ſpring tints, which in midſummer are only weakened, not deſtroyed; and, whether it be not of greater importance to attend to the harmony of theſe tints, than to neglect it altogether, becauſe the effect would be in ſome degree loſt during a month or ſix weeks in ſummer, every man of taſte or ſenſe is left to judge. It is evident, that the *harmony of wood with landſcape* muſt depend upon the general principles that have been already mentioned. One principle of harmony is, that the general appearance of the wood planted about a manſion ſhould correſpond with the general appearance of the wood in the ſurrounding country:

if otherwiſe, the ſpace ſo planted will appear a formal ſpot in the general view. The ſame principle requires alſo, that in a ſcene where water is a prominent part, and has a tendency to make the landſcape too cold; trees of warm tints (by no means evergreens) ſhould be principally planted adjoining to it. On the contrary, where buildings make the landſcape too warm, cool tints, ſuch as ever-greens, ſhould be planted, to counteract that tendency. Some objects in landſcape require to be relieved and ſet off with ſpirit, others require to be kept under, or prevented from becoming principal. Theſe, and a great number of other important particulars, are effected by the colouring of trees and ſhrubs.

It is remarked, that if we operate with the permanent dark and light greens, as with light and ſhade in landſcape painting, we may produce many of the effects of *aerial perſpective*. The imaginary height of a hill may be increaſed, by placing dark coloured trees at the baſe, and lighter kinds towards the ſummit; ſo may the apparent breadth of a lake, by planting trees of a dark green on the ſide neareſt the eye, and others of a lighter tinge on the oppoſite ſide; in the ſame manner, bays or receſſes may be apparently deepened by placing the light coloured greens on the prominences. This mode of operating with the colours of trees will only be deemed unimportant, it is ſuppoſed, by the ignorant or unexperienced.

But though the harmony of tints only produces a pleaſing ſcene, their diſagreement, on the other hand, may produce a ſtriking effect. An outline, which cannot be varied in form, may be broken by the oppoſition of its tints, or by maſſes of dark and light green. Two or three trees together, that form a ſtriking contraſt with all around, may attract the eye, and fix it ſo, as either to induce it to admire ſome object, as a building; or prevent it from viewing ſomething diſagreeable, or leſs noble, in the ſcene. Trees of a reddiſh tint, or ever-greens, have the power of attracting the eye in an aſtoniſhing degree; and in many places, where the former have been planted at random among other trees, they diſtract the whole ſcenery in the autumnal months.

In regard to the arrangement of the materials of plantations, the great buſineſs is that of uniting beauty with utility in the moſt natural manner, which is beſt accompliſhed by the conſideration of foreſts or woody waſtes, which are the ſpecies of ſcenery that approach as near or nearer to nature than any other in this country; by this means may be diſcovered the indications of every valuable or uſeful practice in beneficial or pictureſque planting. But in reſpect to arrangement where utility alone is the main object, it may be obſerved, that as every tree has a certain ſoil and ſituation, or thoſe in which it will proſper better than in any other, that is, produce timber in the greateſt quantity and beſt quality, and as this tree will in general pay better than more valuable kinds which would not thrive, or would grow too quick in ſuch places; it follows, that in the formation of uſeful plantations, one great object ſhould be, to accommodate the trees to theſe circumſtances, as already ſeen. And, as the properties of ſoils and ſituations are various, theſe naturally lead to a correſponding variation of the ſorts of trees alſo; and this *variation*, it is ſuppoſed, *at once produces ornament and utility*. Thus, in natural foreſts ſuch an arrangement actually takes place. Hence, in one part, the oak is found as the principal tree; the hazel the principal undergrowth; and other particular plants, graſſes, and moſſes, chiefly to prevail. While a little farther on, a few beeches mingle with the oaks; ſtill more onward the beech becomes the principal tree; the undergrowths changing in the ſame way, the thorn, with other plants, graſſes, and moſſes being found. Ultimately the land becomes moiſt, when the birch gradually ſhews itſelf, and this moiſture increaſing as the birch retires, it is ſucceeded by the alder; each with their appropriate undergrowths, or ever-varying glades of paſture, as ſhewn by Gilpin in his "Foreſt Scenery," and "Walks in a Foreſt," &c. In this manner the arrangement proceeds throughout the whole foreſt; and if the ſoil were minutely examined, it would be found to vary correſpondently with the trees. Where the oak abounds, it will generally be deep and good; dry where the beech ſucceeds beſt; and moiſt in different degrees where the birch and alder prevail.

Planters, it is ſuppoſed, have ſeldom a ſufficient idea of the effects and advantages that might be produced, by having recourſe to this mode of arranging vegetables in artificial ſcenery, whether the firſt expence of planting, the future beauty, or the ultimate utility of it be regarded. Only thoſe who combine a knowledge of botany with painting, it is imagined, can conceive the variety and perpetual intereſt that may be thus created in a place even of the ſmalleſt extent, and with the leaſt natural advantages. In the preſent mode, all improved places have a ſameneſs in their general appearance; as they are compoſed of the ſame kind of mixture. The ſhrubbery, or a part of it, in one place, is preciſely the ſame with another at a diſtance from it, and affords a pattern of all others; but were nature followed in this reſpect, the variety would be endleſs. Nothing, it is believed, could then be more intereſting, than to walk or ride through a place thus laid out; to view the trees, ſhrubs, plants, and even the graſſes and ferns; the infinite diverſity of ſhapes, colouring, and compoſition of the trees and ſhrubs; and the ever-varying openings and intricate receſſes between them; again, varied with groups and turfs of flowering plants and ferns, ſpreading among the graſs, in every direction; and all this independently of every other object, ſuch as buildings, rocks, water, animals, diſtant proſpect, and even variety in the grounds. So that by this mode of planting, a ſituation naturally the moſt dull and inſipid, may be made infinitely varied and intereſting. And it is aſſerted, that this mode of arrangement is not more beautiful in ſhrubberies, flower-gardens, and green-houſes, than it is profitable in extenſive plantations.

In the diſpoſition of the wood in plantations about country reſidences, the forms of the ſurfaces the moſt deſireable to be planted in the grounds, are chiefly to be determined by the character which they are to aſſume. Where they are of an even or level ſurface, there can be nothing to interfere with this rule; but when the ſurface is varied with ſwells, hollows, and abruptneſſes, the great art is, to combine the natural character of the place with the character to be created; and when theſe are underſtood by the deſigner, the beſt effect will be produced. However, independently of artificial characters, nature always points out riſing grounds for plantations. Wood placed on knolls or ſwells, it is contended, heightens their effects, and gives ſpirit, force, and intricacy to a ſcene, otherwiſe tame and monotonous. On the contrary, wood placed in the hollows only, or in the hollows and eminences indiſcriminately, deſtroys all the expreſſion or natural features of the ſurface, and often produces deformities. Nothing is more noble than a ſteep hill clothed with wood; but, imagine this hill perfectly bare, while the ſurrounding country is wooded, and it becomes a deformity in the general view. To plant the hollows, and leave bare the eminences, is, in almoſt every ſituation, counteracting nature. Even in pleaſure grounds or parks, a group of ſhrubs, or a few trees, placed upon a riſe, however gentle, ſet off the ſcene, as it were, at once; but, plant them only in the low places, and they will remain until full grown before they have much effect; and at that time, though the reſidence may have the appearance of wood at a diſtance; yet, when it is examined particularly, the features of the grounds are totally deſtroyed. There are many places in the country which have a ſufficient quantity of old wood, which, if it had been planted with a proper regard to the natural variety of the grounds, would have made them as ſuperior to their preſent ſtate, as that is now to ſuch as are totally deſtitute of trees. It is not, however, meant that no low ſituation ſhould be planted, or that trees ſhould be placed formally on the ſummit of every eminence; on the contrary, dills, dingles, and ſuch romantic places ſhould be ſhaded with wood; and not a group, nor a ſingle tree ſhould exiſt, but what appears connected with other trees, as well as with the grounds. Taking the country in a general point of view, the hills ſhould be wooded; the riſing grounds between the hills and vallies diverſified with handſome reſidences, paſture lands, and ſome corn fields; and the loweſt parts kept in a ſtate of almoſt perpetual aration. Theſe vallies in general, in order to promote a more free circulation of air, and favour the particular mode of farming to which they are ſuited, ſhould be free from plantations, and ſometimes even from hedges. Viewed from riſing grounds in the autumnal ſeaſon, they ſhould preſent broad flat ſhades of rich yellows, interſperſed with farm houſes, and relieved by roads, canals, or rivers. An example in illuſtration of which is ſuppoſed to be met with in the valley called the Carſe of Gowrie in Scotland.

In fact, it is contended, that there is nothing of ſo great importance as the ſituation of wood, whether the general appearance of the country and the improvement of its climate, or the beauty and value of individual properties, are had in contemplation. All other operations that can be effected about reſidences, are thought comparatively of little conſequence. It is the wood, it is ſuppoſed, like the ſhades in a picture, that gives the effect; and as it is by the ſituation and relative connection of theſe ſhades, that an expreſſive or unmeaning picture is produced by the painter; ſo by the ſcite and connection of plantations, a place is either deformed or beautified by the planter. Even ſmall groups and detached trees are of the utmoſt conſequence in this reſpect, when ſkilfully performed or put in their places, but where the contrary is the caſe the whole is ſpoiled. It is ſaid to be lamentable to ſee the plantations that are daily making at a conſiderable expence, without any regard to this principle. In this level country it may, however, be thought of leſs conſequence, than where the grounds are ſtrikingly varied by nature, as in Wales and Scotland, where it is of the firſt importance. It is conceived, that in leſs than half a century, wood may completely change the appearance of the reſidences of gentlemen, and of the whole country; and thoſe who underſtand the ſubject will allow, that there is ſome danger of the change producing a bad effect, as is illuſtrated by the example of ſome parts of Scotland.

In reſpect to the quantity and diſpoſition of the wood which is to ſurround reſidences, it ſhould either, it is ſaid, be arranged in groups, ſo cloſe together, as, at a ſmall diſtance, to appear a connected maſs; or one or more large irregular maſſes muſt be planted, to which all the groups and ſingle trees ſhould ſeem to belong. The former method, it is ſuggeſted, will have a good effect when the ſurface is unvaried; but can only be adopted with propriety, when the ſituation of the reſidence is elevated or on a declivity, where moiſture or ſtagnation of air will not prove pernicious. But the latter method may be had recourſe to in every caſe. In *levels*, the principal maſs or maſſes may be placed at ſome diſtance from the houſe; which may ſtill be connected with it or them by intervening groups judiciouſly placed for the purpoſe. On *irregular ſurfaces* and *hilly ſituations* the ſame mode may be ſucceſsfully adopted. The maſſes may generally be placed upon the hills, while the connecting chain, thickets, and ſtraggling groups deſcend into the valley, and embrace the houſe. Theſe groups ſhould never be large, three or four trees together will generally be ſufficient; their effect depends not upon the magnitude of the group, but upon their number and apparent connection. This object is attained by making the groups looſe and open, and by ſcattering ſingle trees among them; and again by grouping theſe ſingle trees, and even many of the groups and thickets, with low growths, as hollies, thorns, honeyſuckles, ivy, &c. to take away from the formality of ſolitary and naked ſtems riſing from ſmooth turf. The common method of ſcattering ſingle trees here and there, and always at ſome diſtance from one another, gives a formal *ſtemmy* appearance to a lawn or park, which is never ſeen in nature. An example of the valuable mode of forming plantations, which is here recommended, is given from Foxley.

In regard to the nature or kinds of plantations, they may be conſidered as the *grove*, which is a collection of trees without undergrowth; the *wood* or *foreſt*, which is a collection of trees with undergrowth; the *copſe-wood*, which is undergrowth alone; the *group*, which is compoſed of two trees or more, or a tree and one or more ſhrubs planted together; and the *avenue*, which conſiſts of ſingle rows of trees ſet in different directions according to fancy or utility.

The firſt, or grove, is divided into two kinds, the former of which is commonly employed for ornament in parks and other ſimilar places. Theſe are moſtly uninclosed; they admit the paſture to grow below them; and appear, in walking through them, as a large collection of ſingle trees. The latter kind of which is compoſed of the pine or fir tribe. This ſort is for the moſt part planted upon hills, moors, commons, or other places of the ſame nature; they are thicker than the former kind, and they effectually prevent the growth of paſture: they are principally incloſed. The character of the former is generally ſolemnity and beauty; that of the latter chiefly pictureſqueneſs. Groves are originally planted equally thick with other plantations. As they grow, they are gradually thinned out, until the trees left ſtanding are able to defend themſelves from cattle. The fence is then removed or deſtroyed, the outline varied, and the ſpaces between the trees ſown with graſs-ſeeds. Fir groves are often allowed to remain, without thinning, until they are fifteen or twenty years old; and then they are conſidered as a full crop, and cut regularly over. See Grove.

The ſecond, or wood, is moſtly well ſuited both for ornament and utility. It is primarily formed by planting timber trees at ſuch diſtances as would form a grove, and filling up the interſtices with the kinds intended for undergrowth. This, it is ſuppoſed, is the moſt generally applicable kind of plantation, and commonly the moſt profitable, particularly when in ſtripes and belts. There, the undergrowth thrives beſt; thickens the ſtripe below; completes the ſhelter; and by concealing the real breadth, gives a maſſiveneſs and grandeur to narrow plantations, which they can never have, if planted in the grove ſtyle. Oak undergrowth is generally the moſt proper, and, if its worth were fully known, many plantations might be made of double their preſent value, have a much better effect, and afford better ſhelter. Moſt plantations, eſpecially in the northern parts of the country, though they generally go under the title of woods, are, in reality, of the grove kind. None of the trees are found kept under the reſt in a decided manner, cut over, and allowed to ſpring up again, while a certain number, from fifteen to thirty feet diſtance, are preſerved until their timber be full grown; but the trees being once planted, are allowed to grow up together, only a few being thinned out where they are too much crowded, and even this is very little attended to. Thoſe removed are either cut over, or grubbed out by the roots, as is found moſt convenient, without any regard to propriety. In conſequence of this management, a few buſhes of undergrowth are found in ſome places, and the reſt of the ground, if not ſhaded too much by the crowded trees, is covered with paſture; and neither the paſture, nor the undergrowth, from being intermixed, can be turned to the advantage of the proprietor. There are other plantations where undergrowth exiſts among timber trees in a more general way, but of kinds which are of little or no uſe, except for fuel; and this is by no means a profitable article, eſpecially in a cold diſtrict. But, on the other hand, there are woods in ſome places where both timber and undergrowth are cultivated; and it is from obſerving the great profits derived by the proprietors of theſe, that the advantages of raiſing oak undergrowth in woods is ſo ſtrongly recommended. The very high price which is given for oak-bark is generally known; and the ſum given for an acre of oaks, from twelve to twenty-five years old, valuable for the bark alone, is very conſiderable. Inſtances of theſe kinds are adduced from the woods of Dunkeld in Scotland, where there are lands of very little value for any other purpoſe, that contain oak woods, chiefly of the natural kind, the undergrowth of which is ſold every twenty-five years, at the rate of from 35*l.* to 60*l.* the acre, clear of all expences; or from 25*s.* to 48*s.* the acre annually; independent of the value of the timber trees left, fifty of which commonly remain to each acre. And in more low and ſheltered ſituations, it is contended, that double the advantage would be derived, in conſequence of the more quick growth, as in ſuch caſes the undergrowth would become equal in ſize in the courſe of twelve or thirteen years, and therefore afford two cuttings inſtead of one in the ſame length of time; beſides more uniform crops be produced, from the greater regularity in planting, which would be adopted. But leſt oak undergrowth ſhould be thought to be made more profitable than it really is, it is further remarked, that, in the moſt cold, hilly ſituations of Scotland and Wales, it will afford upwards of 2*l.*, and in more favourable ſituations above 3*l.*, the ſtatute acre annually; and if properly attended to in its early growth, ſtill more. The eaſy and cheap method of raiſing it by means of the acorn, is alſo a great recommendation of it, as well as that of its growing better and more expeditiouſly in this way. Where an undergrowth alone of oak is wanted, other ſorts of timber trees may be planted with the acorns. Theſe ſtatements ſtrongly diſplay the ſuperiority and advantages of woods over other kinds of plantations; but the recommendation of the formation of them, excluſive of groves or coppices, is not by any means intended, as, on the contrary, there are thin kinds of land, with bad under ſtrata, where the fir formed into groves, is more profitable than any other kind of plantations: and there are ſteeps and rocky banks, where no tree can be ſo advantageouſly cultivated as the common aſh; and rich moiſt places, where no plantation will turn out ſo profitable as oſiers. But, generally ſpeaking, it may be ſafely aſſerted, that woods are the kind of plantation that ought to be moſt commonly formed; and that though the kind of *timber* grown in theſe woods muſt vary according to the conſumption of different places, yet that oak will be found the beſt and moſt profitable *undergrowth* of any. See Wood.

In reſpect to the third ſort, or copſe-wood, it is alone ſeldom deſirable in point of character, though, in many places, it is the moſt profitable kind of plantation. Its formation is very ſimple: when of a proper ſize it is cut down; after which the ſtools ſpring up again; and this operation is had recourſe to in a periodical manner. Theſe kinds of woods are, however, in general, under a very wretched ſort of management in many parts of this country. See Coppice.

With regard to the fourth, or group, whether made in the ground, or in the hedges which divide the fields, it ſhould be well and ornamentally formed.

And in the fifth, or avenue, whether the rows of the trees be leading to a reſidence or in other parts of grounds, they ſhould be well ſuited to the nature of their ſituations and other circumſtances. See Avenue.

In all caſes where plantations are to be made, it is of great conſequence to fix upon the moſt proper kinds. In aſcertaining this, the kinds of woods and ſpecies of trees met with in the ſurrounding country, the market, the preſent or probable expence of carriage by land or water, and a variety of other circumſtances, are to be conſidered; and that kind fixed upon which will in the end turn out the moſt profitable. And the plantations being once made, the particular kinds ſhould be held ſtrictly in view in their management afterwards. A collection of oaks deſigned for a grove, if not gradually thinned out as they grow up, will never, it is ſuppoſed, ſucceed; but if the ſame collection were intended for a wood, thinning them out, in place of cutting over, would leſſen the crop of undergrowth. There is no method of management that will make a collection of firs a wood; nor can a collection of hazels, or other low growths erroneouſly planted to rear a grove, ever be made to aſſume that character. The idea of forming and preſerving a diſtinct character in plantations, it is thought, is never ſufficiently attended to by planters in general,—a certain ſpace is to be planted, and it is filled up with trees at random. It is ſuppoſed to be from this neglect alone, independent of all others, as thoſe of previouſly preparing the ſoil to planting, cultivating, and keeping it in order afterwards, training and thinning, with other operations, that few plantations yield one-third of the profit which they might. It is, however, ſuggeſted, that, if the particular kind of plantation to be formed, were previouſly determined upon, the buſineſs might proceed with a degree of certainty unknown and unpractiſed at the preſent period, as well as other great advantages be derived from it.

In relation to the outlines or boundaries of plantations, they ſhould, it is imagined, be determined by the character which they are to aſſume. The tree being a pictureſque object, all wood is conſequently ſo; and as the addition of wood to ground is always an addition of pictureſqueneſs, although frequently blended with grandeur or beauty, hence the propriety of irregular or pictureſque outlines in all kinds of plantations. Where the character to be produced is that of grandeur, the bounding line, it is aſſerted, ſhould conſiſt of bold angular prominences, ſucceeded by deep inciſions, forming large bays and promontories; and to give theſe ſtill greater effect, and vary their outline againſt the ſky, they ſhould be adapted to the variations of the ground, the bays being in the hollows, and the promontories on the eminences. In this mixture of curves and ſtraight lines, the former ſhould generally be obtuſe and convex, and the latter of conſiderable length. All ſhould appear "irregularly great." Such plantations as are made on hills ought always to aſſume the character of grandeur. Thoſe introduced among cultivated fields, and bounded by ſtraight lines, may alſo have a very grand effect, if due regard be had to vary their outline, by attending to the angular inſertions of hedgerows, or belts of planting; though, in this caſe, it is impoſſible to avoid a degree of formality, which is always connected with cultivation, and which, being eſſential to it, cannot be conſidered as a deformity. But where a plantation is to be made of a ſize which does not aſſume the character of grandeur, the outline ſhould be compoſed of ſuch a mixture of ſtraight and curved lines as will relieve each other, produce variety and intricacy, and correſpond with the ſurface of the ground. Nothing can be more unnatural or inſipid than a ſerpentine line, or one wholly compoſed of curves, as the boundary of a plantation: it is totally void of variety and intricacy, and deſtitute of force and ſpirit, which are ſome of the great objects gained by planting, and which it is the peculiar property of irregular or pictureſque forms to confer. The outline, whoſe ornament is a principal conſideration, ſhould be broken by ſingle trees and groups, ſo diſperſed, as to increaſe its irregularity, and take away from that formality and ſameneſs which lines of every kind have, when viewed alone. Thoſe who attempt this, without underſtanding effect, clog up the bays and receſſes, in place of making them appear deeper and more intricate; and thus they do much more harm than good. The outline is alſo greatly varied, and much improved, by mixing low growths with timber trees along the boundary of the plantation; and afterwards by taking away the fence, and making partial inroads or receſſes of different forms and degrees of depth. In open groves, where the trees ſtand ſingle, and have no fence, the outline is eaſily varied, and with great effect. The different forms, colours, and ſhades of green, when no other mode is applicable, may often have a ſurpriſing effect in apparently varying the boundary of a plantation; a fine example of which is ſeen at Keddleſtone. Groups and thickets, when planted in place of a circular fence, like a clump, ſhould always have the moſt irregular outline. This irregularity is apparently increaſed, by mixing low with tall growths at planting; by removing the fence, when theſe are grown to a certain height; and by judicious thinning. The great beauty of ſmall groups and ſingle trees ariſes from their connection, and the bends and inclinations of their ſtems. This may be produced, by planting two or more trees or ſhrubs in one hole, of different kinds, or the ſame kinds of different ſizes, &c.; and connecting theſe by others ſtraggling round them. And the moſt beautiful examples for this ſort of work are, it is ſuppoſed, to be found in natural foreſts, or woody banks and commons, where trees have ſprung up in an accidental manner. Examples repreſenting the manner in which ſmall maſſes and groups of trees may be grown, without giving a clump-like appearance to the incloſures, are given from the working plans of planting at Barnbarrow, and other places. The general forms of the maſſes may, it is aſſerted, be infinitely varied on a level ſurface; and on an irregular one, they ſhould correſpond with it. And, as it is believed that this principle is univerſally applicable, there never can be the ſmalleſt neceſſity or apology for any thing of the clump kind in ſuch caſes.

Plantation, in *Rural Economy*, a portion of land planted with timber, or other trees. It is plain that plantations, when judiciouſly made, not only afford great improvement to eſtates, but are highly ornamental to the country. They ſhould, therefore, be more particularly attended to, where there are large tracts of poor barren lands, that cannot be converted to the more profitable purpoſes of tillage or graſs. They have alſo a fine effect in the vicinity of habitations. And in many caſes, the proprietors of eſtates, whether of large or moderate ſizes, may reap great pleaſure and advantage in allotting a part of them to this uſe, as they give an air of cultivation and fertility; and after eight or ten years, in many caſes, bring in great profit by the gradual thinning of the underwood, beſides leaving a ſufficiency of ſtandards to attain full growth. The expence attending the making of plantations, and the knowing that they muſt wait ſeveral years before the trees have made any conſiderable progreſs, or can afford any advantage, often, however, prove an obſtacle in attempting the proſecution of the buſineſs. But the expence of planting, where the plants are raiſed on the grounds, will not be ſo great as may be imagined, eſpecially as a ſmall ſpot of nurſery-ground will raiſe plants ſufficient, in three or four years, to plant a great many acres of land; and the expence of raiſing and planting, with the loſs of time in waiting till the plants attain ſome growth, will be compenſated by the firſt fall or thinning, in eight or ten years after planting; and the ſtools which remain ſhoot up again, in many of the deciduous kind, and afford a lopping every eight or ten years, excluſively of the due portion of ſtandards, left at proper diſtances to attain full growth for timber, or other purpoſes.

It may be noticed that, in former ages, this iſland abounded in natural plantations or foreſts, which ſpread themſelves over the ſurface of it to a very conſiderable extent, and which were compoſed of various ſorts of tall or lofty trees of great magnitude, all blended together in a promiſcuous manner, and of ſpontaneous growth. Thoſe vaſt foreſts were never planted by any human hands; ſuch only have been employed for ages in cutting them down: for in many places there were ſuch profuſions of uſeleſs wood, that large tracts were obliged to be cleared by degrees, in order to cultivate the ground for other purpoſes; which, together with the neceſſary demands for the wood, from time to time, for building, and other uſes, as well as that of the owners of ſuch lands reaping conſiderable advantage from the ſale of their timber, continued gradually, one generation after another, the practice of grubbing up and deſtroying their timber woods and plantations without meaſure: and but few ever planted any in the place of that which they cut down; ſo that, in many parts, there is at this time almoſt a general demolition of woodland, and many conſiderable eſtates have ſcarcely any timber of conſequence or value left ſtanding upon them. There is, in ſhort, a want, in moſt places, of nearly a complete renovation of the timber; which ſhould take place as ſoon as poſſible, otherwiſe the nation, in many parts, may ſuſtain conſiderable injury, from the increaſing ſcarcity of ſo important an article of internal produce and general conſumption. Every portion of land in the kingdom, which is capable and proper for the purpoſe, ought, therefore, without delay, to be covered with plantations of this ſort. All the different ſteep, waſte, unproductive tracts of land, in different ſituations, are in general fit for being converted to this uſe, often with conſiderable advantage, as from two or three to eight or ten times that which they could be made to afford under any other ſyſtem of cultivation. It is indeed remarked, that of ſuch barren waſtes, there are few ſpots which would not admit of being improved in this manner, under particular circumſtances; and that there is a very great number of tracts, of vaſt extent, on which it would be far more profitable to the owner than that of attempting any other ſorts of improvement; as in all thoſe caſes where the ſoil is dry, but of an infertile nature, of a heathy, ſtiff, hard, clayey quality, with little ſurface produce, or where it is much covered or filled with rocks and ſtones; that, in fact, there is hardly any land ſo poor, barren, rocky, or unproductive, as not to admit of it, when properly managed.

In making plantations, it is neceſſary to chooſe ſuch trees as are adapted to the nature of the particular ſoil and ſituation. As to the proper ſorts of trees, moſt of the deciduous and evergreen kinds may be employed with propriety; and young plants of from about two or three to five or ten feet in height always prove more ſucceſsful than ſuch as are older, as thoſe of a younger growth always take root ſooner, and eſtabliſh themſelves more firmly, ſo as to form conſiderably the fineſt plantations at laſt, and are of longeſt duration: for though large trees of from fifteen to twenty feet in height, eſpecially of the deciduous kind, may with care be tranſplanted, ſo as to grow, and probably thrive tolerably well for ſome years; yet, by not rooting firmly, like young plants, they often fail, and, after ſome years ſtanding, have hardly any ſhoots, and at laſt gradually dwindle and periſh altogether.

In caſes where large plantations are to be formed of foreſt and timber trees, particular ſorts muſt be choſen, conſiſting of deciduous and evergreen trees. Of the firſt kinds, the oak, elm, aſh, beech, cheſnut, hornbeam, birch, alder, maple, ſycamore, plane, poplar, lime, walnut, mountain aſh, larch, willow, &c.

There are two methods practiſed in forming plantations: one is by raiſing the trees from ſeed at once, on the ground where the plantation is intended to be, eſpecially the deciduous kinds, and which is effected by ſowing the ſeed in drills, a yard aſunder, the plants remaining where raiſed, thinning them gradually; the other method is by previouſly raiſing the plants in a nurſery, till two or three feet high, then planting them out into the places allotted them. The former, or that of raiſing the plants where they are to remain, though it may be more expeditious, and at once gets quit of the trouble of tranſplanting, requires greater attention for a few years, till the plants have ſhot up out of the way of weeds; but the trees, from their always remaining where raiſed, without being diſturbed by removal, may probably make a greater progreſs. The latter method, or that of raiſing the trees firſt in the nurſery, is probably the moſt commonly practiſed, as being thought the leaſt troubleſome and expenſive, with regard to the attendance at firſt to the young growth. In reſpect to the preparation of the ground for the final reception of the ſeed or plants, it is moſtly performed by deep ploughing and harrowing upon ſuch ground as the plough can be employed on; but where this or other tillage is not practicable, only young plants from the nurſery can be uſed, digging holes, &c. at proper diſtances, one for the reception of each plant. Where, however, the ground can be tilled, it will prove very advantageous, by performing it a year before; ſowing it with a crop of turnips, or other plants of a ſimilar kind; and when theſe come off, ploughing and harrowing the ground again, for the reception of either the ſeed or plants the enſuing ſeaſon. The moſt proper ſeaſon for making this ſort of plantation, either by ſeed or plants, is any time in dry mild weather, in the autumn, as from October till February, or later in moiſt ſoils. Where large tracts are to be planted, both the ſeed and plant methods muſt be purſued all winter, at every favourable opportunity. The ground, where the plantations are made, ſhould be previouſly fenced in all round with a deep ditch, to guard againſt the encroachments of cattle, or other animals. In reſpect to after-management, while the plantations are young, they muſt have ſome attendance to deſtroy weeds, which may be expeditiouſly executed by hoeing between the rows in dry weather, or occaſionally by horſe-hoeing: and this care will be needful for two or three years, eſpecially to the ſeedling plantations, until the trees are advanced out of the reach of weeds; after which no farther trouble will be required, until the trees are ready for the firſt fall or thinning for poles, faggots, &c.

After eight or ten years growth, they are moſtly of a proper ſize to begin the firſt fall by a moderate thinning, which will ſerve for poles and faggot-wood, to repay ſome of the expence of planting, &c. But only a part of the plantation ſhould be lopped the firſt year; thinning out the weakeſt and moſt unpromiſing growth firſt, leaving a ſufficiency of the moſt vigorous plants pretty cloſe, to grow up for larger purpoſes; the year following thinning another part, and ſo continue an annual thinning fall, till the whole plantation has been gone over; cutting each fall down near the ground, leaving the ſtools to ſhoot out again, eſpecially in the deciduous kinds; and by the time the laſt fall has been made, the firſt will have ſhot up, and be ready to be cut again. So the returns of the fallings may be contrived to be every ſix, ſeven, eight, or ten years, or more, according to the uſes the poles or wood are wanted for: and if large poles, &c. are wanted, the fall may be only once in fourteen, eighteen, or twenty years; ſtill at every fall being careful to leave enough of the moſt thriving plants for ſtandards; being left pretty cloſe at firſt, that they may mutually draw each other up in height, but thinned out in every ſucceeding fall as they increaſe in bulk, and ſo as to leave a ſufficient quantity of the principal trees at proper diſtances, to grow up to timber; which in their turn, as they become fit for the purpoſes intended, may alſo be felled, according as there may be a demand for them, to the moſt advantage; having young ones from the ſtools coming up in proper ſucceſſion, as ſubſtitutes, ſo as the ground may always be occupied as completely as poſſible in all parts.

In regard to the advantages that may be derived from the uſe of different ſorts of trees in plantations, they have been ſtated as very conſiderable by different writers. In Mr. Melliſh's experience, on a foreſt ſandy ſoil of 3*s.* an acre value, as ſtated by Mr. Young in his Eaſtern Tour, in 1771, and made in different ways; as by cleaning the land in the manner as for grain, ploughing once and then ſetting the trees, by trench-ploughing and ſetting, and by not ploughing at all, but ſetting in holes, with the ground only cleared for them: the reſults were found nearly equal; but what ſuperiority there was, was in favour of the ploughing method. The ſorts of trees were Scotch and ſpruce firs, larch, oak, aſh, cheſnut, beech, birch, &c.; the whole being mixed. The Scotch and ſpruce firs have grown much the faſteſt, and generally ſucceeded with ſcarcely any failures. The number ſet on the acre moſtly 5000; the expence of incloſing, raiſing the trees, and planting, 3*l.* the acre. In five years they require thinning, when the wood taken out about pays for the labour; the number thinned out being about a thouſand. And in five years more they are thinned again, when another thouſand trees are taken out, which make good hedge wood and hedge ſtakes; the value about five pounds more than pays the expence of the labour. When theſe thinnings have been performed, three thouſand are left, which have been found from experience to be then worth 6*d.* each on an average, as ſtandards, and clear of all expences, if ſold. At this time another thouſand ſhould be taken out. Two thouſand are therefore left, which, at 30 years growth, will be worth, as they ſtand, 1*s.* each; and at 40 years, they will be worth 2*s.* each. This is the produce of ſuch poor foreſt ſands; but this experienced planter has, Mr. Young ſays, many Scotch firs planted 35 years ago in good land, which are worth 40*s.* each, and a great many from 25*s.* to 35*s.* On theſe *data*, Mr. Young calculates the profit of the plantations, at different periods, in this manner:

Account of an acre of firs at the end of the fifth year.

	£	*s.*	*d.*
Firſt incloſing, raiſing, planting, fencing, &c.	3	0	0
Intereſt of the above ſum five years	0	15	0
Rent 15*s.*	0	15	0
	4	10	0

In five years more.

	£	*s.*	*d.*
Reparation of the fences	0	5	0
Intereſt of 4*l.* 10*s.* for five years	1	2	6
Allow for compound intereſt	0	15	0
Rent	0	15	0
	2	17	6
Firſt five	4	10	0
Expence at the end of ten years	7	7	6
Received for thinnings	5	0	0
Exceſs	2	7	6

At the end of twenty years.

		£	*s.*	*d.*
Rent		1	10	0
Reparation of fences		0	10	0
Intereſt		1	0	0
		3	0	0
Received for 1000 at 6*d.*		25	0	0
Value of 2000 remaining, at ſame rate		50	0	0
		75	0	0
Deduct as above	£3 0 0			
Exceſs at end of five years	2 7 6			
		5	7	6
Clear profit in 20 years		69	12	6
Which is *per* acre *per annum*		3	9	1

And that ſuppoſing the 2000 trees left ten years longer, the account will ſtand thus:

	£	*s.*	*d.*
Received for 1000 at 6*d.*	25	0	0
Deduct, as above	5	7	6
Profit in 20 years, excluſive of trees remaining	19	12	6
Which *per* acre *per annum*, may be called	1	0	0

At the end of thirty years.

	£	*s.*	*d.*
Rent	1	10	0
Fences	0	10	0
Intereſt	1	0	0
	3	0	0
Suppoſing the plantation then cut down, the 2000 trees at 1*s.* bring	100	0	0
Deduct, as above	3	0	0
Profit	97	0	0
Firſt ten years expence	7	7	6
Second ten ditto	3	0	0
Third ditto	3	0	0
Total expence	13	7	6
Received ſecond thinning	5	0	0
Third ditto	25	0	0
The 2000 remaining	100	0	0
Total	130	0	0
Expences	13	7	6
Clear profit in 30 years	116	12	6
Or *per* acre *per annum*	3	17	1

At the end of forty years.

		£	*s.*	*d.*
Expences, as before		3	0	0
Received for 2000 trees at 2*s.*		200	0	0
Ditto firſt and ſecond thinnings		30	0	0
Total		230	0	0
Deduct expences, as before	£13 7 6			
Ditto	3 0 0			
		16	7	6
Clear profit in 40 years		213	12	6
Or *per* acre *per annum*		5	6	1

It is further ſtated, that this account of the expences, produce, and profit, of planting foreſt land at 3*s.* an acre, ſhews the amazing profit of ſuch undertakings. Plantations have, in general, been raiſed with a view merely to beauty, or elſe through a very noble patriotic motive of being ſerviceable to the country; but it is evident, that they may be undertaken with very different views—with thoſe of profit: ſo that a man may cut down the trees he planted himſelf, and expect to reap, in ſo doing, very conſiderable profit. If he cuts all down at the end of 20 years, and leaves not a ſingle tree, he gains a profit clear of near 70*l.* an acre, which is 3*l.* 3*s.* *per* acre *per annum*, from the firſt planting. Let me aſk the moſt ſkilful farmers of this country, how they will exceed ſuch a profit, by any ſyſtem of common huſbandry, on ſuch poor land? It before appeared, that common good huſbandry, after ſome improvements, would yield but 1*l.* 1*s.* 11*d.* *per acre* profit; ſo that the planting to cut in 20 years, is more than thrice as beneficial, and certainly much leſs expoſed to accidental loſſes. But ſuppoſing the trees left 30 years, in that caſe the thinnings pay, for the firſt 20 years, 1*l.* *per* acre *per annum*; and at the end of the 30th, the account from the firſt planting is 3*l.* 17*s.* 1*d.* *per* acre; and in 40 years, 5*l.* 6*s.* 1*d.* After which time, they may be ſuppoſed to decline in quickneſs of growth, and conſequently had better be cut down, in point of profit. It is noticed, that if beauty of ſituation is not, in ſome reſpects, commanded, we ſeldom ſee plantations of quick-growing trees; but it is evident, that poor ſoils ſhould be planted upon in the mere view of profit. A crop of firs, inſtead of a crop of wheat, barley, or oats, at 20 years growth, which ſo many men may expect to ſee arriving at perfection, turns out far ſuperior. One of the moſt profitable farms would be a 30 years leaſe of ſuch land, with liberty to plant and cut down. One of 20 years, which is a ſhorter period than the generality of long leaſes, would, thus applied, exceed common huſbandry on ſuch ſoils.

It is added, that Mr. Melliſh has a waſte, incloſed with a ring fence of 700 acres, which he would let at 3*s.* an acre, tythe free. Suppoſe a perſon hired it under a leaſe of 30 years;

The raiſing, planting, &c. &c. would come to	£2100
Rent for 700 acres, for 30 years	3150
Reparation of fences, ſuppoſe	30
Intereſt of 2100*l.* for 30 years, at 4 *per cent.*	2520
Total expence	7800
Produce.—Thinning in 10 years, at 5*l.* an acre	3500
Ditto, in 20 years, 1000 *per* acre, at 6*d.*, 25*l.*	17500
Cut down at 30 years, 2000 *per* acre, at 1*s.*, or 100*l.* *per* acre	70000
Total produce	91000
Total expences	7800
Clear profit	83200

This account is ſtated in the ſtyle of a common farm; the firſt expenditure called ſtock, and compound intereſt, not calculated. It is very evident that no man, poſſeſſed of ſuch ſoils, who can hire them for 20 or 30 years, under a planting leaſe, need ever to be diſtreſſed at the idea of younger children's fortunes, or raiſing large ſums of money in future. A moderate expenditure will, by planting, ſecure the certain poſſeſſion of any ſum that may in future be wanted.

And in Mr. Bevor's experiments, as ſtated by the ſame writer, Scotch firs, in 18 years, are found to be worth 2*s.* 6*d.* And a whole plantation of 50 years growth, worth 50*s.* on an average: they ſtand 20 feet ſquare, which is 108 to an acre. In another plantation on a moiſt ſandy loam, larches of 18 years growth, are worth 3*s.* 6*d.*: ſpruce firs among them not half ſo good, which Mr. Bevor attributes to their being trimmed up; others on ſame ſoil and growth, not ſerved ſo, are almoſt double the ſize.

Mr. Berney, at Bracon Aſh, has alſo made great improvements by planting land of 20*s.* an acre. Oaks, of 50 years growth, are worth 15*s.* each: they ſtand 15 feet ſquare; this is 180 on an acre. Larch, in 18 years (20 from the ſeed), are worth 6*s.* each: they grow out of underwoods that pay 20*s.* an acre. Some few of 20 years, worth 15*s.* each. Silver firs in the ſame wood not quite ſo large, but they beat both the ſpruce and Scotch. They all ſtand 15 feet ſquare in the underwood. And in another plantation without underwood, Scotch firs, of 18 years, are worth 2*s.* 6*d.* each: they ſtand 8 feet ſquare; which is 680 on an acre, or 85*l.*; that is, 4*l.* 14*s.* *per* acre *per annum*, excluſive of thinnings. No huſbandry, Mr. Young contends, will equal this. A man who would plant for profit muſt not regret land of 20*s.* an acre.

The Weymouth pines, in 18 years, much larger than Scotch firs of 22 years.

But in Mr. Fellowes' of Shotteſham experiments, who has, according to Mr. Young, tried various trees, ſome years ago, ſo that he is now able clearly to judge which is the moſt profitable; the following are the reſults.

Experiment 1.—A plantation of Scotch firs of 45 years growth, 20 feet ſquare, on land of 15*s.* an acre, are now worth 20*s.* each on an average. At that diſtance there are 108 trees on an acre, or 108*l.*; which is 2*l.* 9*s.* *per* acre *per annum*, from the firſt planting, excluſive of thinnings, which would more than double it. But the graſs under the trees would have let for many years paſt at 7*s.* an acre.

Experiment 2.—Another plantation of Scotch firs, 38 years growth, ſtanding in rows 14 feet wide and 10 in the rows, are now worth 12*s.* on an average. This diſtance gives 300 on an acre; and at 12*s.* they come to 180*l.*, or 4*l.* 14*s.* *per* acre *per annum*, beſides thinnings. The rent of the land 15*s.*; poor rates, 1*s.* 3*d.* *per annum* in the pound; and tythe, till 20 years old, 5*s.* an acre; the graſs under them now 5*s.* an acre. It is ſufficiently evident, Mr. Young thinks, that no huſbandry can equal this.

Experiment 3.—Cheſnuts in 38 years, on the ſame land, ſtanding 14 feet by 10, are worth 15*s.* each. This is 225*l.* *per* acre; or 5*l.* 16*s.* *per* acre *per annum*, beſides thinnings.

Experiment 4.—Scotch firs in 38 years, on the ſame land, meaſure 17 feet of timber on an average, for which Mr. Fellowes has been offered 11*d.* a foot: that is, 15*s.* 7*d.* a tree. They ſtand 14 feet by 10. An acre would therefore be 233*l.* 15*s.*; or 6*l.* 3*s.* *per* acre *per annum*, beſides thinnings. Theſe trees are 60 feet high.

Experiment 5.—On the ſame land larch trees, of only 31 years growth, are as large as the firs of experiment No. 4, which ſhews that the larch is a much quicker grower. Spruce by them not ſo large as either. The pinaſter of 38 years, larger than the Scotch. The cedar of Lebanon, of the ſame age, would now cut into planks 12 inches wide.

Experiment 6.—A very ſtriking compariſon between the larch and the ſpruce fir, was tried by planting an old gravel pit levelled, ſurrounded by a plantation of Scotch fir, with thoſe two ſorts in alternate rows. The larch is from 6 to 12 feet high; whereas the ſpruce is but 2 feet on an average.

Experiment 7.—A large plantation of many acres of a poor gravelly land at 8*s.* an acre, containing Scotch and ſpruce firs and larches, is now 16 years old; they are in ſquares of ten feet, and are worth;

The Scotch, 2*s.* 6*d.* each.
The ſpruce, 3*s.* 6*d.*
The larches, 4*s.* 6*d.*

At ten feet, there are 435 trees on an acre.

The Scotch, at 2*s.* 6*d.* come to 54*l.* 7*s.* 6*d.*; or *per* acre *per annum*, 3*l.* 7*s.*

The ſpruce, at 3*s.* 6*d.* to 76*l.* 2*s.* 6*d.*; or *per* acre *per annum*, 4*l.* 15*s.*

The larch, at 4*s.* 6*d.* to 97*l.* 17*s.* 6*d.*; or *per* acre *per annum*, 6*l.* 2*s.*

All three excluſive of thinnings. Suppoſe, ſays Mr. Young, we calculate theſe at no more than paying the rent, tythe, and town charges; and that the larch, in 20 years, come only to 100*l.*, which is, however, under the truth: let any one calculate the profit of hiring land on a 21 (or more) years leaſe, and immediately planting. In what other application of the lands can ſuch great profit be made, as gaining 6*l.* an acre without any riſk, and almoſt without any expence? It is true ſuch a conduct cannot, like the culture of corn and graſs, be general, for reaſons obvious to every one; but as far as the whole demand of any neighbourhood extends, it is profitable to execute it.

And ſuppoſe, ſays he, 5 acres of larch planted every year; at the end of 16 or 17 years, 5 acres will every year be cut down, of the value of 500*l.*: from that day a regular product of 500*l.* a-year is gained from the application of 100 acres of land. Let to a tenant, theſe 100 acres produce 40*l.* a-year; but planted, they produce 500*l.* a-year. What an amazing difference! Or ſuppoſe a ſingle acre planted every year, after the expiration of 18 or 20, to cut annually 100*l.* a-year from only 20 acres, which let, would yield but 8*l.* a-year. How beneficial a conduct!

Mr. Fellowes has alſo planted plane-trees, and finds them to thrive amazingly in low moiſt ſituations. They will, in ſuch, grow much faſter than the poplar. One he has of 30 years growth that will cut into planks 20 inches broad; but ſo vaſt a ſize he attributes in ſome meaſure to its ſtanding on the edge of a ditch through which the drainings of a farmer's pigſties run. Poplars, in ſome parts of the kingdom, are planted in low ſituations, to the excluſion of every thing elſe: it is of conſequence, therefore, to know that the plane will do better. But Mr. Fellowes, in general, recommends the larch as preferable to every other tree he has tried; and which will pay a planter much greater profit than any of the reſt. Theſe ſtatements ſhew the great profits formerly derived from planting, and they have not been leſs ſince.

Mr. Davis, ſteward to the marquis of Bath, after obſerving that oaks and beeches planted on the *beſt* ſpots of ground, and nurſed by Scotch firs, will not be ſo valuable at ſixty years old, as the Scotch firs are on the very *worſt* land at thirty, further ſtates, that four firs will grow where one oak or beech will grow; for firs are the better, and deciduous trees the worſe, for being crowded. And that a great deal of poor heathy ſhallow land, which will produce Scotch firs in the greateſt perfection (and a great deal of the land planted by lord Bath is of that deſcription), will not grow oak or beech at all, nor in fact any thing but Scotch fir. Even larch has failed univerſally on all thoſe ſpots where the upper ſtratum is peat. Having lately had occaſion to cut ſome rides through ſome extenſive plantations of Scotch firs which were planted juſt thirty years ago, I meaſured the land, and the trees which were cut off it, very exactly, and the following reſult ſhews that the profit of planting Scotch firs has been full ſeven *per cent.* compound intereſt; whereas no plantation of deciduous trees, within my knowledge, has paid five *per cent*, ſimple intereſt. Indeed we uſually reckon, in valuing eſtates for ſale, that the common growth, even of elm timber, on its moſt favourite ſoils, is ſeldom equal to more than three or three and a half *per cent.* ſimple intereſt.

		£.	*s.*	*d.*
336 Scotch firs, of 30 years old, cut upon a ſtatute acre, average meaſure three feet *per* tree, valued at only 10*d. per* foot, *viz.* 2*s.* 6*d. per* tree, amount to, *per* acre, - - - - - -		42	0	0
At the time of planting, this land, then newly incloſed from a common, was not worth above 2*s. per* acre *per ann.*, which, at twenty-five years purchaſe for the fee ſimple, amounts to -	2 10 0			
And the coſt of the trees and planting was not above - - - -	3 0 0			
Total expence *per* acre, even ſuppoſing the land to be annihilated -	5 10 0			

5*l.* 10*s.* principal will increaſe, in thirty years, as follows:

	£.	*s.*	*d.*
At 5 *per cent.* ſimple intereſt, to only - -	13	15	0
At 5 *per cent.* compound intereſt, to - -	23	15	5
At 7 *per cent.* compound intereſt, to - -	41	17	4

So that the Scotch firs, which have increaſed 5*l.* 10*s.* principal to 42*l.* in thirty years, have paid upwards of 7 *per cent.* compound intereſt. Tranſactions of the Society of Arts. &c. vol. xvi.

The ſtatements which are given below, as drawn up by Mr. Maſon, ſhew the great advantage of making plantations with aſh, on the grounds of his grace the duke of Newcaſtle, together with a valuation of the lands previous to their being planted with the trees.

Names of the Places and Fields.	A.	R.	P.	Value *per* Acre. *s.*	Value *per* Acre. *d.*	Yearly Value. *L.*	Yearly Value. *s.*	Yearly Value. *d.*
At Houghton.								
Bog Cloſe, late George Padley - -	10	0	22	8	0	4	1	1
Bog Cloſe, late Dewick - - - - -	20	0	34	2	0	2	0	5
Great Kennel, in Dewick's bogs - -	3	2	0	7	0	1	4	6
Little Kennel, in the ſame - - -	2	0	0	5	0	0	10	0
Dobſon's Hopyard - - - - - -	1	0	0	10	0	0	10	0
Goſling Carn - - - - - -	8	1	37	5	0	2	2	0
Crow Park - - - - - - -	5	2	0	9	0	2	9	6
Decoy plantation, including the banks about Fat Coſe ponds - - - - -	7	2	0	15	0	5	12	6
Croſs Cloſe plantation - - - -	3	2	0	12	0	2	2	6
Bog ground - -	61	3	13			20	12	6
At Bevercotes.								
Farny's plantation - - - - - -	51	1	0	8	0	20	10	0
Clay ground								

	A.	R.	P.	Value *per* Acre. *s.*	*d.*	Yearly Value. *L.*	*s.*	*d.*
At Waleſby								
Some pieces of land laid to Bevercotes wood	1	0	27	12	0	0	14	0
A piece of land laid to Nickhaghbuſh wood	1	2	32	10	0	0	17	0
Clay ground	2	3	19			1	11	0
At Weſt Drayton.								
School-houſe plantation	3	0	0	8	0	1	4	0
Bog ground								
At Gamſton.								
Land adjoining the wood	3	2	0	5	0	0	12	6
Land upon the common	5	0	0	10	0	2	10	0
Clay ground	8	2	0			3	2	6
In Bothamſell and Elkſley								
In Patmour	41	0	0	5	0	10	5	6
Crookford	14	0	0	5	0	3	10	0
In Elkſley hopyards, by the fiſh-pond below Elkſley wood	0	2	0	10	0	0	5	0
Bog ground	55	2	0			14	0	0
Aſh plantations collected.								
In Haughton	61	3	13	0	0	20	12	6
Bevercotes	51	1	0	0	0	20	10	0
Waleſby	2	3	19	0	0	1	11	0
Weſt Drayton	3	0	0	0	0	1	4	0
Gamſton	8	2	0	0	0	3	2	6
Bothamſell and Elkſley	55	2	0	0	0	14	0	0
	181	3	32			61	0	0
Theſe 180 acres, now planted, are worth, upon a moderate calculation, 40*s.* an acre	180	0	0	40	0	360	0	0

In this caſe, the expences of planting the hundred and eighty acres are ſaid to have amounted to the ſum of 2700*l.* for which his grace will have the additional rent of 300*l.* a-year.

The biſhop of Landaff has made the following calculation of the probable profit of converting the waſte rocky lands in Weſtmoreland into plantations with larch. A thouſand acres of this ſort of land might, he ſuppoſes, be incloſed with a circular wall ſix feet in height, (where the ſtones can be eaſily gotten, as they may in moſt parts,) after the rate of ſix ſhillings an acre, or 300*l.* for the whole; five hundred larches two feet in height, (ſo as to enable them to reſiſt the long graſs,) might be planted on each acre for fourteen ſhillings; hence a plantation of 500,000 larches might be made for 1000*l.* Now 1000*l.* improved at compound intereſt, at the rate of 4*l.* *per cent.*, would, in 60 years, amount to the ſum of 10,519*l.*: this is the accumulated loſs attending the incloſing and planting 1000 acres of rocky land in ſixty years. The rent of 1000 acres, at one penny *per* acre, is 4*l.* 3*s.* 4*d.* a-year; in eight years the larches would be out of all danger from ſheep, ſo that the loſs of rent ought only to be eſtimated for eight years; but 4*l.* 3*s.* 4*d.* a-year, though improved after the ſame rate of compound intereſt, would not amount to 40*l.* in eight years; ſay, however, that it would amount to 81*l.*, which is allowing more than two-pence an acre for the annual rent of the land, then would the whole expence attending the plantation in 60 years be 10,600*l.* If the amount of 81*l.* for 52 years be taken into conſideration, the expence of the plantation in 60 years will be 11,222*l.* He has here ſuppoſed ſheep to be ſhut out of the plantation for eight years; if it ſhould be found that ſheep will not crop the larch, (and from more than one obſervation he has reaſon to believe that they will not,) they need not be ſhut out at all; nor, on diſtricts where nothing but ſheep are depaſtured, need any fence be made. He knows the advocates for cloſe planting, inſtead of 500, would require 5000 larches for each acre; he is not convinced of the utility of ſuch cloſe planting, except when it is intended to nurſe up oaks, or other kinds of wood; but if that mode ſhould be adopted, the thinnings, after twenty years growth, would pay the expence of it. At the expiration of 60 years, ſuppoſe that only 250 larches remained on each acre, or that one-half had periſhed, the probable value of them may be thus eſtimated. From a great many experiments made by himſelf and collected from others, he finds the annual increaſe in circumference of the larch at ſix feet from the ground, to be an inch and a half on an average of ſeveral years; and this inference has been drawn from the actual admeaſurement of larches in different parts of England and Scotland, and of different ages, from ten years old to fifty. On this ſuppoſition, the larches would meaſure, one with another, ninety inches in circumference, at ſix feet from the ground. A larch which meaſures ninety inches at ſix feet from the ground, would meaſure above ſeventy at twenty feet from the ground; but ſuppoſing ſeventy inches to be the circumference at twenty feet, and the length of the tree to be forty feet, neglecting the remaining top; then will its ſolid content be eighty-five cubic feet, and the value of the tree at nine-pence a foot, above three guineas. But as the trees are ſuppoſed to be planted in an high, bleak, barren ſituation, their annual increaſe may not be ſo great as is here ſuppoſed; inſtead of being worth, at ſixty years after planting, three guineas a-piece, admit that they are worth only ten ſhillings each, then would the whole plantation be worth 125,000*l.*, and deducting the whole expence, 10,600*l.* as before eſtimated, there would remain a profit of 114,400*l.* The preſent value of 114,400*l.*, to be received ſixty years hence, is above 10,000*l.* (intereſt of money at 4*l.* *per cent.*) Ten thouſand pounds at 4*l.* *per cent.* purchaſes an income of 400*l.* a-year: by planting then, a barren eſtate of a thouſand acres, is improved from 4*l.* 3*s.* 4*d.* to 400*l.* a-year, reckoning the value of a reverſion as a preſent certainty. Sixty years is a great part of the life of a man: but it ought to be conſidered as nothing in the exiſtence of a nation, or even of a family, which is a little nation. The waſte lands in this and other countries are a public treaſure in the hands of private perſons; all of them ought to be converted into arable, meadow, or paſture land, which are capable of admitting, with profit, that kind of improvement; and ſuch of them as will not pay for that mode of improvement, ought to be covered with wood; the high parts, and eſpecially the ſheltered dells in the high parts, with larch, and the lower with oak, aſh, &c.

And in making plantations of this ſort, it has been adviſed by E. Harries, eſq. of Hanwood, to attend to two circumſtances, namely, ſituation and diſtance. The ſtrong weſterly winds are very apt to bend the upper part of the trees, eſpecially if they ſtand ſingle, or upon ſloping grounds. To guard againſt this, a ſhelter of Scotch pines ſhould be planted to the weſtward, ſome years before the larch. In reſpect to giving the plants ſufficient room: in eight years they may be twenty feet high, and their lateral ſhoots extend two yards every way from the trunk; and they ſhould not then be ſuffered to continue nearer than five or ſix yards; and what are left may continue to be uſeful building timber. At firſt planting, a diſtance of about ſeven feet ſhould be allowed; they will then be furniſhed with ſufficient lower branches, which give the tree a ſteady and tapering trunk. The knife ſhould never be applied to them. There is no tree of quicker growth. He has larches that are twenty feet high in ſeven years growth, and ſixteen or eighteen inches round. At thirty years growth, they meaſure from four to five feet round, at five feet from the earth.

As the larch and fir are ſo much in uſe in forming plantations, it may be proper to take ſome further notice of their properties. In ſpeaking of the larch, the wood, Dr. Anderſon obſerves, is poſſeſſed of ſo many valuable qualities, that to enumerate the whole would appear extravagant hyperbole. It is known to reſiſt water, without rotting, almoſt for ever. The piles of this timber, on which the houſes of Venice were built many hundred years ago, are ſtill found as freſh as when firſt put in. Stakes of it have been tried in the decoys of Lincolnſhire, which, between wind and water, have already worn out two or three ſets of oak ſtakes, and do not yet diſcover any ſymptoms of decay. It is alſo known to poſſeſs the valuable quality of neither ſhrinking nor warping when put into work, nor is it liable to be pierced by worms in our climate. Beſides, it is known to be one of the quickeſt growing trees, remarkably hardy, and extremely beautiful. It is much more eaſily reared than the oak, and could be ſpread over a great extent of mountains, if ſufficiently bare of herbage, at little or no expence, by the natural ſhedding of its ſeeds. It would be valuable not only for ſhip-plank; but even crooked timbers might be obtained by uſing a little art to bend it when young. For flood-gates in navigable canals and wet docks, it would exceed every thing that can be obtained in this climate; for barrel-ſtaves it would be inimitable; and in building it would anſwer all the purpoſes to which fir is now applied, being much ſtronger and more durable than that wood. When it is alſo adverted to, that it is next to incombuſtible, it deſerves to be ſtrongly recommended to planters in this country, particularly in the moſt rugged and barren diſtricts; where, at a very trifling charge, eſtates might be brought to a hundred times their preſent value. And that it is ſo much more valuable than the Scotch fir that is now univerſally preferred to it, for plantations of large extent, in almoſt every ſituation. That as it has only been of late introduced into Britain, the qualities of the wood are not ſufficiently underſtood; for before the laſt thirty years it was cultivated rather as an ornamental tree than with a view to profit. But wherever it has been introduced, it grows ſo freely; is ſo beautiful when in leaf; ſo highly ornamental when covered with its abundant pink bloſſoms in the ſpring; and it is ſo elegant in its form, that it is ſure to become a favourite with the planter. However, in the opinion of Mr. Harte, it grows ſlowly the firſt four years; but in twenty years will exceed a fir tree, both in height and circumference, that is double its age.

In making a plantation of larch, the thinnings may be applied to a variety of uſeful purpoſes, whilſt they are yet of a ſmall ſize. In ſix, eight, or ten years, according to ſoil and circumſtances, the trees will have attained a ſize ſufficient to be made into hay-rakes. They grow ſo ſtraight, and the wood is ſo light, ſtrong, and durable, as to be peculiarly calculated for this purpoſe; and from its ſhrinking leſs than any other wood, theſe rakes will remain longer firm than thoſe made from any other. About two feet cut off from the root end will form the rake head; and five feet above that, with a very little taken off from the thickneſs of the under part, will form the handle. No wood is more proper for the teeth of the rake, than ſome of the red wood of an alder tree, becauſe it is not only tough, but little liable either to ſplit or ſhrink. The bow may be made of aſh, or of the laurel-leaved ſweet-ſcented willow (*ſalix pentandra*), which is ſtill better. Nothing is ſo fit for ſhafts to hoes; for it is nearly as ſtrong, and much more durable than aſh. Handles for bruſhes, brooms, ſcythes, &c. would occaſion a vaſt conſumption of theſe ſmall ſpars. And light, neat, and ſtrong chairs, for ruſh bottoms, might be made of larch wood at this age. It is likewiſe ſuppoſed, that nothing will anſwer better for hop-poles; for one ſet of theſe would outlaſt two or three ſets of aſh. Hurdles, ſpars, and gates, may be made of it both lighter and more durable than of any other wood; and when the trees are of a ſufficient ſize, they may be ſplit down for cart-ſhafts; and in mining countries they might be employed as poſts for ſupporting the roofs of the mines. And the ſmall tops cut off in making theſe various works, would furniſh a neat, elegant, cheap, and durable kind of railing, to be put upon the top of low walls, eſpecially for preventing light ſheep from overleaping them. One end might be let into the coping, whether of ſod, clay, or lime; and the other end received into a ſlip of ſawn larch wood, with holes bored through it to receive their points. From the ſtraightneſs of the wood, this kind of rail would be very neat without much expence. In the ſame manner hen-coops, crates for packing glaſſes, &c. might be made of thoſe materials. But one of the moſt extenſive and beneficial uſes of this kind of ſmall wood, is for the purpoſe of incloſing. Theſe ſpars, when the root is thick enough, may be ſlit up the middle by a ſaw, and cut into lengths of five or ſix feet; or if ſmaller, they may be employed whole. As they are always ſtraight, and nearly of an uniform thickneſs, if driven into the ground for a few inches in a row, at the diſtance of a few inches from each other, with the ſplit ſides all one way, they would make one of the neateſt and moſt complete fences that can be ſeen. The tops of theſe uprights may be received into a piece of ſawed plank, with holes bored in it for that purpoſe; and ſupported at due diſtances by ſloping pieces reaching from the ground to the top.

It may, however, be noticed, that it muſt ſtand to be of a ſufficient age before the timber acquires its beſt qualities of ſtrength and durability. The largeſt of the larch trees on the duke of Athol's lawn at Dunkeld, was meaſured in the month of March, 1796, and the following are the dimenſions of it.

	Ft.	In.		Ft.	In.
At the height of	1	8	from the ground, the circumference is	11	11
	3	0	- - - -	10	0½
	6	0	- - - -	9	0
	9	0	- - - -	8	6
	12	0	- - - -	8	2
	18	0	- - - -	7	11
	24	0	- - - -	7	7

The whole height was eighty-five feet. There are ſeveral larches upwards of one hundred feet in height, which are five or ſix years younger, but none of ſo great a girth. The largeſt of Mr. Drummond's was ninety-ſeven feet high, but leſs in circumference.

For a trial, the duke of Athol has applied larch to a variety of purpoſes, ſuch as mill-axles, flooring in houſes, window frames and doors, poſts and rails, and boat-building: for all of which it appeared to anſwer ſo well, that it is the greateſt acquiſition of wood ever introduced into Great Britain, eſpecially as it attains a conſiderable ſize on high grounds and bleak expoſures, where even Scotch firs either die or become ſtinted. Fiſhing boats, made of larch under forty years growth, laſt nearly three times as long as thoſe built of Norway fir. The late violent winds blew down a larch in the duke's lawn of fifty years of age, eighty-ſix feet ſix inches in height, containing eighty-two feet of ſolid wood; for which four pounds ſterling was offered as it lay on the ground. And as it is not aſcertained whether larch wood is capable of reſiſting the ſea-worm; Dr. Anderſon has propoſed to prove it by ſinking a piece of the ſound, well ripened wood, with another piece of ſound oak wood in the river Medway at Rocheſter bridge, where it is well known that every other kind of wood is very ſoon perforated by the ſea-worm.

It is therefore concluded, that on account of the valuable qualities of the wood the larch deſerves to be cultivated in this country. And another recommendation of it is, its quickneſs of growth. Eight trees being meaſured in the ſpring and autumn of the year 1794, the average of their increaſe in height was nearly three feet nine inches and a quarter; and one of them increaſed three inches in circumference at two feet above the ground. In another plantation, the trees at eight years growth meaſured above twenty feet in height on an average; the trees were from ſix to nine inches high when planted. At twelve years old they meaſured, on an average, from thirty-four to thirty-ſix feet in height. This plantation was on a good ſoil and in a favourable ſituation. Nor is it only while the tree is young that it makes theſe vigorous ſhoots; for it appears by the meaſurement of the trees in Dunkeld, that this in a great meaſure continues even till a period of age, beyond that which they have as yet attained; for one hundred and twenty feet in fifty years, gives an average of nearly two feet and a half in height for each year of their growth.

Very great improvements have been made in the northern parts of Scotland, by means of plantations of Scotch pine, upon the bareſt moors, and in the bleakeſt and moſt inhoſpitable ſituations; the returns of ſuch plantations having been ſuch as fully to ſatisfy the owners. And when the collateral advantages are adverted to, the improvements, Dr. Anderſon thinks, are very great indeed; for in the neighbourhood of ſuch plantations, houſes can be reared at ſo little expence, and the roofs are ſo much better than ordinary, as to induce ſettlers to make their dwellings much neater and more commodious than in other places; rails and other dead fences can be ſo eaſily obtained, that poor people are firſt enabled to have good well ſenced gardens, and then commodious incloſures of larger extent; the branches afford fuel to the ſettlers; cutting and manufacturing the wood furniſhes employment to many; population is thereby augmented; hence a deſire for land to produce the neceſſaries of life, and a conſequent increaſe of rent to the proprietor. In this way Mr. George Dempſter ſees fields rapidly converting into cultivated grounds on his eſtate, and yielding to him ten or twelve ſhillings an acre rent, not only without any expence to him, but after having derived a conſiderable profit from the ſale of woods of his own planting, which grew upon land that five and twenty years before was not worth, to him, above two-pence an acre, and which might have remained in that ſtate for ages to come had it not been planted. A plantation of Scotch pine can be made at much leſs expence than any other tree in the northern parts of Scotland, becauſe the young plants can be afforded at a ſmaller price. In Aberdeenſhire, plants of two years old (and above that age no experienced planter will ever buy them) ſometimes ſell at four-pence a thouſand, conſiſting of 1200; and they ſeldom exceed eight-pence; and there are men that will undertake to complete the whole incloſing, and planting at the diſtance of a yard from each other, and ſupply the deficiencies for five years, at the rate of from ten to thirty ſhillings the Scotch acre, according to the ſize of the incloſure, and the nature of the fence.

It is found by experience, that there is ſcarcely a ſoil ſo bad or any expoſures ſo bleak, where this tree will not live, if the plantation be of ſufficient extent, and not upon the very ſummit of high peaked hills. They do not indeed bear the ſea air very well; nor is the wood ever of a good quality, or the tree long lived, upon clayey ſoils. Several perſons in the ſouth of England have found, that the pinaſter bears the ſea blaſt much better than any other pines. The ſpruce fir will bear a ſtill more expoſed ſituation than the Scotch pine, and after a few years it ſhoots up with ſtill greater luxuriance. But the cones not being to be had in an equal abundance, and the plants being more difficult to rear, they are ſold at a much higher price. Silver fir in a good ſoil proſpers well, and is a beautiful tree, but the price of the plants is too great to admit of large plantations of them being made.

Where the ſituation is bleak and much expoſed to ſtrong blaſts of wind, the plantation muſt not only be of conſiderable extent, but the trees be planted very cloſe, ſo as to be not more than from two to three feet aſunder; the more expoſed the ſituation the cloſer they muſt be; for it is obſerved, that until the branches intermingle, and thus ſerve to give a mutual ſupport to each other, the trees never begin to advance with vigour. Where the plantations are thus thick, there is a neceſſity for beginning to thin them out from the tenth to the fifteenth year after planting. Where the plantations are extenſive, theſe thinnings ſell at a ſmall price, but there are few ſituations in which they will not do more than pay for the expence of cutting them out. Pruning is likewiſe occaſionally neceſſary in many ſorts of plantations. See Pruning, Thinning, and Sheltering *Woods* and *Plantations*.

The leaves and branches of the Scotch pine afford a very wholeſome nouriſhment to cattle and ſheep. In mountainous countries, where ſnow ſometimes lies upon the ground for many weeks together, the benefit that may occaſionally be derived from ſuch plantations will be very great; and the larger branches that are left make excellent fire wood in ſuch caſes.

In ſome diſtricts where the ſoil is of the loamy and better kinds, there are often large plantations of the fruit-tree, as the apple, pear, and other ſorts, in the fields, hedge-rows, &c. See Orchard.

Plantation *Skreens*, are ſuch tracts or plats of planting as are made round plantations or other woods, for the purpoſes of ſkreening, protecting, and promoting the growth of their timber trees or underwood.

They are particularly beneficial in theſe ways, in many expoſed ſituations, as well as for defending the animals from the cold and cutting blaſts which ſweep over them, as they render the climates of ſuch regions more mild and warm, giving a ſoftneſs to the air in ſuch expoſures.

PLANTE-Ver, in *Natural Hiſtory*, the name of a herb ſent over from China, where it is called *hiatſaotonetchom;* that is to ſay, a plant which at a certain time of the year changes into a worm. The Chineſe ſay, that this is a plant during the ſummer ſeaſon; but that in winter its ſtalk dies, and the root becomes a worm. M. Reaumur has well obſerved, that in the preſent improved ſtate of natural knowledge, we can give no credit to ſuch marvellous accounts; and of the roots ſent over to the Academy at Paris, it appeared, that only a certain part of each was to undergo this change: this, however, if true, was no leſs a marvel than that the whole ſhould.

Father Parenin, who ſent it to France, obſerves, in his account of it, that it was a very ſcarce plant even in China; being found only at the palace of Pekin there, where alſo it was not native, but brought from the mountains of Tibet, and ſome other places on the confines of the Chineſe dominions. This father had never ſeen the leaves or flowers of the plant, but only its roots, which were in high eſteem there, not only becauſe of their miraculous changes, but from their poſſeſſing the virtues of the famous ginſeng; but with this advantage, that the uſe of them was not ſubject to be attended with thoſe hæmorrhages which frequently affected the perſons who take large quantities of that famous root. The roots of this plante-ver are uſually about a quarter of an inch thick, and from an inch to three inches in length; but there are much larger in the places where they grow.

Theſe roots had nothing particular in their figure or appearance; but with theſe the father ſent ſome of thoſe which were ſuppoſed to be changed into worms, concerning which he obſerved, that nothing could more exactly expreſs a worm or caterpillar; the head, the eyes, the feet, and the mouth, being all plainly diſtinguiſhable, as well as the ſeveral folds and cuttings-in of the body. This account was found to be perfectly true; but the miſtake was the want of proper accuracy in the obſervation; for this body, which was ſuppoſed to be the root transformed, had in reality never been any part of the plant, but was found to be really and truly a caterpillar.

This was one of the underground kind, or at leaſt of thoſe which go into the ground to paſs their transformation: of theſe we have a great many different ſpecies in all parts of Europe, and ſome of them, when they are entering into their nymph ſtate, have a cuſtom of faſtening themſelves to the roots of plants. Of this kind was the Chineſe inſect, which, when the time of its change approached, always ſelected the roots of this plant as of a proper ſize and dimenſion for its purpoſe; and, gnawing off the end, hollowed away the ſtump, ſo as to introduce its tail into the cavity; where it remains covered with the bark of the root, which ſo nicely joins to it, that people who obſerve it in a ſlight way cannot but miſtake it to be a part of the root, or the remainder of the root a continuation of its body. The more accurate naturaliſts will, however, eaſily diſtinguiſh the vegetable fibres, which make up the root from the animal ones of the caterpillar; and to an eye accuſtomed to ſuch reſearches, the nice joining of the tail to the remainder of the root will eaſily diſcover itſelf. Mem. Acad. Par. 1720.

PLANTED Coat, in the *Manege*. See Hair.

PLANTIN, Christopher, in *Biography*, an eminent printer, born at Mont-Louis, near Tours, in 1514, learned his art under Robert Mace, printer at Caen in Normandy. He ſettled at Antwerp, where he formed a conſiderable eſtabliſhment; and at length he became one of the moſt eminent printers of the age. He publiſhed a number of important works, to the prefaces of which he has ſubſcribed his name, yet it is aſſerted, that he had no pretenſions to learning, and could not even read Latin. If, however, he was defective himſelf, he employed able and accurate correctors of the preſs, who brought his editions of literary works to great repute. The moſt celebrated performance that came from his preſs was a Polyglott bible, printed after that of Alcala. In the courſe of his trade he acquired large property, which he freely employed for the ſervice of learning and its votaries. He died at Antwerp in 1589, with the title of arch printer to the king of Spain. He poſſeſſed a fine library, which he bequeathed to his grandſon Balthazar Moret. It was the cuſtom of this period for every printer of reputation to adopt a motto, which he inſerted in the title-pages of his works. The deviſe of Plantin was a pair of compaſſes, with the motto "Labore et Conſtantia." Moreri.

PLANTING, in *Gardening*, the operation of inſerting plants of the fruit-tree and other kinds, ſeeds, and roots, into the earth, for the purpoſe of vegetation and future growth.

There are various methods of performing this buſineſs in practice for different ſorts of plants, ſeeds, and roots; as hole planting, trench planting, trenching-in planting, ſlit or crevice planting, holing-in planting, drill planting, bedding-in planting, furrow planting, dibble planting, trowel planting, planting with balls of earth about the roots, planting in pots, &c., all of which are occaſionally uſed by different practitioners in the ſeveral branches of gardening, according as the methods are moſt proper for different particular ſorts of plants.

In the firſt, or Hole Planting, which is the principal method practiſed with moſt ſorts of trees and ſhrubs in the full ground, and which is performed by opening with a ſpade round holes in the earth, at proper diſtances, for the reception of the plants, each hole ſhould be dug large enough to admit all the roots of the tree or ſhrub freely every way to their full ſpread, without touching the ſides of the hole, and about one ſpade deep, or a little more or leſs, according to the ſize of the roots and nature of the ſoil, ſo as, when planted, the uppermoſt ones may be only about three or four inches below the common ſurface, or as low as they were before in the ground; though in very humid ſoils, where the water is apt to ſtand, the holes ſhould be ſhallower, ſo as the uppermoſt roots may ſtand full as high as the general level, or higher if neceſſary, raiſing the ground about them, eſpecially when performed in winter. When the ſoil has been thus dug out, the bottoms ſhould be well looſened; the mould in digging out being laid in a heap cloſe to the edge, in order to be ready to fill in again. The holes being thus prepared, and having ſlightly trimmed the roots, &c. of the trees, one tree or plant muſt be placed in the middle of the hole, making all its roots ſpread equally around; a perſon holding the plant erect by the ſtem, while another with the ſpade caſts in the earth about the roots, taking particular care to break all large clods, and trim in ſome of the fineſt mould firſt all round the roots in general, ſhaking the tree occaſionally, to cauſe the fine ſoil to fall in cloſe among all the ſmall root fibres; and where the tree ſtands too deep, ſhake it up gently to the proper height, and having filled in the earth to the top of the hole, it ſhould be trodden gently all round, firſt round the outſide to ſettle the earth cloſe to the extreme roots, continuing the treading gradually towards the ſtem, to which the mould ſhould be preſſed moderately firm, but no where too hard, only juſt to ſettle the earth, and ſteady the plant in an upright poſition: then all the remaining earth ſhould be pared in evenly round the tree, to the width of the hole, raiſing it ſomewhat above the general level of the ground, to allow for ſettling, giving it alſo a gentle treading; and finiſhing it off a little hollow at top, the better to receive and retain the moiſture from rains, and giving occaſional waterings in ſpring and ſummer, eſpecially for the choicer kinds of trees and ſhrubs.

After this, in winter, or early in ſpring, it may be of advantage to the choicer kinds of trees and ſhrubs, to lay ſome long mulch at top of all the earth, both to keep out the winter's froſt, and prevent the drying winds and drought of ſpring and ſummer from penetrating to the roots before the trees are well rooted in their new ſituations. But ſome, inſtead of mulch, uſe graſs turfs turned upſide down, eſpecially when planting upon graſs ground, or any out-plantations, where turfs of graſs can be obtained; or in orchards, where the ground is in graſs; in which caſe it may be proper to bank ſome turfs round the ſides and top of each hole, particularly for large trees; which will ſteady them more effectually, as well as preſerve the moiſture, if much dry weather ſhould happen the ſucceeding ſummer.

In the ſecond, or Trench Planting, which is a method ſometimes practiſed in the nurſery, in putting out ſeedling and other ſmall trees and ſhrubs in rows; and alſo uſed for box edgings, as well as ſometimes for ſmall hedge-ſets, &c. and always in ſetting out aſparagus; it is performed by opening a long narrow trench with a ſpade, making one ſide upright, then placing the plants againſt the upright ſide, and turning the earth in upon their roots. When uſed for young ſeedlings, or other ſmall trees, ſhrubs, &c. the ground is previouſly trenched or dug over: a line is then ſet, and with a ſpade held with its back towards the line, a narrow trench ſix or eight inches deep is cut out, turning the earth from the line, making the line ſide nearly perpendicular: the plants are then inſerted in the trench at ſmall diſtances, cloſe to the upright ſide, covering in the earth about the roots in planting them; and having planted one row, the earth ſhould be evenly trodden in all the way along, to ſettle it cloſe, and fix the plants ſteady, proceeding from row to row in the ſame manner.

But in planting larger trees, in the nurſery way, by this method, a larger trench will be requiſite; ſometimes a trench one or two ſpades wide, with proportionable depth, according as the roots of the trees require, is made; and having opened it all the way along the intended row, the trees are placed along the middle of the trench, filling in ſome earth to each tree, as placed, one perſon holding it erect, whilſt another throws in the earth; and having placed one row, trim in all the remaining earth evenly; then treading it cloſely all the way to fix the plants ſteady, and in a perfectly upright manner.

In the third, or Trenching-in Planting, which is alſo ſometimes practiſed in light pliable working ground, for young trees in the nurſery way, and ſometimes with edge-ſets, &c., being performed by digging along by a line, about one ſpade in width, and planting at the ſame time; a line is ſet; and then having the plants ready, with a ſpade begin at one end, and ſtanding ſideways to the line, throw out a ſpit or two of earth; which forming a ſmall aperture, another perſon being ready with the plants, he directly depoſits one in the opening, while the digger proceeds with the digging one ſpade wide, covering the roots of the plants with the earth of the next ſpit; and another aperture being thus formed, another plant is placed in: the digger, ſtill proceeding, covers its roots, as before, with the next ſpit of earth; and ſo on to the end of the row, placing them at about a foot, or fifteen or eighteen inches aſunder, according to the ſize of the plants. When larger trees with more ſpreading roots are uſed, inſtead of digging the trench only one ſpade wide, two may probably be requiſite for the proper reception of the roots; likewiſe, in forming the openings for the plants, they ſhould be made large enough to receive the roots freely, digging the earth over them as above. After having planted one row of plants, the earth ſhould be trodden evenly along to ſettle it to the roots, and ſteady the plants in an upright poſition. There is another method of this ſort of planting, ſometimes uſed for ſome ſorts of roots, ſuch as horſe radiſh ſets, potatoes, &c., which is performed by common trenching, placing a row of ſets in each trench. The horſe radiſh ſhould be planted in the bottom of the open trench, twelve inches in depth, turning the earth of the next over them; and the potatoe ſets be placed about from four to five or ſix inches deep, covering them alſo with the earth of the next trench.

In the fourth mode, or that of Slit Planting, which is performed by making ſlits or crevices with a ſpade in the ground, at particular diſtances, for the reception of ſmall trees and ſhrub plants, a ſlit is made for each plant, which is inſerted as the work proceeds; and is practiſed ſometimes in the nurſery way, &c., in putting out rows of ſmall plants, ſuckers, &c., at from about a foot to eighteen inches or two feet high, and which have but ſmall roots: it is alſo ſometimes practiſed in out grounds, where large tracts of foreſt trees are planted, and which are planted out at the above ſizes, and in the moſt expeditious and cheapeſt method.

It is performed in this manner: a line is ſet, or a mark made; and then having a quantity of plants ready, they are planted, as the work proceeds in making the ſlits. A man, having a good clean ſpade, ſtrikes it into the ground with its back cloſe to the line or mark, forming a crevice, taking it out again directly, ſo as to leave the ſlit open, giving another ſtroke at right angles with the firſt; then the perſon with the plants inſerts one immediately into the ſecond-made crevice, bringing it up cloſe to the firſt; and directly preſſes the earth cloſe to the plant with the foot; proceeding in the ſame manner to inſert another plant; and ſo on till all is finiſhed; which is a very expeditious way of putting out ſmall plants, for large plantations, but ſhould never be employed, where other better methods can be uſed.

A man and a boy in this method will plant out ten or fifteen hundred plants, or more, in a day.

In the fifth, or Holing-in Planting, which is ſometimes uſed in the nurſery, in light looſe ground: alſo, ſometimes with potatoes, &c., in pliable ſoils; the ground being previouſly dug or trenched, and a line placed: it is thus performed; a perſon with a ſpade takes out a ſmall ſpit of earth, to form a little aperture, in which another perſon directly depoſits a plant, &c., the digger at the ſame time taking another ſpit at a little diſtance, turns the earth thereof into the firſt hole over the roots: placing directly another plant in the ſecond opening, the digger covers it with the earth of a third ſpit, and ſo on to the end of the row.

In the ſixth, or Drill Planting, which is by drawing drills with a hoe from two to four or five inches deep, for the reception of ſeeds and roots, and is a convenient method for many ſorts of large ſeeds, ſuch as walnuts, cheſnuts, and the like; ſometimes alſo for broad beans, and always for kidney beans, and peas; likewiſe for many ſorts of bulbous roots, when depoſited in beds by themſelves; the drills for theſe ſhould be drawn with a common hoe, two or three inches deep; and for large kinds of bulbous roots, four or five inches in depth, covering in the ſeeds and roots with the earth, always to the depth of the drills.

In the ſeventh, or Bedding-in Planting, which is frequently practiſed for the choicer kinds of flowering bulbs, ſuch as hyacinths, &c., alſo for the larger ſeeds of trees, as acorns, large nuts, and other large kinds of ſeeds, ſtones, and kernels: it is performed by drawing the earth from off the tops of the beds ſome inches in depth, then planting the ſeeds or roots, and covering them over with the earth, drawn off for that purpoſe; for which the ground ſhould be previouſly dug or trenched over, raked, and formed into beds three or four feet wide, with alleys between; then with a rake or ſpade trimming the earth evenly from off the top of the bed into the alleys, from two or three to four inches deep for bulbous roots, and for ſeeds, one or two, according to what they are, and their ſize; afterwards, for bulbous roots, drawing lines along the ſurface of the bed, nine inches diſtance, placing the roots bottom downward, along the lines, ſix or eight inches apart, thruſting the bottom into the earth: but when for ſeeds, they may be ſcattered promiſcuouſly; and having thus planted one bed, then with the ſpade let the earth, that was drawn off into the alley, be ſpread evenly upon the bed again over the roots or ſeed, &c., being careful that they are covered all equally the above depth, raking the ſurface ſmooth and fine.

This method is in occaſional practice, in planting ſeveral kinds of the larger prime ſorts of bulbous-rooted flowers in beds; and nurſerymen alſo practiſe it in planting many of their larger ſeeds, nuts, &c.

And another method of this kind is occaſionally practiſed in ſome parts, particularly for planting potatoes in low wet grounds, which is by dividing the ground into beds, four feet wide, with alleys two or three feet in width; then digging the beds, and placing the potatoe-ſets in three rows along each bed, a foot aſunder in the rows: this done, the alleys are dug one ſpade depth, caſting the ſoil upon the beds over the ſets, ſo as to cover them four or five inches deep; in this way, where the ground is very wet, the alleys drain the moiſture from the beds, ſo as ſometimes to afford great crops. Sometimes, in low moiſt grounds, that are in graſs or ſward, the beds are marked out as above, and without digging the ground; placing the potatoe ſets immediately upon the ſward, then digging the alleys, firſt turning up the ſward, and placing it topſy-turvy upon the bed, ſo as to be ſward to ſward over the ſets; then finiſhing by applying more earth from the alleys, to cover in the ſets, the proper depth of four or five inches. This, in ſome counties, is called the lazy-bed method, becauſe the ground is not dug over.

In the eighth, or Furrow Planting, which is by drawing furrows with a plough, and depoſiting ſets or plants in them, covering in alſo with the plough: it is ſometimes practiſed for planting potatoe-ſets in fields, and has been adopted in planting young trees for large tracts of foreſt-tree plantations, where the cheapeſt and moſt expeditious method is required; but this method can be practiſed only in a light pliable ground, and is performed thus: a furrow being drawn, one or two perſons are employed in placing the ſets or plants in the furrow, whilſt the plough following immediately with another furrow, turns the earth upon the roots of the plants. This is not a mode to be much adviſed.

In the ninth, or Dibble Planting, which is the moſt commodious method for moſt ſorts of fibrous-rooted ſeedling plants, particularly all the herbaceous tribe; alſo for ſlips, offsets, and cuttings both of the herbaceous and ſhrubby kinds; likewiſe for ſome kinds of ſeeds and roots, ſuch as broad beans, potatoe ſets, Jeruſalem artichokes, and horſe-radiſh ſets, with numerous ſorts of bulbous roots, &c.; it is expeditiouſly performed with a dibble or ſetting-ſtick, by making a narrow hole in the earth for each plant, inſerting one in each hole always as the work proceeds.

Having a dibble or ſetting-ſtick, it is uſed by thruſting it into the earth in a perpendicular deſcent, in depth as the particular plants, &c. may require; directly inſerting the plant, ſeed, or ſet, as each hole is made, cloſing it immediately by a ſtroke of the dibble. In ſetting any kind of plants, ſlips, cuttings, &c., having long ſhanks or ſtems, it is proper to make holes a proportionable depth, to admit them a conſiderable way in the ground: for example, cabbage-plants, ſavoys, &c. ſhould be planted down to their leaves; ſlips and cuttings ſhould be inſerted two parts of three, at leaſt, in the ground; being particularly careful in dibbling-in all ſorts of plants, to cloſe the holes well in every part about the roots; by ſtriking the dibble ſlantways into the ground, ſo as to ſtrike the mould firſt firmly up to the root and fibres, at the ſame time bringing it cloſe to the ſtem. See Dibble.

In the tenth mode, or Trowel Planting, it is performed with a garden trowel, made hollow like a ſcoop, and is uſeful in tranſplanting many ſorts of young fibrous-rooted plants with balls of earth about their roots, ſo as not to feel their removal.

The trowel is employed both in taking up the plants and planting them.

In the eleventh, or Planting with Balls of Earth about the Roots, which is the removing of the plant with a large ball of earth about its roots, ſo as by having its roots firmly attached to the ſurrounding earth, it ſtill, during the operation, continues its growing ſtate, without receiving any, or but very little check from its removal: this is often practiſed more particularly for the more delicate and choicer kinds of exotics, trees, ſhrubs, and herbaceous plants; and occaſionally for many of the fibrous-rooted, flowery plants, annuals, perennials, and biennials, even in their advanced growth and flowering ſtate, when particularly wanted to ſupply any deficient compartments; though it is not ſo eligible for bulbous-rooted kinds: likewiſe, when intended to remove any ſort of tree or plant out of the proper planting ſeaſon, as very late in ſpring, or in ſummer, it is proper to tranſplant it with a good ball of earth, to preſerve it more certainly in a ſtate of growth. Some trees and ſhrubs are more difficult to remove with a ball than moſt kinds of the herbaceous fibrous-rooted plants, though many of the tree and ſhrub kinds having very fibry roots, alſo readily riſe with good balls.

In tranſplanting any of the tree and ſhrub kinds by this method, if they grow in the full ground, the operator muſt be careful to begin to open a trench with a ſpade at ſome diſtance from and round the ſtem, perhaps a foot, or two or three, according to the ſize of the tree and expanſion of the roots, digging a ſort of trench all round, a ſpade or two wide, or more if large trees, and in depth below all the roots ; all the time having great care not to diſturb the ball or maſs of earth between the ſtem and trench, but preſerve it as entire as poſſible. When the whole has been detached, the plant ſhould be removed into the ſituation for which it is intended, with the whole of its ball about its roots.

When trees or ſhrubs, with balls to their roots, are intended to be ſent to conſiderable diſtances, they ſhould be placed ſingly in oſier baſkets, in order to preſerve the ball, having a baſket for each tree ; the baſkets to be of an upright make, in width and depth in proportion to the ball, with two handles at top, eſpecially if large, and generally worked rather open at the ſides, as ſometimes the baſket and all is placed in the ground, when the plant cannot be readily removed without danger of breaking the ball of earth about it.

In reſpect to the method of planting in pots in general, having the pots and mould ready for the reception of the plants, previous to planting them place ſome pieces of tile, pot-ſherds, or oyſter-ſhell, &c. over each hole at the bottom of the pots, to prevent the holes being clogged and ſtopped with the earth, and the earth from being waſhed out with occaſional waterings ; alſo to prevent the roots of the plants getting out : then having ſecured the holes, put ſome earth in the bottom of each pot, from two or three to five or ſix inches or more in depth, according to the ſize of the pot, and that of the roots of the plant ; then inſert the plant in the middle of the pot upon the earth, in an upright poſition, making its roots, if without a ball of earth, ſpread equally every way ; directly adding a quantity of fine mould about all the roots and fibres, ſhaking the pot to cauſe the earth to ſettle cloſe thereto : at the ſame time, if the root ſtand too low, ſhake it gently up ; and, having filled the pot with earth, preſs it gently all round with the hand, to ſettle it moderately firm in every part, and to ſteady the upright poſture of the plant, raiſing the earth however within about half an inch, or leſs, of the top of the pot, as it will ſettle lower ; for ſome void ſpace at top is neceſſary to receive waterings occaſionally : as ſoon as the plant is thus potted, give it directly a moderate watering to ſettle the earth more effectually cloſe about all the roots, and promote their rooting more expeditiouſly in the new earth ; repeating the waterings both before and after they have taken root, as occaſion may require.

In tranſplanting plants in pots from one pot to another, they may in general be ſhifted with the whole ball of earth contained in the pot about their roots entire, ſo as to preſerve the plant all along in its growing ſtate, as ſcarcely to ſhrink or retard its growth by the operation ; for plants growing ſingly in pots, and of ſome ſtanding, whoſe roots and fibres have eſtabliſhed themſelves firmly in the earth, will readily remove out of the pots with the entire ball in one compact lump, ſurrounding all the roots and fibres, retaining their growing ſtate by ſtill drawing nouriſhment from the ſurrounding ball of earth.

The removing of plants from one pot to another with balls, is in ſome caſes to be avoided ; as where a plant appears diſeaſed or in a bad ſtate of growth, as it is moſt probable the fault is in the root of the earth ; therefore, it is eligible to ſhake the whole entirely out of the earth, in order to examine its roots ; and trim off all decayed and other bad parts ; then, having a freſh pot, and ſome entire new compoſt, replant the tree, &c. therein.

In potting plants from the full ground, or beds of earth, &c., if they have been previouſly pricked out at certain diſtances, and have ſtood long enough to fix their roots firmly, many ſorts may be potted with balls, particularly moſt of the herbaceous, fibrous-rooted kinds, and many of the ſhrubby tribe, by taking them up carefully with the garden trowel, or with a ſpade, as may be convenient, according to the ſize of the plants ; and, if neceſſary, pare the balls round to fit the pot.

Seedling plants, or thoſe raiſed from ſeed beds, by their growing ſo cloſe together, rarely admit of potting with balls to their roots ; ſo that when it is intended to pot ſuch, they muſt be drawn out of the earth with the root as entire as poſſible, and be potted ſeparately in ſmall pots, ſhifting them occaſionally into larger.

Sometimes in pot-planting, to ſave room, and for other purpoſes, ſeveral ſmall plants are planted in each pot, eſpecially when deſigned as nurſery-pots, to receive either ſmall ſeedlings, offſets, ſlips, cuttings, &c., juſt to ſtrike them, and forward them a little at firſt, either in hot-beds, or for removing them to different ſituations, ſuch as occaſional ſhade, ſhelter, &c., and in which ſome ſorts of ſmall ſlips and cuttings are ſometimes planted many together, in one or more wide pots, eſpecially where large ſupplies of ſome particular ſorts are required, ſuch as myrtle cuttings and pipings of pinks, &c., ſometimes to the amount of a hundred or two of theſe ſmall ſets in one capacious pot or wide ſtore pan. The ſmall ſeedlings, ſlips, cuttings, offſets, &c., when they are a little forwarded, or properly rooted, and ſhoot a little at top, ſhould be all potted off, in proper time, each in a ſeparate pot, eſpecially if plants of any duration ; giving them ſmall pots at firſt, and as they increaſe in ſize ſhifting them into larger ones.

When any large growing plants, ſuch as orange and lemon trees, or any other kinds, are become too large for pots, they ſhould be ſhifted into tubs : theſe tubs ſhould be made of full-inch thick ſtaves, and adapted to the ſize of the reſpective plants ; each tub to be well hooped with iron, and furniſhed with two hooked or bow iron handles at top, by which to move them, either by hand, or, when very large tubs, to receive poles between two men for moving the plants where wanted ; having holes at the bottom of the tubs to diſcharge the ſuperfluous moiſture ; placing ſome ſtones, &c. to prevent the holes being clogged with the earth ; the method of planting and tranſplanting being the ſame as in pot planting.

The twelfth Method, or Planting in Pots, is practiſed to all tender exotics, in order for moving them to ſhelter occaſionally, ſuch as all kinds of green-houſe and hot-houſe plants ; and likewiſe for many ſorts of hardy flowering plants, for the convenience of moving them occaſionally to adorn particular compartments ; and for the convenience of moving ſome curious ſorts when in flower to occaſional ſhelter from the ſun's rays and exceſſive rains, in order to preſerve their beauty and prolong the time of their bloom ; ſuch as the fine auriculas, carnations, &c.

In planting in this way, it is highly requiſite carefully to adapt the ſizes to the ſize and nature of the different plants intended to be potted : if ſmall plants, begin firſt with ſmall pots, one plant only to each pot, eſpecially if to remain ; but according as the different plants advance in growth ſhift them into pots one or two ſizes larger, which may be requiſite to many ſorts once a year, to others once in two or three years, according to circumſtances.

Garden pots for this uſe are of ſeveral regular ſizes, from two to ſixty in a caſt, diſtinguiſhed at the pot-houſes accordingly; as twos, ſixes, twelves, ſixteens, twenty-fours, thirty-twos, forty-eights, ſixties, or ſixty-fours, &c., each pot having one or more apertures at bottom to diſcharge the ſuperfluous moiſture. They are ſold by the potters at ſo much *per* caſt; large and ſmall, all of a price; thoſe of only two in a caſt the ſame as thoſe of ſixty; and from two ſhillings to half a crown or three ſhillings *per* caſt is the general price. See Pot, *Garden*.

Sometimes, inſtead of baſkets, ſmall young trees and other plants with balls, intended to be ſent to any diſtance, are put ſeparately in pots, and when they are to be placed in the full ground, each ſhould be turned out of the pot with the ball entire.

Trees and other plants that have generally grown in pots, where they have been of ſome ſtanding, have the whole earth by means of the numerous fibres formed into one compact lump, ſo that it will readily come out entire and firm; or to ſuch as do not ſo eaſily quit the pot, a long blade of a knife, or ſome other thin inſtrument, may be thruſt down between the outſide of the ball and pot all round, and it will then readily come out, either in drawing by the ſtem of the plant, or by ſtriking the edge of the pot with ſomething; or, if ſmall plants, you may turn the pot mouth downward, and ſtrike the edge gently againſt any firm ſubſtance. In replanting thoſe potted plants, if the ſides of the ball of earth are much matted with the fibres of the root, it is proper to pare off the groſſeſt part, together with a little of the old earth, eſpecially if to be planted in pots again; then put it in a pot a ſize larger than before, filling up all round with freſh mould, finiſhing with a moderate watering.

With reſpect to the proper ſtate and preparation of trees for planting, it may be obſerved that young trees, both of the fruit and foreſt kinds, are the moſt ſuitable, and ſucceed beſt, as from three or four to ſix or eight feet in height, and from three or four to five or ſix years old. See Forest, Dwarf, and Standard Trees.

In foreſt-trees, the ſtraighteſt, moſt vigorous, and thriving plants of the reſpective kinds ſhould always be choſen.

In preparing for planting, in taking up the trees out of the nurſery, the greateſt care is neceſſary in raiſing them with as great a ſpread of root as poſſible, which is often ill attended to, eſpecially when large orders of plants are to be drawn in a hurry. The ground about the trees ſhould always be opened with the ſpade widely round the roots, and deep enough to get to their bottoms without hacking and cutting them with the ſpade, but ſo as to raiſe each plant with all its roots as entire as poſſible. After having taken up the trees out of the nurſery, &c., it is alſo of great moment to have them replanted as ſoon as poſſible in the places allotted for them; for although by properly covering the roots with litter, or, if ſent to any conſiderable diſtance, by tying them in bundles, and packing them up with plenty of ſtraw about the roots, and afterwards cloſely matted round, they may be preſerved in tolerable good condition a fortnight or longer, yet, where it is poſſible to plant them the ſame day, or in a day or two after, before the ſmall fibres are ſhrunk or dried, it will be of much advantage in the firſt growth of the trees; but when this cannot be done, they ſhould be immediately laid in the ground in a trench.

In preparing for planting, the roots muſt have occaſional trimming, not however to retrench or reduce any but the maimed and decayed parts; therefore previous to planting examine the root, and cut out all ſuch parts as have been broken or damaged in taking up, and any caſual decayed parts or other blemiſhes, being careful to leave all the ſound roots every where entire; leaving alſo all the ſmall fibres that are freſh and vigorous, only trimming off ſuch as are become dry and mouldy; ſuffering all the main roots to remain, moſtly at full length, except juſt to tip off their ends a little on the under ſide, ſloping outward; and reduce any very long ſtragglers, and ſhorten long perpendicular tap-roots, more particularly of fruit-trees, to prevent their running down into a bad ſoil, and to promote their throwing out others horizontally.

With regard to the preparation of the heads of the trees, the principal care is to trim off the ſtraggling ſhoots and branches from the ſtems, leaving the heads for the generality entire, only juſt retrenching very irregular branches, and ſhortening any very long ſtragglers; always ſuffering the main or leading top ſhoot to remain at length, particularly in foreſt-treees, and all others that are to grow to a lofty ſtature. Fruit-trees, however, ſometimes require a more accurate regulation of the head preparatory to planting, particularly dwarfs for eſpaliers and walls. If the fruit-tree is taken from the nurſery at one year old from the budding and grafting, and with its firſt ſhoot from budding and grafting entire, this firſt ſhoot muſt neceſſarily be ſhortened or headed down to force out lateral wood below, to furniſh the bottom properly; but this heading down is not neceſſary at the time of planting, but ſhould remain till ſpring, until the tree has taken freſh root and begins to ſhoot; for the head remaining greatly promotes the rooting; when in March or the beginning of April, head it down within half a foot, or five or ſix eyes of the inſertion of the bud or graft, and the ſhoot ſo headed will throw out, from its remaining lower eyes, ſeveral lateral branches the enſuing ſummer.

If it is two, three, or more years old from the budding and grafting, and the firſt ſhoots were headed down in the nurſery at the proper time, it is proper to plant it with its whole head entire, only retrenching any irregular branch, or any very luxuriant ſhoot; or thin out the worſt of ſuch as are evidently too cloſe or crowded, leaving however all the regular branches at full length, except juſt to reduce any very long rambler.

For new planting trees it is very improper to retrench the branches too ſeverely, and cut all that remains ſhort, as is very often practiſed, on a ſuppoſition of ſtrengthening their roots, which however has often the contrary effect; for the branches and leaves imbibe the refreſhing influence of the air, &c., which, being conveyed to the roots, proves nutrimental, and contributes exceedingly towards vegetation, and conſequently promotes the rooting afreſh more expeditiouſly and effectually. Beſides, by a ſevere retrenching, and a general ſhortening, of fruit-trees in particular, in moſt ſorts the very parts where fruit would have been ſoon firſt produced are cut off, and it will probably coſt the tree two or three years growth to furniſh new branches equal to thoſe cut away, as well as retard its bearing in proportion. And it often happens by ſuch a general amputation of the branches of all new planted trees at the time of planting, that they, for want of branches to collect vegetative nouriſhment, either make very little progreſs in ſhooting for two or three years after, or ſometimes, when they do ſhoot, throw out a profuſion of unneceſſary wood from the remaining eyes or buds.

Therefore if young fruit-trees at planting, whether dwarfs or ſtandards, are furniſhed with five or ſix or more good regular principal branches, of one, two, or more years growth, it is improper to retrench any part of them, and disfigure the tree, particularly apples, pears, plums, and cherries, which ſhould at all times be but ſparingly ſhortened; and ſince ſeveral good branches being already obtained in the proper parts to give the head its firſt regular form, they in their turn readily furniſh more; and if there is a vacancy in any part, it will be better to endeavour to fill it by ſtopping ſome of the young ſhoots produced the ſummer after planting, by either pinching or pruning them in May or June the ſame year to three or four eyes, or cutting them down to that length in the winter or ſpring following. Some fruit-trees, however, ſuch as peaches, nectarines, &c., againſt walls, require moſt of their young ſhoots to be ſhortened annually.

Foreſt-trees, &c., in their preparation previous to planting, after being drawn out of the nurſery, ſhould only have the blemiſhed roots trimmed, and all branches from the lower part of the ſtem pruned off, cutting the lower ones cloſe, the others to two, three, or four inches, particularly the deciduous kinds, leaving the head always tolerably branchy, and moſtly entire; not to trim away all the branches to one leading ſhoot only, as is often practiſed, but leave a proportionable ſhare of the upper more erect branches, to form ſome tolerable head, and only juſt retrenching the lower ſtragglers, very long rambling luxuriants, and very irregular growths, to preſerve a little regularity; being particularly careful to leave always the top or leading ſhoot perfectly entire, unleſs it is decayed, or is very crooked, bending much downwards, &c., in which caſes, if any ſtraight ſhoot is conveniently ſituated, the crooked part may be retrenched down to the ſtraight ſhoot, which leave entire to run up in height, as without a leader a tree can never aſpire to any conſiderable ſtature; for the leader, by its annual erect ſhoot, gradually increaſes the length of the ſtem, and, as it advances, ſends out a ſupply of laterals to furniſh the head, branching and ſpreading.

In planting large tall trees, where it is deſigned to form ſhade, ſhelter, or blind as ſoon as poſſible, very little reduction of the branches of the head ſhould be ſuffered, only to reduce any very irregular growers.

In removing pretty large trees of any ſort with conſiderable heads, eſpecially when very ſpreading or crowded, it may be proper to reduce the whole regularly in ſome proportion to the root, that the winds may not have too much power to incommode it after planting; in which caſes it may be neceſſary to retrench or reduce ſome of the moſt extenſive lower branches, and thin out ſome where much crowded, reducing others down to ſome convenient lateral branch they may ſupport, ſo as each reduced branch may, notwithſtanding its reduction, terminate in a leader, having its top entire, not to exhibit naked ends of branches, ſtanding up like ſtumps.

In reſpect to the preparation for planting of all the ſhrub kind, only juſt trim the ſtraggling under branches and ſhoots from the lower part of the ſtem, retrenching any luxuriants of the heads that ſeem to ſhoot away very irregularly and vigorouſly at the expence of the neighbouring branches, and reducing long ramblers, &c., juſt to preſerve a little regularity.

All new planted tall trees ſhould be ſtaked as ſoon as planted, in order to ſupport them ſteady every where till they are well rooted and have ſomewhat eſtabliſhed their roots, that winds may not overſet, or otherwiſe incommode them; particularly all trees of ſix, eight, or ten feet high, and upwards; one tall ſtout ſtake being placed to each tree, or more, if the trees are of large ſize, ſharpening the lower ends, and driving them firmly into the ground near the ſtem; or if larger trees, place it ſlantways, at a little diſtance, ſo as its top reach the upper part of the ſtem, on the oppoſite ſide to that moſt expoſed to the winds, in which it will have the greateſt effect; but large trees with full heads, ſhould generally have very tall ſtrong ſtakes, three to each tree, placed triangular-ways, in an oblique or ſlanting direction, afterwards binding the ſtems of the trees firmly to the ſtakes, previouſly wrapping ſome ſoft ſubſtance, ſuch as hay-bands, &c., round them, at the part where it is to be faſtened to the ſtakes, in order to ſave the bark from being rubbed off againſt the ſtakes by the motion of the winds, which is more particularly neceſſary to tall plants that are much expoſed. Large trees of conſiderable ſtature, with full heads, are often ſupported with ropes ſuſpended from the top of the ſtem three different ways, ſtraining them tight, and the end of each rope ſtaked ſecurely down to the ground; ſo that whatſoever way the wind blows the ropes ſtay the tree ſtill in its upright poſition.

Such new planted trees as are expoſed to cattle ſhould each be well fortified all round the ſtem with thorn buſhes, briars, furze, &c.

The general ſeaſon of planting, for all ſorts of trees, is autumn and ſpring, as from the beginning of the decay of the leaf, in October, until December, for the former; though evergreens may be begun to be tranſplanted towards the middle or latter end of September, and continued till December. And for the ſpring planting, February and March are the principal time, but may be continued occaſionally until April; and ſeveral ſorts of tender young evergreens ſucceed beſt when planted the beginning of that month, or later. Much, however, in this buſineſs, muſt depend on the ſoil and ſtate of the weather.

In preparing to plant herbaceous fibrous-rooted plants, care is to be had to remove them with good roots; young ſeedlings, &c., eſpecially require particular care in drawing them with proper roots. When they are to be taken all clean up, they may be readily looſened and raiſed out of the earth with ſome inſtrument with all their fibres entire; but when they are only to be thinned, they do not admit of this, as it would diſturb the remaining plants, ſo muſt be drawn out by hand carefully, with as much root as poſſible.

Many ſorts of fibrous-rooted plants, however, are ſo hardy, and apt to grow, that if taken up almoſt any how, with a little root, they will ſtrike; it is nevertheleſs adviſeable to uſe care in drawing all ſorts for planting with tolerable roots, as they will, in proportion, make more progreſs in their future growth. And as to any trimming preparatory to planting, very little is wanted, only in ſome ſorts, juſt ſhortening very long naked ſpindly roots, and trimming any ſtraggling fibres; though in numbers of plants of this tribe hardly any trimming at all is required, either in root or top.

PLANTING *Timber Trees*, in *Rural Economy*, the act of making plantations with theſe ſorts of trees, which is a practice that has lately been more attended to than formerly; probably from the advantages of it being more fully underſtood, and more correctly aſcertained. The particular ſorts of land that may be converted to this purpoſe with the greateſt chance of profit, have been already pointed out.

In the accompliſhing the buſineſs, the principal difficulty conſiſts in properly adapting the trees to the nature of the ſoil, as, unleſs that be the caſe, the ſucceſs is far from ſo great as it would otherwiſe be. The land ſhould alſo be in a proper ſtate of preparation for the reception and growth of the trees, and the work be executed at a proper ſeaſon in a proper manner, and at ſuitable diſtances, according to the nature and quality of the ſoil, and that of the trees; the whole being well fenced from the attacks of cattle.

Soil.—The particular kinds of ſoil beſt adapted to the cultivation of the different ſorts of timber trees, and in which ſome or other of them will be found to grow in the moſt perfect manner, are gravelly or light ſandy ſoils, with free porous ſubſoils; gravelly or ſandy loams on porous ſubſoils;

loamy, ſandy, or gravelly ſoils on retentive ſubſoils ; gravelly, chalk or chalky loams on porous ſubſoils ; loamy clays or clayey loams on porous ſubſoils ; and ſtrong clayey or loamy ſoils on retentive ſubſoils. Likewiſe, thin mooriſh heathy ſoils on gravelly or porous ſubſoils, alſo on clay or retentive ſubſoils ; and beſides theſe kinds of land, there are, as has been ſeen above, many other thin poor ſorts of waſte, in different parts of the kingdom, which are not fit for raiſing any other deſcriptions of plants, that might be converted with great advantage to this purpoſe, as the diminution in the quantities of timber and other wood every where now almoſt begins to be ſeriouſly felt.

Mr. Smith, in the "Survey of Argyleſhire," ſtates, that the grounds there which ought to be marked out for this improvement, are ſuch as are mentioned below. The beſt land would no doubt bear timber beſt ; and if arable land could be ſpared for the purpoſe, the return might be expected to be in proportion to the value of the ſoil. But in this county little or no arable land, meadow, or good paſture, ought to be laid under planting. It ſhould have only thoſe waſte grounds which are capable of this improvement, and of no other. And of theſe we may reckon, firſt, thoſe extenſive dry moſſes and moor-lands, in the hollows and on the declivities of hills, eſpecially in the inland parts of the county. Theſe lands are generally covered with ſhort heath, mixed with ſo little graſs, that they are not worth 6*d.* the acre. The trunks of trees generally found in them give, however, a ſufficient proof of their aptitude to grow timber, and they can never be turned to better account than by planting them ; and that with the ſame kind of timber that is found in them. This is generally fir, and ſometimes oak. Whatever it be, follow nature, and you cannot err. It may be ſaid that ſome of theſe ſituations are far from water-carriage. But the whole county is ſo indented with ſeas, and ſo well accommodated with roads, that almoſt every mountain is acceſſible by the one or the other. Or, if any of them be not, ſtill it may be profitable to plant it, were it only with a view of converting a great part of the wood to the purpoſes of extracting from it turpentine, tar, pitch, roſin, and of making pot-aſhes. And another kind of ground which ought to be planted, and of which we have large tracts, is that which is covered with bruſh-wood, ſuch as hazel, birch, &c. ſeldom allowed by the cattle to riſe above two or three feet high. Here nature, which could not be miſtaken in the ſoil, has planted wood, though it has not been allowed to grow, and has marked out the ground as fit for planting. This bruſh-wood will prove an excellent nurſe to young plants, by giving them ſhelter till they raiſe their heads above it ; after which they will deſtroy the bruſh-wood by excluding the ſun and air from it, and reduce it to a manure which will help their growth. Among this bruſh-wood, however, there may ſometimes be found ſome ſprouts of oak and aſh, which ought to be cut over a few inches above the ground ; after which they will ſhoot up, and thrive exceedingly, from the abundance of roots which they have to nouriſh them. Patches of dwarfiſh oak, which the cattle never allow to riſe one foot from the ground, are alſo common in many parts of the county. If theſe ſpots were brought within the encloſure of a plantation, and the buſhes cut over a little above the ſurface of the ground, they would ſoon be valuable. In England, even oak plants are often cut in this manner after one or two years, when they have taken to the ground, and the ſecond ſhoot is truſted to for the tree ; as it is found to grow with greater luxuriance than the firſt, which was checked by tranſplanting.

Stools of natural wood, wherever they are, furniſh much room for planting ; and at a trifling expence, when they are already encloſed. Every vacancy in them ought to be filled up with oak, aſh, elm, and other valuable kinds of timber. The ground is ſuitable for planting ; the natural wood will ſhelter it ; and thus it will thrive well, and improve the coppice. The propereſt time for improving a natural wood with planting, is immediately after it is cut, when the fences are in beſt repair, and when the ſun and air will get at the plants which may be ſet among buſhes of leſs value. Theſe buſhes ſhould afterwards be cut down, if they are found to hinder the growth of the planting. The duke of Argyle has done much in this way, and lord Stonefield, ſir James Campbell, and ſeveral other proprietors, have thus improved their natural woods very conſiderably. In one year, captain Campbell, of Kintarbet, with a ſpirit yet uncommon amongſt the moſt of the proprietors of this county, planted among his natural woods no leſs than 20,000 trees of valuable timber. At this rate, he will, in a few years, lay the foundation of a ſure and large fortune.

And a fourth kind of ground, that ſhould be devoted to planting in this ſituation, is, that on which a number of venerable native firs are ſtill growing. Theſe memorials of our former foreſts are not unfrequent in ſome of the upper parts of the county, particularly in Glenety and Glenurchay ; and they deſerve more attention than they have hitherto met with. From the ſeed which they ſhed in winter, and which is driven to a diſtance by the ſtorm, a beautiful plantation riſes up in the ſpring ; but when the cattle are driven up to the mountains in ſummer, this precious crop, the hope of future foreſts, is for ever deſtroyed. This is the more to be regretted, as the quality of this fir is ſo excellent, as not to be ſurpaſſed by any in the world. The ſeed of this fir is precious, and a ſingle cone of it, if poſſible, ſhould not be loſt. But then, in order to preſerve its valuable quality, it ſhould be ſown where it is meant it ſhould grow, without paſſing through the medium of a ſeed-bed or nurſery. And it appears neceſſary, in order to preſerve the quality of the timber, that we ſhould follow nature, and ſow the ſeed directly where we intend the tree ſhould grow. The ſeed too will thrive where plants would fail.

After ſome heſitation about parting with any thing we call arable ground, he mentions one other kind of land, which it may ſometimes be proper to devote to planting. He means ſome high fields, which, under the old ſyſtem of cultivation, were ſubject to the plough, but never to much advantage. Theſe poor gravelly fields were manured by folding cattle on them at night. But now, where this ſyſtem is given up, they lie neglected, and many of them are already covered with heath. With little expence, and much advantage, they might be converted to plantations. The earthen dikes which ſurround them might be faced with ſtones, of which the dikes themſelves would furniſh a great proportion. The tops of the dikes might be planted with firs, if not with quickſets, for more fence and ſhelter. The fields ſhould then be ploughed, and, if at all convenient, dreſſed with ſome lime or other manure, and ſown with the ſeed of the native Scotch fir, and with acorns. By this preparation of the ground, the trees would thrive amazingly, and the wood retain its native quality. There are many thouſand acres of waſte land in this country as well as Scotland, that might be converted to plantations with great advantage, and which are fit for nothing elſe.

A tabular view, taken, with ſome alteration, from the Agricultural Survey of the County of Kent, ſhewing the nature of the ſoil in which different ſorts of timber trees are found to ſucceed in the moſt certain and perfect manner, with the uſes to which they may be applied in different caſes, is given in the following table.

Surface Soil.	Subſoil.	Common Growth.	Planted Growth.	Uſes of.
Heavy and gravelly loams.	Heavy loam with chalk.	Birch, hornbeam, oak, aſh, hazel, beech, &c.	Oak, aſh, cheſnut, willow, lime, walnut.	Timber, hop-poles, cord-wood, hurdles, bavins for bakers, and lime.
Sandy loams.	Heavy loams.	Birch, hornbeam, oak, aſh, hazel, beech, &c.	Elm, beech, Weymouth pine, common ſpruce.	Timber, hop-poles, cord-wood, hurdles, bavins for bakers, and lime.
Flinty ſtrong loam.	Heavy loam.	Ditto.	Willow and cheſnut.	Timber, fencing-poles, and as above.
Gravelly and ſandy loams.	Gravelly loam.	Aſh, beech, oak, hazel, &c.	Cheſnut, aſh.	Hop-poles, fencing-poles, and all as above.
Gravelly, ſandy and flinty loams.	Heavy gravelly flinty loam.	Aſh, beech, hornbeam, and oak.	Aſh, beech, larch, &c.	Timber, fencing, hop-poles, cord-wood, for charcoal, bavins, &c.
Flinty dry poor gravelly loams.	Chalk at two feet depth, with gravelly loam.	Beech, oak, &c.	Beech, larch, &c.	Cord-wood, bavins, and hop-poles.
Flinty and gravelly loams.	Chalk four feet, with deep gravelly loam.	Aſh, oak, hazel, &c.	Aſh, larch, &c.	Cord-wood, hop-poles, bavins, ſtakes, ethers, &c.
Ditto.	With a few flints, but nearly as above.	Oak, hazel, beech and aſh.	Cheſnut, aſh, and willow.	Hop-poles, fencing-poles, ſtakes, cord-wood, &c.
Lightiſh black loam.	Dry ſandy gravel.	Birch, elm, aſh.	Aſh, elm, &c.	Various uſes in huſbandry.
Flinty gravelly loams.	Strong loam, with flints.	Oak, aſh, beech, &c.	Aſh, &c.	Poles, bavins, cord-wood, &c.
Chalky, flinty gravelly loam.	Chalk, with ſome gravelly loam.	Ditto.	Ditto.	Ditto.
Gravelly loam.	Heavy, flinty, and poor loam.	Oak, aſh, hazel, and beech.	Aſh, oak, &c.	Common produce a few poles, cord-wood, bavins, &c. Plantation many poles, and the above.
Gravelly and chalky loams.	Gravelly loam with chalk.	Oak, aſh, &c.	Aſh and cheſnut.	Poles, cord-wood, &c.
Gravelly loam.	Ditto.	Aſh, oak, and beech.	Oak, larch.	Ditto.
Ditto.	Gravelly loam and heavy loam.	Ditto.	Scotch pine.	Ditto.
Sandy gravel.	Gravelly and ſandy loam.	Aſh, oak, beech, and Scotch pine.	Larch, cheſnut, &c.	Poles, ſtakes, ethers, &c.
Stone ſhatter and gravelly loam.	Strong loam with ragſtone.	Oak, hazel, birch, &c.	Birch, oak, &c.	Oaken tillers, ſmall timber poles, &c.
	Gravelly loam with ſome ſtone.	Oak, birch, aſpen, hazel, and aſh.	Aſh, cheſnut, and willow.	Fencing-poles, hop-poles, cord-wood, &c.
Gravelly loam.	Gravelly loam, with ſome ſtones.	Oak.	Cheſnuts.	Hop-poles, fence-poles, &c.
Sandy loam.	Gravelly loam.	Birch, oak, hornbeam, &c.	Cheſnut, &c.	Fence-poles, hop-poles, &c.
Sandy loam and ſtone ſhatter.	Gravelly loam with ragſtone.	Oak, beech, birch, hazel, aſh.	Ditto.	Ditto.
Gravelly loam and ſtone ſhatter.	Deep loam, heavy clay and gravel.	Ditto.	Ditto.	Ditto.
Ditto.	Gravelly loam.	Ditto.	Ditto.	Ditto.
Gravelly and ſandy loam.	With ſtrong clay and loam.	Oak and ditto.	Aſh, larch, &c.	Poles, fire-wood, &c. as above.
Gravelly loam flinty.	Gravel with clay and ſome flint.	Scrubby oak, hazel, &c.	Oak, aſh.	Timber and ditto.
Wet ſpungy land.	Moiſt and boggy earth	Alder, willow.	Alder, oſier, willow, &c.	Hurdles, hop-poles, &c.
Drier ditto.	Ditto more dry.	Poplar.	White poplar, willow.	Hop-poles, &c.
Light ſandy loam.	Dry gravelly earth.	Mountain aſh, aſh.	Scotch pine, ſilver fir.	Hop-poles.
Light gravelly loam.	With dry gravel.	Aſh.	Sycamore.	Timber, turnery, &c.

Mr. Nicol ſtates, that in planting, where it is performed on the more elevated or mountainous tracts, warmth and ſhelter are to be conſidered, as without theſe the trees ſeldom thrive in a perfect manner. In ſuch ſituations there is, in general, the moſt difficulty and the leaſt progreſs made in the raiſing of timber trees; the ſucceſs of the planter depending greatly upon fixing on ſuch ſorts of timber trees as may in future become the moſt highly valuable, on planting thickly with plants of not too large a ſize, and on a conſiderable plat, or extent of ground both in length and width being planted. In theſe unfriendly ſituations to the growth of trees, ſmall plants muſt conſequently be choſen and planted thick on the ground; as the winds are very prejudicial to trees of a large ſtature, by looſening the roots, and frequently breaking the fibres; but though this is the moſt diſadvantageous ſituation for planting, it is poſſible, with proper care in the above reſpects, to rear young timber in it. Where it is intended to cover a mountain from its baſe, it will be moſt conveniently done by planting round the baſe in the firſt inſtance, riſing gradually; by which means an artificial ſhelter will be forming, from the progreſs that will be made by the trees that were firſt planted, eſpecially if the extent is ſuch as to require ſeveral ſeaſons to complete the planting. The portion firſt planted ſhould be pretty extenſive, in all ſuch caſes eſpecially where ſhelter is principally intended.

The kinds of trees to be choſen for ſuch ſituations muſt be regulated, in a great meaſure, by the ſoil. The pine would perhaps be found to flouriſh moſt, but the larch is preferable as a nurſe. The mountain-aſh, the beech, the aſh, the ſycamore, the birch, the fir, &c. may all be planted with reaſonable hope of ſucceſs; and where the ſoil is deepeſt and richeſt the oak. But in low ſheltered ſituations, where the inconvenience of expoſure to the winds is obviated, timber-trees may be planted with greater certainty of ſucceſs; the chief care neceſſary in this caſe being to fix on trees of a proper kind, and placing them at proper diſtances, according to their ſorts and ſizes. As theſe ſituations admit of moſt kinds, on the more ſheltered parts, the oak, larch, elm, beech, horſe-cheſnut, walnut, lime, ſpruce, and ſilver fir may be ſuitable; and on the leſs ſheltered portions, the aſh, birch, ſycamore, hornbeam, mountain-aſh, and fir, with a mixture of larch. It may likewiſe be noticed that the banks of rivers and canals are moſtly favourable for the planter's purpoſe, and moſt ſorts of timber and other woods may be raiſed in ſuch ſituations; the oak, elm, poplar, willow and ozier, according as they are more or leſs dry; but the preference muſt depend on the local circumſtances of the different caſes.

But in ſituations near the ſea-coaſt, as they are in general inimical to the growth of timber, the beech and ſycamore will be moſtly found the moſt proper, as bearing the ſea air better than other ſorts. At leaſt they are of great uſe in nurſing the other ſorts of trees till they acquire ſufficient ſtrength. It is adviſed in ſuch places, as the beſt mode of performing the buſineſs, to plant, where the banks riſe high, in the face of them much within the level of the tops, in order to afford a ſcreen for the trees within till they have attained a ſufficient height; but when they are flat, to have recourſe to planting in belts, commencing the work as cloſe to the edge of the water as poſſible, putting the plants in, in a very thick manner in the firſt rows, as at the diſtances of not more than about thirty inches, and uſing ſuch plants as are ſtout, well rooted, and not more than eighteen inches growth.

Raiſing the Plants.—The different methods of providing the plants have been already noticed under the head of PLANTATION; but the moſt uſeful are either by raiſing them in nurſeries near the ſpot to be planted till of proper ſizes, or by purchaſing them from nurſerymen in the neighbourhood. For extenſive tracts of ground the firſt is the moſt advantageous mode, but when only ſmall tracts are to be covered, the latter may often be the moſt adviſeable. In forming the nurſery grounds, great attention ſhould be paid to having them properly ſituated in reſpect to warmth, and the ſoil well broken down and enriched by proper manures. In Nottinghamſhire, in the duke of Portland's extenſive plantations, a well ſituated and ſheltered valley, as contiguous as poſſible, is fixed upon for the purpoſe, and a ſpace of ground ſufficient for the purpoſe is well fenced in; large boarded gates being placed at each end, with a road down the middle proper for admitting carriages to convey away the young trees. When after the fence is completed the ground on each ſide the road is trenched about twenty inches deep, which may be done for about 3*l.* 10*s.* or 4*l.* *per* acre, according as the land is more or leſs gravelly. It is beſt done in the ſpring, when the planting ſeaſon is over. If, after the trenching, two or three chaldron of lime be laid on an acre, the land will produce an excellent crop either of cabbages or turnips, which being eaten off by ſheep in the autumn, will make the land in fine order for all ſorts of tree ſeeds: but as the oak is the ſort of tree cultivated in general, this is the method purſued in raiſing and managing that moſt valuable ſpecies. In the autumn, after the cabbages or turnips are eaten off, the ground requires nothing more than common digging. As ſoon as the acorns fall, after being provided with a good quantity, ſow them in the following manner: draw drills with a hoe in the ſame manner as is practiſed for peas, and ſow the acorns therein ſo thick as nearly to touch each other, and leave the ſpace of one foot between row and row, and between every fifth row the ſpace of two feet for the alleys. While the acorns are in the ground, great care muſt be taken to keep them from vermin, which would very often make great havock amongſt the beds, if not timely prevented. Let this caution ſerve for moſt other ſorts of tree ſeeds.

As ſoon as the acorns are come up, the beds require only to be kept clean from weeds till they want thinning; and as the plants frequently grow more in one wet ſeaſon, where the ſoil is tolerably good, than in two dry ones, where the ſoil is indifferent, the time for doing this is beſt aſcertained by obſerving when the tops of the rows meet, which is done when that is the caſe by taking away one row on each ſide the middlemoſt, which leaves the remaining three rows the ſame diſtance apart as the breadth of the alleys. In taking up theſe rows, the workman ought to be careful neither to injure the plants removed, nor thoſe left on each ſide. The reſt of the young oaks being now left in rows at two feet apart, let them again ſtand till their tops meet, then take up every other row, and leave the reſt in rows four feet aſunder, till they arrive to the height of about five feet; which is full as large a ſize as is ever wiſhed to be planted. In taking up the two laſt ſizes, the method is to dig a trench at the end of each row, full two feet deep, then undermine the plants, and let them fall into the trench with their roots entire; as very much of their future ſucceſs depends on this point of their being well taken up. And a ſimilar mode is neceſſary with other ſorts of trees in providing them for the purpoſe of planting.

But in the place of this method, the acorns as well as other ſeeds of trees are ſometimes ſown at firſt where they are to grow and remain. This method, the author of the Argyleſhire Report ſays, makes the beſt timber; the plants ſuffer no checks, nor feel the inconvenience of a change of ſoil, and the expence of raiſing an extenſive plantation in this manner is very trifling. Beſides, it is found that theſe ſeeds of trees will grow in ſituations in which the plants have failed. The moſt expeditious way of ſowing the ſeed in this manner, is, by a party of three men working together. The firſt with a paring ſpade takes up a turf, the ſecond ſtirs the earth with a ſpade, and the third diſtributes the ſeed and covers it. If any of the ſeedlings fail, they may be replaced by young plants raiſed on a ſimilar ſoil, which will ſoon be reconciled, when very young, to their change of ſituation. Indeed the oak, when planted from the ſeed, or at moſt from the ſeed-bed, adapts itſelf wonderfully to almoſt any ſoil or ſituation ; though it delights moſt in that which is very dry and gravelly.

In many caſes, after the plants have been kept in the ſeminary or ſeed-bed for about two years, they are removed to a nurſery of this kind, and planted in rows or lines twelve or more inches apart according to their ſort, and from three to five in the rows, where they remain for two years longer, and are then finally planted out.

Preparation.—As ſoon as the plants have been raiſed in ſome of theſe methods, ſo as to be in a ſtate for planting out, the next point to be attended to, where the ground has been properly drained, is that of preparing it for their reception. In this buſineſs great care is neceſſary, as much depends upon its being in a good condition for the reception of the plants. It is performed by the plough or the ſpade according to the different circumſtances of the land. When coarſe plants prevail, ſuch as heath, furze, broom, &c. they muſt be fully deſtroyed by ſtubbing them up, burning, or otherwiſe clearing them away. When burning is practiſed, the aſhes ſhould be blended with the ſoil, as they are found of great ſervice in promoting the growth of the plants ; in the opinion of Mr. Nicol. But the mode of preparing by the plough on tillable ſcites, where the ſoil is thin, is the cheapeſt and moſt effectual of any ; as where the land has been in tillage, it wants nothing more than two furrows and an equal number of harrowings, to render it fit for the reception of the trees. But where it is in lay, a crop of oats, &c. ſhould be taken the ſeaſon before planting ; or if it is ſtubborn, a ſecond crop, perhaps of beans, turnips or potatoes, will be neceſſary ; previouſly ploughing and harrowing well, and laying the land up in a perfect method. A trench plough is frequently uſed for this purpoſe, which ſtirs the ground to twelve or thirteen inches. In this method it is eſſential to plough to the full depth each time, in order that the roots of the plants may ſtrike down more freely into the ſoil.

Where the ſpade is employed, which muſt be the caſe in ſteep ſituations where the plough cannot come, and where there are rock, ſtones, or other obſtructions ; the beſt planters adviſe, that the holes or pits ſhould be made to the full depth of the ſoil, and ſufficiently large according to the ſize of the trees. For thoſe of eighteen or twenty inches in height, whoſe roots occupy about nine inches when ſpread out, holes of fifteen inches in diameter may be ſufficient. This muſt, however, be regulated by the judgment of the planter. And as it is of great advantage to the trees that the turfy matter ſhould be well broken down and reduced before the time of planting, it may be uſeful to have the holes made a proper length of time before the trees are put in, to admit of this being fully effected, eſpecially on the drier and more light ſoils, where there is a ſmaller proportion of this material.

Mr. Nicol ſtates, that from the deſire of early appearance it has been too much the caſe to plant foreſt-trees of too great growth. It is, however, found, that there is not only much ſaving of expence, but a much greater certainty of ſucceſs, in planting ſmall young trees than ſuch as are large and of greater age. Such as have been in the nurſery two, three, or four years according to their kind, may in common be the moſt advantageous as timber trees. He alſo thinks that deciduous trees of all kinds, except the larch, of from three to five feet in height, being carefully raiſed with good roots, will generally ſucceed. He has, however, ſhewn, that a one year's ſeedling larch, nurſed one or at moſt two years, will outdo all others of its kind in any ſoil or ſituation, and therefore adviſes planting trees of this age only. Firs of any kind will ſucceed better if under than above thirty inches, even in the moſt favourable ſoil and ſituation. Moſt generally thoſe of fifteen or eighteen inches in height are to be preferred. From this view of the ſubject, it may occur to ſome, that to plant ſeedlings only would be the moſt adviſeable and leaſt expenſive method. That it would be the leaſt expenſive method is obvious ; but, that it is moſt adviſeable, except for the Scotch and ſpruce firs, may, he thinks, be diſputed.

As the chief property of any young tree intended for tranſplantation, conſiſts in a multiplicity of healthy fibres ; hence the neceſſity of nurſing, in kindly ſoil, for a year or two, all tap-rooted plants, for the attainment of this object, and that we may commit them to the leſs genial ſoil and more untoward ſituation with greater probability of ſucceſs. For, whether ſhall we ſuppoſe the plant which has both root and branch to make, or that which has the latter only, in the firſt ſeaſon after ſo important a change of habit, is more likely to ſucceed ?—the latter, certainly. From which alone may be demonſtrated the cauſe why plants of this deſcription ſurpaſs thoſe of greater ſize, as ſtated above. Theſe are raiſed with unbroken, tufty, and fibry roots ; thoſe with maimed, lank, fibreleſs ones ; nor do they, with the utmoſt ſkill and attention, bear ſuch proportion to the top. Conſequently the fibrils cannot afterwards, by the utmoſt efforts of human art, be induced ſo immediately to ſeek paſturage for the ſuſtenance of the trunk. For though lopping may in a great meaſure obviate this, injury is thereby done to the tree. In all ſoils and ſituations it is the ſafeſt and leaſt expenſive method to plant young healthy well rooted plants, where they can be procured.

Diſtances, Manner, and Time of Planting.—Mr. Nicol's directions are, that for the moſt expoſed, bleak ſcites, and barren ſoil, from thirty to forty inches may be conſidered as a good medium ; varying according to circumſtances. For in an extenſive tract, it will hardly happen that there is not a variety of ſoils. Some parts may be deeper and more loamy ; others more gravelly and rocky. In the former, the greater diſtance may be adviſeable ; in the latter the leſſer. But for leſs expoſed ſcites, and where ſoil is found above ſix inches in depth, from four to five feet will be a good medium ; varying the diſtances according to circumſtances as above. And for belts, ſtripes, or clumps, whoſe breadth or diameter does not exceed a hundred feet, lying in a bleak ſituation, and thin ſoil, the margin, on all ſides, ſhould be planted at not more than two feet apart : the interior at three. Thoſe lying on a more ſheltered ſituation, and of deeper ſoil, may be allowed diſtance according to circumſtances. But narrow ſtripes, or ſmall clumps, even if the ſoil may be termed good, ſhould generally be planted thicker than a more extended maſs, that the plants may afford each other ſhelter.

For the more ſheltered ſcites, where the ſoil is deep, good, and where apparently every plant will grow, ſix feet will be a good medium diſtance. Wider than this he cannot approve in any caſe whatever ; becauſe at this diſtance, the plants have room to grow till their thinnings become uſeful. But even where this is not an object, there is a greater; namely, that the plants may not grow too ſquat in their infancy, and that the pruning hook be not much wanted in the formation of ſtately timber. It is ſuppoſed that he who plants too thin, with the idea of ſaving trouble in thinning, deviates as widely from the right path, as he who thins none at all. It is, therefore, contended that thick, rather than thin planting, is the ſafer ſide to err on. By which mode alſo, there is a more equal crop on the ground, beeting or filling up vacancies being much leſs neceſſary. And in oppoſition to the common practice, it is ſuppoſed that thick planting is moſt neceſſary where the plants are largeſt, as the greateſt number die in theſe caſes. The Nottinghamſhire Report ſtates, that in the duke of Portland's plantations, where trees of various ſizes are planted in an irregular manner, the number upon an acre is uſually about two thouſand; but in other caſes the number is frequently much larger.

With reſpect to the manner of ſetting the trees in the plantations, it is probably the beſt method, except where vegetable crops are to be cultivated between, to plant without any regular order, though the line or row manner is frequently practiſed, as being the leaſt troubleſome and expenſive of any that can be adopted. With reſpect to the moſt advantageous manner of blending or intermixing the trees, it is obſerved that ſome have adviſed the planting in groups, to prevent the ſuppoſed injury of trees of different ſorts growing together; others, however, prefer the mixed method, not only as affording a better means of aſcertaining what ſorts of timber trees ſucceed beſt, but as enabling the planter to protect them more effectually. It has, however, been ſuggeſted by Mr. Nicol, that it matters little whether we plant in diſtinct groups or in indiſcriminate mixture; provided, in the latter caſe, we ultimately retain the moſt profitable and flouriſhing kinds only: for, with the proviſo that moſt of the kinds evidently adapted to the ſoil and ſituation be planted according to the mode of thick planting, a ſufficiency of them will remain, after all others are thinned away, for a full and final crop. For inſtance: if it ſhould be ſuppoſed that the ſoil is beſt adapted to the oak; that it is deſirable to raiſe the moſt valuable kinds rather than the decorative; and that, excluſive of the larch for nurſes, and a few firs to enliven the borders, ſix kinds are to compoſe the mixture; plant two oaks for one elm, two elms for one beech, two beeches for one aſh, two aſhes for one birch, and two birches for one ſycamore. And thus will the plantation at once be formed, in uniform gradation, of kinds moſt likely to ſucceed each other, in the caſe of either diſagreeing with the ſoil or climate; and which alſo ſucceed each other in reſpect of value as timber: doing juſtice, at leaſt, to the patriotic intention of the planter, ſhould the firſt and more valuable kinds fail.

It is conceived that in all ſituations, and on all ſoils, except thoſe termed humid, and which are adapted to the aquatic kinds only, the larch is, without doubt, the moſt proper nurſe, and therefore ſhould take preference of all others for this purpoſe. But on ſub-humid, or loamy ſoils, the Lombardy poplar and Huntingdon willow are good ſubſtitutes; and, when variety is the object, ought to be mixed with the larch, for the purpoſe of nurſing the other more valuable kinds. And that on elevated, poor ſcites, the mountain-aſh, for the firſt ten or fifteen years, is outdone by the larch only in the office of nurſing, and is juſtly admitted for the ſake of variety. In all ſituations, this plant grows quickly in youth. In maritime ſituations, the ſycamore is likewiſe evidently uſeful for this purpoſe. Few trees, except the above, grow faſter in youth; and none are more patient of the ſea-breeze. Conſequently, when the ſcite is much expoſed thereto, this tree ſhould be freely planted in mixture with the larch for nurſing the oak, beech, elm, &c. if the intention be the culture of ſhip-timber. It is likewiſe ſuggeſted, that the common pine may ſometimes be uſeful in this view, and afford greater variety. The proportion in which trees of this ſort ſhould be employed, muſt neceſſarily depend on the peculiarity of the ſituation, and other circumſtances. Some recommend in thin ſoils, and bleak ſituations, tree for tree; and in leſs expoſed ſituations, and better ſoils, one nurſe for two principal trees; and in moſt ſheltered ſituations, with good ſoil, one nurſe for three, four or five principal trees may be a ſufficient allowance. On the moſt expoſed and bleak ſituations, where the ſoil is evidently ſterile, the ſafeſt way is to plant too many rather than too few, as, unleſs well ſheltered, the timber trees never ſucceed well in expoſed ſituations.

The time of planting theſe ſorts of trees with the moſt advantage, and the greateſt chance of ſucceſs, differs according to the nature of the ſoils and the plants, as well as in the ſtate of the weather. It has been ſtated, that in the more porous dry ſoils, with the hardier ſorts of trees, the autumn, as from the middle of October to the latter end of November, may be the moſt ſuitable; as they will be better eſtabliſhed againſt the ſummer heats, which are often deſtructive to new planted trees. But in the more heavy ſoils, eſpecially thoſe of the clayey and loamy kinds, and with leſs hardy ſorts of trees, the early ſpring ſeaſon, as from the middle or latter end of February to the beginning of April, may be the moſt proper. The condition of the land ſhould be particularly attended to in this ſort of work, as it is equally improper to plant when either in too dry or too moiſt a ſituation. At a time when the ſoil is neither wet nor dry, the operation of planting is moſt eaſily, and alſo moſt ſucceſsfully performed. The mould adheres not to the ſpade, nor does it run in; it divides well, and with little trouble intermingles with the fibres; nor, in the operation of treading and ſetting the plant upright, is it wrought into a mortar, to the evident prejudice of the plant, whatever weather may enſue. Conſequently, on a retentive ſoil, it cannot be proper to plant in time of rain, nor in many caſes for a day or two afterwards; nor after a fall of ſnow, until for ſeveral days it has entirely diſappeared. Whereas on a dry abſorbent ſoil, it may be very proper to plant in time of gentle rains or immediately after heavy ones.

Another circumſtance which ought to be regarded in this buſineſs, is the difference in the forwardneſs of the vegetation of different ſorts of trees, as it ſhould regulate in ſome degree the time of planting, where thoſe of the ſame ſorts are only made uſe of. In this view, it is adviſed that the larch, elm, ſycamore, lime, horſe-cheſnut, mountain-aſh, birch, alder, poplar, willow, and ſome others, ſhould be put in by the beginning of March; and that the oak, birch, aſh, cheſnut, hornbeam, &c. be finiſhed planting by the beginning of April at the lateſt. The beſt ſeaſon for planting of many trees of the evergreen kind, ſuch as the Weymouth pine, ſpruce, Scotch, ſilver, and other firs, is ſuppoſed by ſome to be in the latter end of July, or in the beginning of the following month, when the weather is inclined to be moiſt or cloudy.

Planting out.—It is adviſed, that as ſoon as the trees have been taken up with care, ſo as to injure the fibres of the roots as little as poſſible, and a few of the bruiſed extremities cut off, they ſhould, when intended to be planted in mixture, be put together in proper proportions, and conveyed in this way to the place where they are to be planted. They muſt then be diſtributed on the ground, at the pits or other places, in order to be ready for the planters, as by this means much time is ſaved, which would otherwiſe be loſt in ſorting. But to prevent the roots from getting too dry, it is neceſſary not to take up or bring on to the land more than can be planted in a ſhort ſpace of time. But where only one or two ſorts of trees are to be planted, the uſual practice of carrying the plants along as the planting proceeds, may be the moſt convenient method for performing the work. And the operation is the beſt and moſt readily performed by two perſons: a man to do the work, and a boy to hold the plants. In executing the work, the labourer firſt ſtirs the mould well in the holes or pits that have been previouſly prepared, rendering it level, and fit for the reception of the plant: or forms new holes according to the mode of planting that is adopted. The boy then places the plant in the hole, with all the fibres of its roots regularly ſpread out and unconfined, to the depth of about an inch more than it had ſtood in the nurſery, holding it perfectly upright; while the man gently fills in the looſe mould, moving the tree a little up and down to let it mix with the roots: the remainder of the earth is afterwards put in; and the labourer proceeds to the preparation of the next hole, leaving the boy to ſet the plant erect and cloſe the mould about it, which in ſoils of the ſtiffer ſorts ſhould be only performed in a light manner, but in thoſe of the drier kinds, as the ſandy and gravelly, as cloſely as poſſible. In this way the work is to proceed till the whole is finiſhed. There are other methods of planting ſometimes made uſe of, ſuch as by forming ſlits, nicks, or openings of other kinds, ſo as juſt to preſs in the roots of the plants; but theſe, from the roots being confined, and having no looſe freſh mould to ſhoot into, ſeldom anſwer in any perfect manner. It is well remarked that much of the ſucceſs of the planter depends upon this part of the work being well executed; but that great care ſhould be taken, particularly where the land is inclined to moiſture, or of a retentive quality, not to plant at too great a depth. In planting on ſteeps, it is directed that the trees ſhould be placed towards the declivity, being put in at the loweſt part of the opening; which ſhould, in completing the work, be left the higheſt, by which the moiſture may be better preſerved for the ſupport of the plant.

It ſeems not improbable, the author of Practical Agriculture ſays, but that in many caſes and ſituations, the planting of ſmall trees of the timber kind might be performed with great convenience and expedition by the aſſiſtance of a plough ſuitable for the purpoſe, as has been ſometimes practiſed in ſetting hedge-plants. Where trees of conſiderable growth are planted, great attention is neceſſary to have them well ſecured againſt the wind, as, when they become looſe, the fibres are ſo broken and deſtroyed that they ſoon die. This has been commonly effected by means of ſtaking: but as in this way the trees are often in danger of being injured by rubbing, a practice of ramming the earth cloſely about the roots has been attempted, which in ſome ſoils, and upon ſmall ſcales of planting, has, it is ſaid, been found to ſucceed; but in extenſive concerns it is wholly inadmiſſible, from the trouble that muſt attend it.

When the plants have been all put in, it is a practice in ſome caſes to ſow or ſet the plantations with acorns, as it is found that ſown oaks as well as other trees exceed in growth thoſe that are planted. This work is done either by paring off the ſurface with a mattock, and ſetting the acorns with a dibble, or by putting them in ſlight drills by the hoe, at the diſtance of about ſix inches. The beſt ſeaſon for performing this buſineſs is in April, and it may be performed the firſt, ſecond, or third year after planting the ground, but the firſt or ſecond is probably to be preferred. It is adviſed that great care ſhould be taken to preſerve the acorns well, by expoſure to the air and frequent turning, as they are very apt to ſprout ſoon after being gathered. The proportions of theſe and other ſorts of ſeeds that are neceſſary are thus ſtated in the Nottingham Agricultural Report.

Quantities *per* Acre.

Of acorns from four to ſix ſtrikes.
— aſh keys, four ſtrikes.
— Spaniſh cheſnuts, one ditto.
— hawthorn berries, one ditto.

It is neceſſary to bury the aſh keys and hawthorn berries one year in beds or pots of ſand before they are ſown in theſe ſituations.

When the trees have been thus planted out, it is adviſed as neceſſary not to loſe ſight of them, as the young plants ſhould be kept clean and free from the annoyance and choaking of coarſe weeds of all kinds, for at leaſt three or four years. This may be done by the hoe in many caſes; but ſome have recourſe to the culture of different ſorts of crops in this view. In this method, however, much care is requiſite not only to avoid injuring the plants, but to guard againſt the ſoil being too much impoveriſhed, and their growth thereby retarded in too great a degree. And where coarſe plants abound, ſuch as broom, furze, briars, and other ſimilar productions, in all the leſs expoſed ſituations, they ſhould be wholly cut up and deſtroyed; but in bleak expoſures it may be a better practice to only clear them to a diſtance round the trees, ſo that they cannot do any injury by rubbing or ſtriking againſt them, the others being left for the purpoſe of ſheltering and protecting the young trees during their young growth. There is another circumſtance likewiſe to be attended to in this buſineſs, which is that of filling up the vacancies that are cauſed by the dead plants. Where the ground is kept perfectly clean, this may be done at any proper ſeaſon; but in other caſes, when the dead plants cannot be ſo eaſily detected, it may be better to delay the buſineſs to the third or fourth year, when the deficiencies can be more perfectly aſcertained. If this ſort of buſineſs be done too early, many plants are frequently removed that would have thrown out from the bottom, on account of their not being dead in that part, though wholly gone in the top. It is adviſed that the plants employed in filling up theſe vacancies ſhould never be too large, as where that is the caſe they are liable to die or be deſtroyed.

There is ſtill another kind of planting which is frequently practiſed, but the propriety of which is not yet well aſcertained. It is that of ſetting hedge-rows with trees of the timber kinds. The utility of the practice is maintained by ſome on the ground of the degree of ſhelter and ornament that it affords, and its being a means of raiſing much uſeful timber at little or no expence; while others condemn it as highly improper, and diſadvantageous, on the principle that much injury is not only done to the crops, eſpecially when of the grain kind, by the dropping and the ſpreading of the roots, but alſo to the hedge in the places where they ſtand, by their producing gaps and openings. The author of a late practical work, however, ſuggeſts, that though ſome inconvenience and injury may be ſuſtained where this ſort of planting is much in uſe in arable diſtricts; yet from theſe being, in a great meaſure, capable of being obviated by proper training and pruning, and from the naked appearance which is exhibited without them in a country, but more particularly from the vaſt benefit that may be derived in the way of timber; it would ſeem that ſome extent of planting in this method ſhould be attempted in moſt ſituations. Mr. Middleton hints, that it would not be an eaſy matter to make an accurate eſtimate of the advantages to be derived from ſuch a meaſure: but in order to gain a ſlight idea as to the quantity of hedge-row timber, let it be conſidered that, in well-incloſed, hedged, and cultivated diſtricts, the hedge-rows occupy from a twentieth to a tenth of the whole ſurface. Even including the common fields, and cultivated ſlopes and borders of ſheep-downs, the average quantity of land occupied by hedge-rows, at this time, amounts to a twentieth, or two millions of acres; all of which might probably be made to produce timber: more than half of it, however, would no doubt do ſo, by only trimming the loweſt ſide branches off to the height of ten, twelve, or fifteen feet from the ground. This would permit the air to circulate freely, give every advantage to the occupier's crops; and would leave ſufficient tops upon the trees for the purpoſes of growth and rural ornament. Under management like this, the hedges would every where preſent healthy, vigorouſly-growing, and handſome timber; and would add very much to the profit of the land owner, to the ſecurity of the country, and to the pleaſures of the traveller. But in performing the work of planting in ſuch caſes, the nature of the land, the ſort of huſbandry that it is principally conducted under, and the kind of expoſure in which it is placed, ſhould be well conſidered, and the ſort of trees properly adapted to it. In dry ſoils, moſt ſorts of timber trees, as has been ſeen, may be planted; but in thoſe more ſtiff and heavy kinds, the oak and the elm may be the moſt proper. The aſh ſhould, perhaps, never be had recourſe to where the land is almoſt wholly under the plough; but on lands under the grazing or graſs ſyſtem, it may be planted with advantage. In bleak and expoſed ſituations, the beech is probably the beſt for this uſe; and near the ſea the ſycamore. The trees where the ground is moſtly in an arable ſtate ſhould be planted at much greater diſtances than under the contrary circumſtances, and ſuch trees as run moſt to tall clear ſtems be preferred. It is recommended that the young trees in this ſort of planting ſhould be larger than in other caſes, being kept in the nurſery two years longer than has been here adviſed, and ſhifted ſo as to produce more fibrous roots. When about five or ſix feet in height they are probably in the moſt ſuitable condition for being planted out in theſe places.

In theſe caſes the moſt proper time of planting in hedgerows is, when the fields are firſt broken up from the ſtate of lay, as at that time, from their being continued in the ſtate of tillage for ſome years, there will be leſs trouble and expence in protecting them from cattle by palings, &c. as well as leſs danger of their being injured by the browſing of live ſtock, as they will be advanced beyond their reach by the time the land is reſtored to graſs.

Where the planting is performed in the hedge-rows of graſs lands, the trees muſt always be perfectly ſecured from the croppings of cattle, as well as the rubbing of ſheep, or other animals, as where this is not the caſe, they are ſoon much injured, and frequently wholly deſtroyed. The work of planting in theſe caſes ſhould be carefully performed in the manner deſcribed; and where the trees do not ſtand perfectly firm againſt the wind, be well ſecured by ſtakes, or other proper means, as they never thrive well when not kept perfectly faſt and ſteady in the ſoil.

The practice frequently employed of converting the hedge-row timber trees into pollards by lopping off their top branches, ſhould conſtantly be guarded againſt as much as poſſible, as it is the deſtruction of timber. Where pollards abound, they are moſtly cropped once in from about nine to fifteen years, the profits of which, in general, belong to the tenant. This work ſhould be conſtantly finiſhed by the end of February, where it is in uſe, at the lateſt.

As ſoon as the trees have acquired a tolerable growth, it is neceſſary, in all caſes, to attend to the proper pruning and thinning of them occaſionally as they advance, in order to prevent their growing in an improper manner, and their injuring each other by rubbing or being drawn up weak. In the firſt intention, they are therefore to be occaſionally looked over after the third ſeaſon from planting, and ſuch headed down, or otherwiſe cut, as may appear neceſſary for their more regular or perfect growth. When this has been done, the only thing further will be to encourage a leader, by ſhortening all the other branches that appear to contend with it to nearly one-third of their length, in order to ſtrengthen their main ſtem. The whole that is afterwards neceſſary, is that of properly thinning the ſtrong top branches, and thoſe on the ſides, which may be done by a light bill. This is, however, only applicable to trees of the foreſt kind; thoſe of the fir and evergreen ſort require nothing more than the regulation of their leaders, as that of keeping them ſingle where they throw out double. The leſs the ſide branches are touched the better in all theſe ſorts of trees, as they are very much hurt by cutting.

On the whole, planting is without doubt the moſt productive improvement that can be attempted on poor barren lands, and ought to be promoted in every way as much as poſſible; but more eſpecially by the application of ſome ſort of ſtimulus which could have the effect of inducing the proprietors of lands, in ſituations proper for it, not to neglect ſuch undertakings, as being the beſt means of rendering their properties fully and completely valuable, as well as of benefiting the country.

Planting, *Inverſe* or *Reverſe*, is a method of planting, in which the ordinary poſition of the plant, or ſhoot, is inverted; the branches being ſet in the earth, and the roots reared into the air.

Agricola mentions this monſtrous way of planting, which, he aſſures us, ſucceeds very well in moſt, or all ſorts of fruit-trees, timber-trees, &c. both foreign and domeſtic. Bradley affirms his having ſeen a lime-tree in Holland, growing with its firſt roots in the air, which had ſhot out branches in great plenty, at the ſame time that its firſt branches were turned into roots, and fed the tree.

The induſtrious Mr. Fairchild has practiſed the ſame with us, and gives us the following directions for the performance of it.

Chooſe a young tree of one ſhoot, of alder, elm, willow, or any other tree that takes root readily by laying; bend the ſhoot gently down, till the extreme part be in the earth, and ſo let it remain till it has taken good root. This done, dig about the firſt root, and gently take it up out of the ground, and raiſe it till the ſtem be nearly upright; in which ſtate ſtake it up.

Then prune the roots, now erected in the air, from the bruiſes and wounds they received in being dug up; and anoint the pruned parts with a compoſition of four parts of bees'-wax, four of tallow, two of reſin, and two of turpentine, melted together, and applied pretty warm. Then prune off all the buds or ſhoots upon the ſtem, and dreſs the wounds with the ſame compoſition, to prevent any collateral ſhootings; and leave the reſt to nature.

Planting, in *Architecture*, denotes the laying the firſt courſes of ſtone on the foundation, according to the meaſures, with all the exactneſs poſſible.

PLANTS, in *Botany* and *Vegetable Phyſiology*, compoſe the ſecond of the three kingdoms of nature. To define the limits of theſe, the animal, the vegetable, and the foſſil kingdoms, has exerciſed the ingenuity of philoſophers. When foſſils were believed to poſſeſs a vegetative power, which even Tournefort maintained, the chief difficulty lay in diſtinguiſhing them from plants; but ſince the mineral kingdom has been aſcertained to depend on the laws of chemiſtry alone, all ambiguity on that ſide of the queſtion is removed. On the other hand, in proportion as the phyſiology of plants has been ſtudied, their anatomy, nutrition, developement, and propagation, have been found ſo nearly allied to ſimilar functions in animal bodies, that increaſe of knowledge has but augmented our perplexity. The following are among the moſt approved definitions, intended to diſcriminate between animals, vegetables, and foſſils.

Jungius, in his Iſagoge, p. 1, ſays "a plant is a living body deſtitute of ſenſation; or it is a body attached to ſome certain place or ſeat, whence it derives powers of nouriſhment, increaſe, and propagation." Linnæus cites this paſſage inaccurately in Phil. Bot. 1. He obſerves, in a manuſcript note, that the floating ſea-weeds, and *Confervæ*, form an exception.

Boerhaave conſiders a plant as "an organic body, attached by ſome part of itſelf to ſome other body, whence it derives nouriſhment."

Ludwig aſſerts that "natural bodies conſtantly endowed with the ſame form, and with locomotion, are animals; thoſe which have the ſame form, without locomotion, are vegetables; and thoſe which have a diverſity of form, are minerals." To this Linnæus well objects, the perfect regularity of form in cryſtals of the ſame ſpecies; and the want of locomotion in ſeveral animals.

Tournefort, in his Iſagoge, 54, ſays "a plant is an organic body, always furniſhed with roots, perhaps always with ſeeds, and almoſt always with leaves, flowers, and ſtems."

Alſton has defined vegetables as nouriſhed by pores ſituated in their external ſurface, animals by veſſels in their internal one.

Linnæus, in Phil. Bot. 1, has given the moſt neat, and generally approved, definition. "Stones grow. Vegetables grow and live. Animals grow, live, and feel."—To which he has ſubjoined, in manuſcript, "*et ſe movent, motu poſſibili;*" *i. e.* and are endowed with a certain degree of ſpontaneous motion.

Difficulties attend all theſe poſitions. The want of ſenſation in vegetables cannot be demonſtrated, nor are appearances to the contrary wanting; ſo that it can never ſerve for a practical mode of diſcrimination, nor as a baſis for any philoſophical argument.

Mirbel, in his Traité d'Anatomie et de Phyſiologie Végétales, has remarked "that plants alone have a power of deriving nouriſhment, though not indeed excluſively, from inorganic matter, mere earths, ſalts or airs, ſubſtances certainly incapable of ſerving as food for any animals, the latter only feeding on what is or has been organized matter, either of a vegetable or animal nature. So that it ſhould ſeem to be the office of vegetable life alone to transform dead matter into organized living bodies."

To this we can find no exception. However inconvenient, and indeed impoſſible to be uſed, as a practical teſt, it appears to be a ſound philoſophical diſtinction, between the animal and vegetable kingdoms. The foſſil or mineral kingdom is eſſentially diſtinguiſhed from both, by the want of an organized ſtructure, developed and increaſed by abſorption; and of a vital principle, eſſential to the performance of all the functions on which their health, growth and propagation depend.

Plants come under conſideration, in various points of view, in a work like the preſent. For what concerns their anatomy and phyſiology, ſee Anatomy, Bark, Cortex, Circulation *of Sap*, Fecundation *of Plants*, Leaf, Flower, Germen, Pericarp, &c.: for their ſcientific arrangement and diſcrimination, ſee Botany, Classification, Flora, Figures *of Plants*, Genus, Species, Natural *Orders*, System, &c. See alſo Lichenes and Musci. The reader is requeſted to correct two typographical errors in the latter article, column eighth, line 18 from the top, for *ſinks* read *ſhrinks;* and line eight from the bottom, for *ſexual* read *eſexual.*

Plants *of Britain*, the natural ſpontaneous production of our ſoil and climate, have formed the ſubject of many ſeparate botanical works. More or leſs perfect catalogues of Britiſh plants have been publiſhed by How, Ray, Petiver, Wilſon, Hill, Jenkinſon, and others, beſides a number of local Floras. Ray's *Synopſis Methodica Stirpium Britannicarum* firſt ſet the example of a ſyſtematic arrangement, and ſcientific diſcrimination, of our native vegetable productions, and has been the foundation of all that has been done ſince. This excellent work was accommodated to the Linnæan ſyſtem and principles, with augmentations, by Hudſon, and has led the way to the labours of Withering, Lightfoot, Robſon, Broughton, Wade, Hull, Curtis, Relhan, Abbott, and the writer of the preſent article, whoſe *Flora Britannica*, extended as yet no farther than the end of the *Muſci*, was written on a compariſon of all that had before been done, with the ſpecimens of the Linnæan herbarium. This Latin work has been followed up and illuſtrated by the figures, and Engliſh deſcriptions, of the ſame author's *Engliſh Botany*, drawn, engraved, and publiſhed by Mr. Sowerby, which is juſt now come to a concluſion, in thirty-ſix volumes octavo, with 2592 coloured plates. In the progreſs of this latter work, ſince the *Flora Britannica*, or the *Compendium Fl. Britannicæ*, appeared, about 150 ſpecies have been added to the Britiſh liſt; even in the firſt twenty-three, or phænogamic, claſſes of the Linnæan ſyſtem. We propoſe, therefore, in the preſent article, to exhibit a complete catalogue of the Phænogamic plants of Britain, as far as the preſent ſtate of our knowledge extends, with a reference throughout to the *Engliſh Botany*, in which, with two or three exceptions only, they are now all ſeparately delineated. Theſe amount to 1450. So full an enumeration of Britiſh plants has no where, hitherto, appeared; and we ſhall take the opportunity of correcting miſtakes of the *Flora Britannica*, reſpecting certain ſpecies erroneouſly there admitted. This catalogue is arranged according to the Linnæan ſyſtem, with thoſe ſlight alerations only, which are adopted in the *Fl. Brit.* and accounted for in the author's *Introduction to Botany.* Each plant is mentioned by its generic and ſpecific names, in Latin and Engliſh; then follows a reference to the volume and plate of Engl. Bot.—The particular ſituation, duration, and flowering month, of every ſpecies are ſubjoined. Whatever the reader may wiſh further to know, is to be ſought under the name of each genus, at its proper place in the alphabet. New ſpecies, not there mentioned, are particularly deſcribed or defined, and various neceſſary corrections are given reſpecting preceding articles, as in the claſſes *Tetradynamia* and *Gynandria.* New matter, regarding genera

nera belonging to the poſterior part of the alphabet, will hereafter be found there. An aſteriſk (*) is prefixed to every ſpecies, preſumed to be of foreign origin, or but imperfectly naturalized here; and a croſs (†) to thoſe concerning which ſome error is ſuſpected, they being, not at preſent, found in the places indicated, and perhaps having had other ſpecies originally miſtaken for them. The Latin names throughout correſpond with the *Flora Britannica* and *Engliſh Botany*, except where the contrary is expreſſed by a ſynonym between crotchets.

The 24th claſs, *Cryptogamia*, though not omitted, is neceſſarily treated in the moſt compendious manner, it being impracticable at preſent correctly to enumerate the Britiſh ſpecies of that claſs. Even a partial catalogue of them would alſo have extended this article too far. They are nearly all, except *Fungi*, included in the *Engliſh Botany*.

Claſs 1. MONANDRIA.

Ord. 1. *Monogynia*.

SALICORNIA. Glaſſwort.

1. S. *herbacea*, common, or ſamphire. vol. 6. pl. 415. Sandy ſea ſhore. Annual. 8th and 9th months.

2. S. *procumbens*, procumbent. 35. 2475. Sea ſhore. Ann. 8.

3. S. *radicans*, creeping. 24. 1691. Muddy ſhores. Perennial. 9.

4. S. *fruticoſa*, ſhrubby. 35. 2467. Sea-coaſt, rare. Per. 8, 9.

HIPPURIS. Mare's-tail.

1. H. *vulgaris*, common. 11. 763. Pools and ditches. Per. 5.

CHARA. Chara.

1. C. *vulgaris*, common. 5. 336. Muddy waters. Ann. 7.

2. C. *hiſpida*, prickly. 7. 463. Pools and ditches. Ann. 7, 8.

3. C. *flexilis*, ſmooth. 15. 1070. Pools and lakes. Ann. 7, 8.

4. C. *tranſlucens*, great tranſparent. 26. 1855. Pools, rare. Ann. 6, 7.

This is the larger plant of Vaillant, fig. 8, mentioned as a variety of *flexilis* in our article CHARA, n. 4.

5. C. *nidifica*, proliferous. 24. 1703. Sea ditches. Ann. 7, 8.

"Smooth, tranſparent, without prickles. Leaves cylindrical, elongated, all ſimple. Anther often ſtalked."

More ſlender and branched than the laſt, but more ſtout and firm in habit than *C. flexilis*.

6. C. *gracilis*, ſlender. 30. 2140. Pools, rare. Ann. 9.

"Smooth, tranſparent, ſhining, without prickles. Lateral branches repeatedly forked; their ſegments awl-ſhaped, acute. Leaves awl-ſhaped, often branched."

Much ſmaller and more tufted than the laſt. When dry almoſt colourleſs, ſhining like glaſs.

ZOSTERA. Graſs-wrack.

1. Z. *marina*, ſea. 7. 467. Sea ditches. Per. 8, 9.

Ord. 2. *Digynia*.

CALLITRICHE. Water Star-leaf.

1. C. *aquatica*, common. 11. 722. Ditches and pools. Ann. 4—10.

Claſs 2. DIANDRIA.

Ord. 1. *Monogynia*.

LIGUSTRUM. Privet.

1. L. *vulgare*, common. 11. 764. Woods and hedges. Shrubby. 5, 6.

FRAXINUS. Aſh.

1. F. *excelſior*, common. 24. 1692. Woods and hedges. Tree. 4, 5.

2. F. *heterophylla*, ſimple-leaved. 35. 2476. Woods, rare. Tree. 4, 5.

See FRAXINUS, n. 8. var. b.—Vahl's name, *heterophylla*, is preferable to *ſimplicifolia*, as a few leaves are often ternate, or even pinnate, on the ſame tree with the ſimple ones.

CIRCÆA. Enchanter's Nightſhade.

1. C. *lutetiana*, common. 15. 1056. Shady dank places. Per. 6, 7.

2. C. *alpina*, mountain. 15. 1057. Rocks and woods. Per. 7, 8.

VERONICA. Speedwell.

1. V. *ſpicata*, ſpiked. 1. 2. Chalky paſtures. Per. 7—9.

2. V. *hybrida*, Welch. 10. 673. Mountains, rare. Per. 7.

3. V. *officinalis*, male, or common. 11. 765. Barren heaths. Per. 5, 6.

4. V. *ſaxatilis*, blue rock. 15. 1027. Highlands. Per. 7.

5. V. *fruticuloſa*, fleſh-coloured ſhrubby. 15. 1028. Highl. Per. 7.

6. V. *alpina*, alpine. 7. 484. Highland rills. Per. 7, 8.

7. V. *ſerpyllifolia*, ſmooth. 15. 1075. Meadows and paſtures. Per. 5, 6.

8. V. *Beccabunga*, brooklime. 10. 655. Rivulets. Per. 7.

9. V. *Anagallis*, water. 11. 781. Rivers and ditches. Per. 7.

10. V. *ſcutellata*, narrow marſh. 11. 782. Sandy ditches. Per. 7, 8.

11. V. *montana*, mountain. 11. 766. Chalky woods. Per. 5, 6.

12. V. *Chamædrys*, germander. 9. 623. Groves and hedges. Per. 5.

13. V. *agreſtis*, procumbent. 11. 783. Fields and gardens. Ann. 4—9.

14. V. *arvenſis*, wall. 11. 734. Dry ground. Ann. 5.

15. V. *hederifolia*, ivy-leaved. 11. 784. Fields, &c. Ann. 4, 5.

16. V. *triphyllos*, fingered. 1. 26. Sandy fields, rare. Ann. 4.

17. V. *verna*, vernal. 1. 25. Barren fields. Ann. 4.

PINGUICULA. Butterwort.

1. P. *luſitanica*, pale. 3. 145. Bogs, rare. Per. 6, 7.

2. P. *vulgaris*, common. 1. 70. Bogs. Per. 5, 6.

3. P. *grandiflora*, large-flowered. 31. 2184. Bogs, Ireland. Per. 5, 6.

UTRICULARIA. Bladder-wort.

1. U. *vulgaris*, common. 4. 253. Ditches and pools. Per. 7.

2. U. *intermedia*, intermediate. 35. 2489. Lakes, Irel. Per. 7.

3. U. *minor*, leſſer. 4. 254. Bogs and ditches. Per. 7.

LEMNA. Duck-weed.

1. L. *triſulca*, ivy-leaved. 13. 926. Pools and ditches. Ann. 6.

2. L. *minor*, leſſer. 16. 1095. Pools, common. Ann. 6, 7.
3. L. *gibba*, gibbous. 18. 1233. Pools. Ann. 6, 7.
4. L. *polyrrhiza*, greater. 35. 2458. Ditches. Ann. 7, 8?

Flowers of this ſpecies only have never been obſerved.

LYCOPUS. Water-horehound.

1. L. *europæus*, common. 16. 1105. Ditches. Per. 7, 8.

SALVIA. Clary.

1. S. *pratenſis*, meadow. 3. 153. Dry meadows, rare. Per. 7.
2. S. *verbenaca*, common Engliſh. 3. 154. Paſtures. Per. 6—10.

Ord. 2. *Digynia.*

ANTHOXANTHUM. Vernal-graſs.

1. A. *odoratum*, ſweet-ſcented. 9. 647. Paſtures. Per. 5.

Claſs 3. TRIANDRIA.

Ord. 1. *Monogynia.*

VALERIANA. Valerian.

1. V. *rubra*, red. 22. 1531. Walls, and chalk cliffs. Per. 6—9.
2. V. *dioica*, ſmall marſh. 9. 628. Marſhes. Per. 6.
3. V. *officinalis*, great wild. 10. 698. Marſhes and hills. Per. 6.
4. V. *pyrenaica*, heart-leaved. 23. 1591. Woods, Scotland. Per. 6.
5. V. *Locuſta*, corn-ſallad. 12. 811. Fields, common. Ann. 4.
6. V. *dentata*, oval-fruited. 20. 1370. Fields, rare. Ann. 6, 7.

CROCUS. Saffron.

*1. C. *ſativus*, cultivated. 5. 343. Fields. Per. 9.
2. C. *vernus*, ſpring. 5. 344. Meadows and paſtures. Per. 3.
3. C. *nudiflorus*, naked-flowering. 7. 491. Sandy low meadows. Per. 10.

IXIA. Ixia.

1. I. *Bulbocodium*, Dwarf. 36. 2549. Hillocks, Jerſey. Per. 4.

IRIS. Iris.

1. I. *Pſeud-acorus*, yellow. 9. 578. Waters. Per. 7.
2. I. *fœtidiſſima*, ſtinking. 9. 596. Groves. Per. 6.

SCHOENUS. Bog-ruſh.

1. S. *Mariſcus*, prickly. 14. 950. Bogs and marſhes. Per. 7, 8.
2. S. *nigricans*, black. 16. 1121. Spongy turfy bogs. Per. 6.
3. S. *compreſſus*, compreſſed. 11. 791. Spongy meadows. Per. 7.
4. S. *rufus*, red-brown. 15. 1010. Marſhes. Per. 7.
5. S. *albus*, white-headed. 14. 985. Spongy bogs. Per. 8.

Stamens but two. Seeds with many briſtles at the baſe.

6. S. *fuſcus*, brown-headed. 22. 1575. Bogs, South Wales. Per. 8.

Stamens three. Seeds with only three briſtles at the baſe.

CYPERUS. Engliſh Galangale.

1. C. *longus*, ſweet-ſcented. 19. 1309. Marſhes, rare. Per. 7.

SCIRPUS. Club-ruſh.

1. S. *paluſtris*, marſh creeping. 2. 131. Bogs and ditches. Per. 6, 7.
2. S. *multicaulis*, many-ſtalked. 17. 1187. Turfy bogs. Per. 7.
3. S. *cæſpitoſus*, ſcaly-ſtalked. 15. 1029. Turfy heaths. Per. 7.
4. S. *pauciflorus*, chocolate-headed. 16. 1122. Mountain bogs. Per. 8.
5. S. *acicularis*, leaſt. 11. 749. Moiſt heaths. Per. 8.
6. S. *fluitans*, floating. 3. 216. Ditches and pools. Per. 7, 8.
7. S. *lacuſtris*, bull-ruſh. 10. 666. Clear waters. Per. 7.
8. S. *glaucus*, glaucous. 33. 2321. Salt marſhes. Per. 7, 8.
9. S. *Holoſchoenus*, round cluſter-headed. 23. 1612. Sea-ſhore. Per. 8—11.
10. S. *ſetaceus*, briſtle-ſtalked. 24. 1693. Sandy wet places. Ann. 7, 8.
11. S. *triqueter*, triangular. 24. 1694. Marſhes and rivers. Per. 8.
12. S. *carinatus*, blunt-edged. 28. 1983. Rivers. Per. 8.
13. S. *maritimus*, ſalt-marſh. 8. 542. Salt marſhes. Per. 7, 8.
14. S. *ſylvaticus*, wood, or millet. 13. 919. Moiſt woods. Per. 7.

ERIOPHORUM. Cotton-graſs.

1. E. *vaginatum*, hare's-tail. 13. 873. Highland moors. Per. 3, 4.
2. E. *capitatum*, round-headed. 34. 2387. Highland mountains. Per. 8.
3. E. *polyſtachion*, broad-leaved. 8. 563. Bogs. Per. 4.
4. E. *anguſtifolium*, narrow-leaved. 8. 564. Bogs. Per. 4.
5. E. *gracile*, ſlender mountain. 34. 2402. Highland mountains. Per. 7.
6. E. *alpinum*, alpine. 5. 311. Highland bogs. Per. 4, 5.

NARDUS. Mat-graſs.

1. N. *ſtricta*, common. 5. 290. Sandy moiſt heaths. Per. 7.

Ord. 2. *Digynia.*

PHALARIS. Canary-graſs.

*1. P. *canarienſis*, manured. 19. 1310. Waſte ground. Ann. 6–8.
2. P. *arundinacea*, reed. 6. 402. 30. 2160. f. 2. Ditches, &c. Per. 7.

PANICUM. Panick-graſs.

1. P. *verticillatum*, rough. 13. 874. Moiſt fields. Ann. 6, 7.
2. P. *viride*, green. 13. 875. Sandy fields. Ann. 7.
3. P. *Crus-galli*, looſe. 13. 876. Moiſt fields. Ann. 7.
4. P. *ſanguinale*, cock's-foot. 12. 849. Fields, rare. Ann. 7.
5. P. *dactylon*, creeping. 12. 850. Sandy ſea-ſhore. Per. 7, 8.

PHLEUM. Cat's-tail-graſs.

1. P. *pratenſe*, common. 15. 1076. Paſtures. Per. 6—10.

2. P. *alpinum*, alpine. 8. 519. Highlands. Per. 7.
3. P. *paniculatum*, panicled. 15. 1077. Fields, rare. Ann. 7.
4. P. *Boehmeri*, canary. 7. 459. Sand or chalk. Per. 7.
5. P. *Michelii*, Michelian. 32. 2265. Highland rocks. Per. 7.
6 P. *arenarium*, ſea. 4. 222. Sandy fields. Ann. 6.

Alopecurus. Fox-tail-graſs.

1. A. *pratenſis*, meadow. 11. 759. Paſtures and meadows. Per. 5.
2. A. *alpinus*, alpine. 16. 1126. Highlands. Per. 7.

" Stem erect, ſmooth. Spike ovate. Glumes of the calyx downy, without awns, and nearly as long as the awns of the corolla."—Found by the late Mr. G. Don on mountains about Loch Nagore, Aberdeenſhire. *Stem* a foot high. *Spike* white and downy, ſcarcely an inch long.

3. A. *agreſtis*, ſlender. 12. 848. Cornfields, and way ſides. Ann. 7.
4. A. *bulboſus*, bulbous. 18. 1249. Salt marſhes. Per. 7.
5. A. *geniculatus*, floating. 18. 1250. Ponds and ditches. Per. 7.
6. A. *fulvus*, orange-ſpiked. 21. 1467. Ponds. Per. 7.

" Stem aſcending, bent at the joints. Spike compound, cylindrical. Glumes obtuſe, hairy. Awn the length of the calyx. Anthers roundiſh."—Larger than the laſt. *Anthers* orange-coloured, opening at each ſide by an oval orifice.

Knappia. Knappia.

1. K. *agroſtidea*, early. 16. 1127. Sandy places, rare. Ann. 3, 4.

Polypogon. Beard-graſs.

1. P. *monſpelienſis*, long-awned. 24. 1704. Salt marſhes. Ann. 7, 8.
2. P. *littoralis*, ſhort-awned. 18. 1251. Muddy ſalt marſhes. Per. 8.

Milium. Millet-graſs.

1. M. *effuſum*, ſpreading. 16. 1106. Moiſt woods. Per. 6, 7.
2. M. *lendigerum*, cloſe, or panick. 16. 1107. Low fields. Ann. 8.

Agrostis. Bent-graſs.

1. A. *Spica venti*, ſilky. 14. 951. Moiſt ſandy fields. Ann. 6, 7.
2. A. *canina*, brown. 26. 1856. Moiſt paſtures. Per. 7.
3. A. *ſetacea*, briſtly. 17. 1188. Dry heaths. Per. 7, 8.
4. A. *vulgaris*, fine. 24. 1671. Paſtures and heaths. Per. 7.
5. A. *ſtolonifera*, creeping. 22. 1532. Moiſt fields. Per. 7, 8.
6. A. *alba*, marſh. 17. 1189. Bogs and woods. Per. 7.

Aira. Hair-graſs.

1. A. *criſtata*, creſted. 9. 648. Dry paſtures. Per. 7, 8.
2. A. *aquatica*, water. 22. 1557. Ponds, &c. Per. 5. 6.
3. A. *cæſpitoſa*, turfy. 21. 1453. Moiſt ground. Per. 6, 7.
4. A. *lævigata*, ſmooth-ſheathed. 30. 2102. Highlands, and ſea-coaſt. Per. 5, 6.

" Leaves flat; with very ſmooth ſheaths. Panicle cloſe. Petals awned, hairy at the baſe. Partial ſtalk ſmooth and very ſhort."—Native of Lapland as well as Scotland. Generally viviparous. Not half ſo tall as the laſt.

5. A. *flexuoſa*, wavy. 22. 1519. Sandy heaths. Per. 7.
6. A. *caneſcens*, grey. 17. 1190. Sandy ſhores. Per. 7.
7. A. *præcox*, early. 18. 1296. Dry gravelly places. Ann. 5, 6.
8. A. *caryophyllea*, ſilver. 12. 812. Barren heaths. Ann. 7.

Holcus. Soft-graſs.

1. H. *lanatus*, meadow. 17. 1169. Meadows and paſtures. Per. 6, 7.
2. H. *mollis*, creeping. 17. 1170. Fields and woods. Per. 7, 8.
3. H. *avenaceus*, oat-like. 12. 813. Waſte ground. Per. 6, 7.

Melica. Melic-graſs.

1. M. *uniflora*, wood. 15. 1058. Groves. Per. 5, 6.
2. M. *nutans*, mountain. 15. 1059. Mountain woods. Per. 6, 7.
3. M. *cærulea*, purple. 11. 750. Wet ſandy ground. Per. 8.

Sesleria. Moor-graſs.

1. S. *cærulea*, blue. 23. 1613. Limeſtone rocks. Per. 4.

Poa. Meadow-graſs.

1. P. *aquatica*, reed. 19. 1315. Ditches and rivers. Per. 7.
2. P. *fluitans*, flote. 22. 1520. Ponds and ditches. Per. 6—8.
3. P. *diſtans*, reflexed. 14. 986. Waſte ground. Per. 7.
4. P. *maritima*, creeping ſea. 16. 1140. Salt marſhes. Per. 7.
5. P. *procumbens*, procumbent ſea. 8. 532. Near the ſea. Ann. 7, 8.
6. P. *rigida*, hard. 20. 1371. Walls. Ann. 6.
7. P. *compreſſa*, flat-ſtalked. 6. 365. Walls, &c. Per. 7, 8.
8. P. *alpina*, alpine. 14. 1003. Highlands. Per. 7.
9. P. *flexuoſa*, zig-zag. 16. 1123. Highlands. Per. 7.
10. P. *bulboſa*, bulbous. 15. 1071. Sea-coaſt Per. 5, 6.
11. P. *cæſia*, ſea-green. 24. 1719. Highlands. Per. 6, 7.
12. P. *trivialis*, roughiſh. 15. 1072. Meadows and paſtures. Per. 6—9.
13. P. *pratenſis*, ſmooth-ſtalked. 15. 1073. Mead. and paſt. Per. 5, 6.
14. P. *humilis*, ſhort blueiſh. 14. 1004. Mountain paſtures. Per. 6.
15. P. *annua*, annual. 16. 1141. Cultivated ground. Ann. 3—11.
16. P. *glauca*, ſlender glaucous. 24. 1720. Mountains. Per. 6, 7.
17. P. *nemoralis*, wood. 18. 1265. Woods. Per. 6.
18. P. *decumbens*, decumbent. 11. 792. Barren bogs. Per. 7.

Briza. Quaking-graſs.

1. B. *minor*, ſmall. 19. 1316. Fields, rare. Ann. 7.
2. B. *media*, common. 5. 340. Paſtures. Per. 5. 6.

Dactylis. Cock's-foot-graſs.

1. D. *ſtricta*, ſmooth. 6. 380. Muddy ſea ſhore. Per. 8.
2. D. *glomerata*, rough. 5. 335. Meadows and paſtures. Per. 6—8.

Cynosurus. Dog's-tail-graſs.

1. C. *criſtatus*, creſted. 5. 316. Paſtures. Per. 7.
2. C. *echinatus*, rough. 19. 1333. Sandy ground. Ann. 7.

FESTUCA. Feſcue-graſs.

1. F. *ovina*, ſheep's. 9. 585. Open paſtures. Per. 6.
2. F. *vivipara*, viviparous. 19. 1355. Mountains. Per. 7.
3. F. *cæſia*, ſea-green heath. 27. 1917. Dry heaths. Per. 6.

"Panicle pointing one way, cloſe, glaucous. Florets cylindrical, roughiſh, awned; inner glume rough-edged. Stem quadrangular. Leaves compreſſed, channelled, glaucous."—About Bury, Suffolk, forming broad, depreſſed, very glaucous tufts. *Stems* a ſpan high.

4. F. *duriuſcula*, hard. 7. 470. Meadows and paſtures. Per. 6.
5. F. *rubra*, creeping. 29. 2056. Mountains and ſea ſhore. Per. 7.
6. F. *bromoides*, barren. 20 1411. Walls and ſand. Ann. 6.
7. F. *myurus*, wall. 20. 1412. Walls and ſand. Ann. 6.
8. F. *uniglumis*, ſingle-huſked. 20. 1430. Sea ſand. Ann. 6.
9. F. *triflora*, three-flowered. 27. 1918. Paſtures. Per. 7.

"Panicle ſpreading. Spikelets three-flowered, with long awns."—Like the following, but leſs drooping, and with fewer *florets*.

10. F. *gigantea*, tall. 26. 1820. Woods and hedges. Per. 7, 8.
11. F. *calamaria*, reed-like. 14. 1005. Mountain woods. Per. 7.
12. F. *decidua*, deciduous. 32. 2266. Mountain woods. Per. 8.

"Panicle pointing one way, erect, much branched. Florets two or three, oblong, angular, beardleſs; the upper ones deciduous. Leaves linear, ſtriated."—Lower and much more ſlender than the laſt. The lowermoſt *floret* only ripens ſeed.

13. F. *loliacea*, ſpiked. 26. 1821. Moiſt paſtures. Per. 6, 7.
14. F. *pratenſis*, meadow. 23. 1592. Meadows and paſt. Per. 6, 7.
15. F. *elatior*, tall. 23. 1593. Moiſt meadows. Per. 6, 7.

BROMUS. Brome-graſs.

1. B. *ſecalinus*, ſmooth rye. 17. 1171. Corn-fields. Ann. 7.
2. B. *multiflorus*, downy rye. 27. 1884. Corn-fields. Ann. 7.
3. B. *mollis*, ſoft. 15. 1078. Paſtures, &c. Bienn. 6.
4. B. *racemoſus*, ſmooth. 15. 1079. Paſt. and meadows. Ann. 6.

†5. B. *ſquarroſus*, corn. 27. 1885. Corn-fields. Ann. 7.

6. B. *arvenſis*, taper field. 28. 1984. Fields. Ann. 7.
7. B. *pratenſis*, tumid field. 13. 920 (arvenſis). Fields. Ann. 6.

"Panicle ſpreading, compound. Spikelets ovate, turgid, eight or ten-flowered. Florets elliptical, broad, imbricated, ſmoothiſh, with three equidiſtant ribs at each ſide."—Two feet high. *Panicle* ſmaller and more erect than in the laſt, but the *ſpikelets* are larger, more tumid, and greener. The true *arvenſis* has only two cloſe ribs on each ſide the keel of the *glume*.

8. B. *erectus*, upright perennial. 7. 471. Chalky paſt. Per. 7.
9. B. *aſper*, hairy wood. 17. 1172. Moiſt woods. Ann. Biennial. 7.
10. B. *ſterilis*, barren. 15. 1030. Waſte ground, and fields. Ann. 6, 7.
11. B. *diandrus*, upright annual. 14. 1006. Walls and ſand. Ann. 6.
12. B. *ſylvaticus*, ſlender wood. 11. 729. Thickets and hedges. Per. 7.
13. B. *pinnatus*, ſpiked heath. 11. 730. Chalky heaths. Per. 7.

STIPA. Feather-graſs.

†1. S. *pennata*, plumy. 19. 1356. Rocks. Per. 7.

AVENA. Oat-graſs.

1. A. *fatua*, wild haver. 31. 2221. Fields. Ann. 8.
2. A. *ſtrigoſa*, briſtle-pointed oat. 18. 1266. Corn-fields. Ann. 7.

This is now admitted as a native ſpecies, in conſequence of its having been found in Scotland, Wales, Yorkſhire, and Cornwall, notwithſtanding the contrary opinion expreſſed in Fl. Brit. 140. See AVENA, n. 22.

3. A. *pubeſcens*, downy. 23. 1640. Chalky paſtures. Per. 6.
4. A. *pratenſis*, narrow leaved. 17. 1204. Limeſtone ſoil. Per. 7.
5. A. *planiculmis*, flat-ſtrawed. 30. 2141. Highland mountains. Per. 7.

"Panicle erect. Calyx containing about five florets. Receptacles bearded upwards. Leaves naked, finely ſerrated, with rough ſheaths. Stem compreſſed."—Like *A. pubeſcens* in general aſpect, but larger in every part, and the *leaves* are naked, not downy; their edges finely ſerrated, as in *pratenſis*. *Flowers* much larger than in either of thoſe.

6. A. *flaveſcens*, yellow. 14. 952. Paſtures and waſte ground. Per. 6, 7.

LAGURUS. Hare's-tail-graſs.

1. L. *ovatus*, ovate. 19. 1334. Sands in Guernſey. Ann. 6.

ARUNDO. Reed.

1. A. *Phragmites*, common. 6. 401. Fens and ditches. Per. 7.
2. A. *epigejos*, wood. 6. 402. Moiſt woods. Per. 7.
3. A. *Calamagroſtis*, ſmall. 30. 2159. Moiſt woods and fens. Per. 7.
4. A. *ſtricta*, ſmalleſt cloſe. 30. 2160. Marſhes, Scotland. Per. 6.

"Calyx ſingle-flowered, full as long as the corolla. Panicle erect, cloſe. Flowers ſcattered, erect, with a dorſal awn. Down ſhorter than the corolla."—Half the ſize of the laſt. *Calyx* acute, but without elongated points. *Stipula* very ſhort. The *panicle* is of a purpliſh bronze hue, not unlike *Melica cærulea*.

5. A. *arenaria*, ſea. 8. 520. Sandy ſea-coaſt. Per. 7.

LOLIUM. Darnel.

1. L. *perenne*, perennial. 5. 315. Meadows and paſtures. Per. 6.
2. L. *temulentum*, bearded. 16. 1124. Fields. Ann. 7.
3. L. *arvenſe*, white. 16. 1125. Fields, rare. Ann. 7.

ROTBOLLIA. Hard-graſs.

1. R. *incurvata*, ſea. 11. 760. Salt marſhes. Ann. 8.

ELYMUS. Lyme-graſs.

1. E. *arenarius*, upright ſea. 24. 1672. Sandy ſea-coaſt. Per. 7.

2. E. *geniculatus*, pendulous ſea. 23. 1586. Muddy ſea-coaſt. Per. 7.
3. E. *europæus*, wood. 19. 1317. Chalky woods. Per. 6.

HORDEUM. Barley.

1. H. *murinum*, wall, or mouſe. 28. 1971. Way ſides. Ann. 6–8.
2. H. *pratenſe*, meadow. 6. 409. Moiſt paſtures. Per. 6.
3. H. *maritimum*, ſea. 17. 1205. Salt marſhes. Ann. 6, 7.

TRITICUM. Wheat-graſs.

1. T. *junceum*, ruſhy. 12. 814. Sandy coaſts. Per. 7.
2. T. *repens*, creeping, or couch. 13. 909. Waſte ground. Per. 6—9.
3. T. *caninum*, bearded. 20. 1372. Chalky woods. Per. 7.
4. T. *criſtatum*, creſted. 32. 2267. Sea cliffs, Scotland. Per. 7 ?

Bromus criſtatus of Linnæus; ſee BROMUS, n. 32.

5. T. *loliaceum*, dwarf ſea. 4. 221. Sea ſand. Ann. 6, 7.

Ord. 3. *Trigynia.*

MONTIA. Blinks.

1. M. *fontana*, water. 17. 1206. Rills and ſprings. Ann. 4, 5.

HOLOSTEUM. Jagged-chickweed.

1. H. *umbellatum*, umbelliferous. 1. 27. Old walls. Ann. 4.

POLYCARPON. All-ſeed.

1. P. *tetraphyllum*, four-leaved. 15. 1031. Sandy ſouth coaſt. Ann. 5—8.

Claſs 4. TETRANDRIA.

Ord. 1. *Monogynia.*

DIPSACUS. Teaſel.

*1. D. *fullonum*, manured. 29. 2080. Hedges. Bienn. 7.

2. D. *ſylveſtris*, wild. 15. 1032. Moiſt hedges. Bienn. 7.
3. D. *piloſus*, ſmall. 13. 877. Moiſt chalks. Per. 8.

SCABIOSA. Scabious.

1. S. *ſucciſa*, devil's bit. 13. 878. Paſtures. Per. 8—10.
2. S. *arvenſis*, field. 10. 659. Corn-fields. Per. 7.
3. S. *columbaria*, ſmall. 19. 1311. Gravel or chalk. Per. 6, 7.

SHERARDIA. Field-madder.

1. S. *arvenſis*, blue. 13. 891. Corn-fields. Ann. 5—8.

ASPERULA. Wood-ruff.

1. A. *odorata*, ſweet. 11. 755. Woods. Per. 5.
2. A. *cynanchica*, ſmall. 1. 33. Chalky hills. Per. 6.

GALIUM. Bed-ſtraw.

1. G. *cruciatum*, croſs-wort. 2. 143. Thickets and hedges. Per. 5.
2. G. *paluſtre*, white water. 26. 1857. Moiſt meadows. Per. 7.
3. G. *Witheringii*, rough heath. 31. 2206. Moiſt hills. Per. 7.
4. G. *ſaxatile*, ſmooth heath. 12. 815. Heaths and dry hills. Per. 7, 8.
5. G. *uliginoſum*, rough marſh. 28. 1972. Ditches. Per. 8.
6. G. *erectum*, upright. 29. 2067. Moiſt paſtures. Per. 6, 7.
7. G. *verrucoſum*, warty-fruited. 31. 2173. Corn-fields. Ann. 6—8.

This is the *Valantia Aparine* of Linnæus, whoſe ſeeds, beſet with large tubercles, are compared by Tournefort and Vaillant to coriander comfits.

8. G. *tricorne*, three-flowered. 23. 1641. Corn-fields. Ann. 7.
9. G. *ſpurium*, ſmooth-ſeeded corn. 26. 1871. Corn-fields, rare. Ann. 6, 7.
10. G. *puſillum*, leaſt mountain. 2. 74. Limeſtone hills. Per. 7, 8.
11. G. *verum*, yellow. 10. 660. Fields and hills. Per. 7, 8.
12. G. *Mollugo*, great hedge. 24. 1673. Hedges. Per. 7, 8.
13. G. *anglicum*, wall. 6. 384. Old walls. Ann. 6, 7.
14. G. *boreale*, croſs-leaved. 2. 105. Rocky hills. Per. 7.
15. G. *Aparine*, gooſe-graſs. 12. 816. Hedges, common. Ann. 5—8.

RUBIA. Madder.

1. R. *peregrina*, wild. 12. 851. Rocks in the ſouth. Per. 6, 7.

EXACUM. Gentianella.

1. E. *filiforme*, leaſt. 4. 235. Sandy marſhes. Ann. 7.

PLANTAGO. Plantain.

1. P. *major*, greater. 22. 1558. Paſtures and cultivated ground. Per. 5—9.
2. P. *media*, hoary. 22. 1559. Chalky hills. Per. 5—8.
3. P. *lanceolata*, rib-wort. 8. 507. Meadows and paſtures. Per. 6, 7.
4. P. *maritima*, ſea. 3. 175. Sea-coaſt and lofty mountains. Per. 8.
5. P. *Coronopus*, buck's-horn. 13. 892. Sandy paſtures. Ann. 5—8.

CENTUNCULUS. Chaff-weed.

1. C. *minimus*, ſmall. 8. 531. Inundated heaths. Ann. 6, 7.

SANGUISORBA. Burnet.

1. S. *officinalis*, great. 19. 1312. Meadows and paſtures. Per. 6.

EPIMEDIUM. Barren-wort.

1. E. *alpinum*, alpine. 7. 438. Mountain thickets, rare. Per. 5.

CORNUS. Cornel.

1. C. *ſanguinea*, wild. 4. 249. Hedges. Shrub. 6.
2. C. *Suecica*, dwarf. 5. 310. Alpine meadows. Per. 6, 7.

PARIETARIA. Pellitory.

1. P. *officinalis*, wall. 13. 879. Old walls. Per. 6—9.

ALCHEMILLA. Ladies'-mantle.

1. A. *vulgaris*, common. 9. 597. Meadows and paſtures. Per. 6, 7.
2. A. *alpina*, alpine. 4. 244. Micaceous rocks. Per. 7.

3. A. *arvenſis*, field. 15. 1011. Fallow fields. Ann. 5—8.

Ord. 2. *Digynia.*

BUFFONIA. *Buffonia.*

†1. B. *tenuifolia*, ſlender. 19. 1313. Sea-coaſt? Ann. 6.

Ord. 3. *Tetragynia.*

ILEX. *Holly.*

1. I. *Aquifolium*, common. 7. 496. Woods and hedges. Tree. 5.

POTAMOGETON. Pond-weed.

1. P. *natans*, broad-leaved. 26. 1822. Ponds and rivers. Per. 7.
2. P. *heterophyllum*, various-leaved. 18. 1285. Ditches and pools. Per. 7—9.
3. P. *perfoliatum*, perfoliate. 3. 168. Rivers and pools. Per. 7, 8.
4. P. *denſum*, cloſe-leaved. 6. 297. Pools and flow ſtreams. Per. 6.
5. P. *fluitans*, long-leaved floating. 18. 1286. Ditches and rivulets. Per. 8, 9.
6. P. *lucens*, ſhining. 6. 376. Rivers, pools and lakes. Per. 6, 7.
7. P. *lanceolatum*, lanceolate. 28. 1985. Lakes, Wales. Per. 8.
8. P. *criſpum*, curled. 15. 1012. Pools and rivers. Per. 6, 7.
9. P. *compreſſum*, flat-ſtalked. 6. 418. Rivers and ditches. Per. 6, 7.
10. P. *gramineum*, graſſy. 32. 2253. Rivers and ditches. Per. 7.
11. P. *puſillum*, ſmall. 3. 215. Clay-pits. Per. 7.
12. P. *pectinatum*, fennel-leaved. 5. 323. Rivers and marine ditches. Per. 7.

RUPPIA. Ruppia.

1. R. *maritima*, ſea. 2. 136. Salt-water ditches. Per? 7.

SAGINA. Pearl-wort.

1. S. *procumbens*, procumbent. 13. 880. Sandy waſtes. Per. 5—8.
2. S. *maritima*, ſea. 31. 2195. Sea-coaſt, and mountains. Ann. 5—8.
3. S. *apetala*, ſmall-flowered. 13. 881. Sandy waſtes. Ann. 5, 6.
4. S. *erecta*, upright. 9. 609. Gravelly paſtures. Ann. 5.

TILLÆA. Tillæa.

1. T. *muſcoſa*, moſſy. 2. 116. Sandy heaths. Ann. 5, 6.

RADIOLA. Flax-ſeed.

1. R. *millegrana*, thyme-leaved. 13. 893. Wet ſand. Ann. 7, 8.

Claſs 5. PENTANDRIA.

Ord. 1. *Monogynia.*

MYOSOTIS. Scorpion-graſs.

1. M. *arvenſis*, field. 36. 2558. Dry fields. Ann. 6.

"Seeds ſmooth. Leaves oblong. Branches ſpreading. Cluſters many-flowered, without bracteas; their lower ſtalks axillary and remote. Calyx ovate, with ſpreading incurved briſtles."—See MYOSOTIS, n. 1; where the author, Mr. Drake, has mentioned two varieties. The β is our following ſpecies, *verſicolor;* the γ is alſo probably diſtinct, but has not yet been publiſhed as ſuch in Engl. Bot.

2. M. *verſicolor*, yellow and blue. 7. 480. f. 1. Barren fields. Ann. 6.

"Seeds ſmooth. Leaves oblong. Branches aſcending. Cluſters many-flowered, on long naked ſtalks, without bracteas. Calyx ovate, with ſpreading incurved briſtles."—Found ſometimes alſo in boggy meadows. The *flowers* are yellow when they firſt open.

3. M. *paluſtris*, water. 28. 1973. Ditches and pools. Per. 7, 8.
4. M. *rupicola*, rock. 36. 2559. Highland rocks. Per. 7.

"Seeds ſmooth. Leaves oblong; the radical ones on long footſtalks. Cluſters many-flowered, without bracteas. Calyx divided above half way down, its hairs copious, ſpreading and elongated."—Moſt like the laſt; with ſtill larger blue *flowers*.

LITHOSPERMUM. Gromwell.

1. L. *officinale*, common. 2. 134. Chalky hills. Per. 5.
2. L. *arvenſe*, corn. 2. 123. Fields. Ann. 5, 6.
3. L. *purpuro-cæruleum*, creeping. 2. 117. Chalky thickets, rare. Per. 5.

ANCHUSA. Alkanet.

1. A. *officinalis*, common. 11. 662. Rubbiſh by the ſea. Per. 6, 7.
2. A. *ſempervirens*, evergreen. 1. 45. Waſte ground. rare. Per. 5, 6.

CYNOGLOSSUM. Hound's-tongue.

1. C. *officinale*, common. 13. 921. Waſte ground. Bienn. 6.
2. C. *ſylvaticum*, green-leaved. 23. 1642. Shady hedges. Bienn. 6.

PULMONARIA. Lung-wort.

1. P. *officinalis*, common. 2. 118. Groves, rare. Per. 5.
2. P. *anguſtifolia*, narrow-leaved. 23. 1628. Groves, rare. Per. 5.
3. P. *maritima*, ſea. 6. 368. Sandy ſhores. Per. 7.

SYMPHYTUM. Comfrey.

1. S. *officinale*, common. 12. 817. Watery places. Per. 5, 6.
2. S. *tuberoſum*, tuberous-rooted. 21. 1502. Moiſt groves. Per. 7.

BORAGO. Borage.

*1. B. *officinalis*, common. 1. 36. Waſte ground. Bienn. 6, 7.

ASPERUGO. Madwort.

1. A. *procumbens*, procumbent. 10. 661. Waſte ground, rare. Ann. 5.

LYCOPSIS. Bugloſs.

1. L. *arvenſis*, ſmall. 14. 938. Fields and hedges. Ann. 6, 7.

Echium. Viper's-bugloſs.

1. E. *italicum*, white. 29. 2081. Sandy fields, rare. Bienn. 7.
2. E. *vulgare*, common blue. 3. 181. Fields and walls. Bienn. 6, 7.

Primula. Primroſe.

1. P. *vulgaris*, common. 1. 4. Groves and banks. Per. 4.
2. P. *elatior*, ox-lip. 8. 513. Groves, rare. Per. 4.
3. P. *veris*, cowſlip. 1. 5. Meadows and paſtures. Per. 4, 5.
4. P. *farinoſa*, bird's-eye. 1. 6. Mountain bogs. Per. 6, 7.

Cyclamen. Cyclamen.

*1. C. *europæum*, ſpring. 8. 548. Groves, rare. Per. 4.

Menyanthes. Buck-bean.

1. M. *trifoliata*, common. 7. 495. Wet meadows. Per. 6, 7.
2. M. *nymphæoides*, fringed. 4. 217. Rivers. Per. 8.

Hottonia. Water-violet.

1. H. *paluſtris*, common. 6. 364. Pools and ditches. Per. 6, 7.

Lysimachia. Looſeſtrife.

1. L. *vulgaris*, yellow. 11. 761. Watery thickets. Per. 7.
2. L. *thyrſiflora*, tufted. 3. 176. Bogs, rare. Per. 7.
3. L. *nemorum*, wood. 8. 527. Groves. Per. 5—9.
4. L. *Nummularia*, creeping. 8. 528. Shady rills. Per. 6, 7.

Anagallis. Pimpernel.

1. A. *arvenſis*, ſcarlet. 8. 529. Fields and gardens. Ann. 6, 7.
2. A. *cærulea*, blue. 26. 1823. Fields, rare. Ann. 6, 7.
3. A. *tenella*, bog. 8. 530. Bogs and ſprings. Per. 7, 8.

Azalea. Azalea.

1. A. *procumbens*, trailing. 13. 865. Alpine heaths. Small ſhrub. 7.

Convolvulus. Bind-weed.

1. C. *arvenſis*, ſmall. 5. 312. Gravelly paſtures. Per. 6, 7.
2. C. *ſepium*, great. 5. 313. Moiſt hedges. Per. 7, 8.
3. C. *Soldanella*, ſea. 5. 314. Sandy ſea-coaſt. Per. 7.

Polemonium. Jacob's-ladder.

1. P. *cæruleum*, blue. 1. 14. Mountain thickets, rare. Per. 6.

Campanula. Bell-flower.

1. C. *rotundifolia*, round-leaved. 13. 866. Heaths and banks. Per. 8, 9.
2. C. *patula*, ſpreading. 1. 42. Paſtures, rare. Bienn. 7, 8.
3. C. *Rapunculus*, rampion. 4. 283. Banks. Bienn. 7, 8.
4. C. *latifolia*, giant. 5. 302. Woods and ſhady rocks. Per. 8.
5. C. *rapunculoides*, creeping. 20. 1369. Woods, rare. Per. 8.
6. C. *Trachelium*, nettle-leaved. 1. 12. Groves and hedges. Per. 7.
7. C. *glomerata*, cluſtered. 2. 90. Chalky hills. Per. 7, 8.
8. C. *hybrida*, corn. 6. 375. Chalky fields. Ann. 8.
9. C. *hederacea*, ivy-leaved. 2. 73. Shady rills, rare. Per. 6—8.

Phyteuma. Rampion.

1. P. *orbiculare*, round-headed. 2. 142. Chalky hills, rare. Per. 8.

Jasione. Sheep's-bit.

1. J. *montana*, ſcabious. 13. 882. Sandy paſtures. Ann. 6, 7.

Lobelia. Lobelia.

1. L. *Dortmanna*, water. 2. 140. Lakes, rare. Per. 7.
2. L. *urens*, acrid. 14. 953. Moiſt heaths, rare. Per. 8, 9.

Impatiens. Balſam.

1. I. *Noli-me-tangere*, yellow. 14. 937. Shady ſprings, rare. Ann. 8.

Viola. Violet.

1. V. *hirta*, hairy. 13. 894. Limeſtone woods. Per. 4.
2. V. *odorata*, ſweet. 9. 619. Groves and banks Per. 3, 4.
3. V. *paluſtris*, marſh. 7. 444. Moſſy bogs. Per. 4.
4. V. *canina*, dog's. 9. 620. Groves and heaths. Per. 4—6.
5. V. *lactea*, cream-coloured. 7. 445. Mountainous heaths. Per. 5.
6. V. *tricolor*, common panſy. 18. 1287. Fields. Ann. 5—9.
7. V. *lutea*, yellow mountain. 11. 721. Mountain bogs. Per. 5—9.

Verbascum. Mullein.

1. V. *Thapſus*, great. 8. 549. Hedges and way ſides. Bienn. 7, 8.
2. V. *Lychnitis*, white. 1. 58. Chalky banks. Bienn. 7, 8.
3. V. *pulverulentum*, yellow hoary. 7. 487. Gravelly banks. Bienn. 7.
4. V. *nigrum*, dark, or black. 1. 59. Gravel or chalk. Per. 7, 8.
5. V. *virgatum*, large-flowered. 8. 550. Gravelly fields, rare. Bienn. 8.
6. V. *Blattaria*, moth. 6. 393. Gravelly fields. Ann. 7.

Datura. Thorn-apple.

*1. D. *Stramonium*, prickly. 18. 1288. Dunghills and waſtes. Ann. 7.

Hyoscyamus. Hen-bane.

1. H. *niger*, common. 9. 591. Waſte ground. Ann. 7.

Atropa. Deadly-nightſhade.

1. A. *Belladonna*, common, or dwale. 9. 592. Chalky hills. Per. 6.

Solanum. Nightſhade.

1. S. *Dulcamara*, woody. 8. 565. Hedges. Shrub. 6, 7.
2. S. *nigrum*, common, or garden. 8. 566. Cultivated ground. Ann. 6—9.

CHIRONIA. Centaury.

1. C. *Centaurium*, common. 6. 417. Gravelly paſtures. Ann. 7, 8.
2. C. *littoralis*, dwarf tufted. 33. 2305. Sea-coaſt. Ann. 6.

" Stems herbaceous, ſimple, ſtraight. Leaves linear-obovate. Calyx-teeth awl-ſhaped. Flowers denſely corymboſe, nearly ſeſſile."—About two inches high. *Flowers* large and handſome. Diſtinct from the varieties of the foregoing mentioned under CHIRONIA, n. 11.

3. C. *pulchella*, dwarf branched. 7. 458. Sandy ſea-coaſt. Ann. 8, 9.

SAMOLUS. Brook-weed.

1. S. *Valerandi*, pimpernel. 10. 703. Marſhes. Per. 7.

LONICERA. Honeyſuckle.

1. L. *Caprifolium*, pale perfoliate. 12. 799. Groves and coppices. Shrub. 5, 6.
2. L. *Periclymenum*, common woodbine. 12. 800. Woods and hedges. Shrub. 6, 7.
3. L. *Xyloſteum*, upright. 13. 916. Thickets, rare. Shrub. 7.

RHAMNUS. Buckthorn.

1. R. *catharticus*, common. 23. 1629. Hedges. Shrub. 5, 6.
2. R. *Frangula*, alder-leaved. 4. 250. Woods and thickets. Shrub. 5.

EUONYMUS. Spindle-tree.

1. E. *europæus*, common. 6. 362. Hedges and woods. Shrub. 5.

RIBES. Currant.

1. R. *rubrum*, red. 18. 1289. Shady banks of northern rivers. Shrub. 5.
2. R. *alpinum*, taſteleſs mountain. 10. 704. Woods and thickets. Shrub. 4, 5.
3. R. *ſpicatum*, acid mountain. 18. 1290. Mountain woods. Shrub. 5.
4. R. *petræum*, rock. 10. 705. Mountains. Shrub. 5.
5. R. *nigrum*, black. 18. 1291. Wet thickets. Shrub. 5.

*6. R. *Groſſularia*, rough gooſeberry. 18. 1292. Hedges. Shrub. 4.

*7. R. *Uva criſpa*, ſmooth gooſeberry. 29. 2057. Hedges. Shrub. 4.

HEDERA. Ivy.

1. H. *Helix*, common. 18. 1267. Woods and walls. Shrub. 10.

ILLECEBRUM. Knot-weed.

1. I. *verticillatum*, whorled. 13. 895. Sea marſhes, Dev. and Corn. Per. 7.

GLAUX. Salt-weed.

1. G. *maritima*, ſea, or black. 1. 13. Muddy ſalt-marſhes. Per. 6, 7.

THESIUM. Baſtard Toad-flax.

1. T. *linophyllum*, common. 4. 247. Chalky hills. Per. 7.

VINCA. Periwinkle.

1. V. *minor*, leſſer. 13. 917. Banks and groves. Per. 5.
2. V. *major*, greater. 8. 514. Woods and hedges. Per. 5.

Ord. 2. *Digynia*.

HERNIARIA. Rupture-wort.

1. H. *glabra*, ſmooth. 3. 206. Sand or gravel. Per. 7, 8.
2. H. *hirſuta*, hairy. 20. 1379. Sand, rare. Per. 7, 8.

CHENOPODIUM. Gooſefoot.

1. C. *Bonus Henricus*, perennial. 15. 1033. Waſte ground. Per. 5, 6.
2. C. *urbicum*, upright. 10. 717. Dunghills and banks. Ann. 8, 9.
3. C. *rubrum*, red. 24. 1721. Waſte ground. Ann. 8.
4. C. *botryodes*, many-cluſtered. 32. 2247. Sea marſhes. Ann. 8.

" Leaves triangular, ſomewhat toothed; the upper ones bluntiſh. Cluſters upright, compound, rounded, leafy." *Leaves* much ſmaller, and more fleſhy, than in the laſt, of which it has long been taken for a maritime variety.

5. C. *murale*, nettle-leaved. 24. 1722. Walls and banks. Ann. 8, 9.
6. C. *hybridum*, maple-leaved. 27. 1919. Moiſt waſte ground. Ann. 8.
7. C. *album*, white. 24. 1723. Fields and gardens, common. Ann. 7, 8.
8. C. *ficifolium*, fig-leaved. 24. 1724. Dunghills and fields. Ann. 8.
9. C. *glaucum*, oak-leaved. 21. 1454. Sandy fields. Ann. 8.
10. C. *olidum*, ſtinking. 15. 1034. Near the ſea. Ann. 8.
11. C. *polyſpermum*, round-leaved. 21. 1480. Dunghills, &c. Ann. 7, 8.
12. C. *acutifolium*, ſharp entire-leaved. 21. 1481. Waſte ground. Ann. 7, 8.

" Leaves ovate, acute, entire. Stem erect. Cluſters ſomewhat cymoſe, elongated, leafleſs."—Differs from the laſt, with which it has generally been confounded, in its erect, more angular *ſtem*, and ſharp-pointed *leaves*. The *cluſters* alſo are ſpiked rather than cymoſe.

BETA. Beet.

1. B. *maritima*, ſea. 4. 285. Muddy ſea-ſhores. Per. 8.

SALSOLA. Salt-wort.

1. S. *Kali*, prickly. 9. 634. Sandy beach. Ann. 7.
2. S. *fruticoſa*, ſhrubby. 9. 635. Norfolk and ſouthern coaſts. Shrub. 7, 8.

ULMUS. Elm.

1. U. *campeſtris*, common, or Norfolk. 27. 1886. Woods and hedges. Tree. 4.
2. U. *ſuberoſa*, cork-barked, or Suſſex. 31. 2161. Woods and hedges. Tree. 3.
3. U. *glabra*, ſmooth, or wych. 32. 2248. Hedges, Eſſex. Tree. 3.
4. U. *montana*, broad-leaved, or wych hazel. 27. 1887. Woods and hedges. Tree. 4.

*5. U. *major*, Dutch. 36. 2542. Hedges. Tree. 3.

CUSCUTA. Dodder.

1. C. *europæa*, greater. 6. 378. On thiſtles and nettles. Ann. 8, 9.
2. C. *Epithymum*, leſſer. 1. 55. On heath and thyme. Per? 8.

SWERTIA.

SWERTIA. Felwort.

†1. S. *perennis*, marſh. 21. 1441. Alpine bogs. Per. 8.

GENTIANA. Gentian.

1. G. *Pneumonanthe*, marſh. 1. 20. Moiſt heaths. Per. 8, 9.
2. G. *acaulis*, dwarf. 23. 1594. South Wales. Per. 5.
3. G. *verna*, ſpring. 7. 493. Barren mountains. Per. 4.
4. G. *nivalis*, ſmall alpine. 13. 896. Highland rocks. Ann. 8.
5. G. *Amarella*, autumnal. 4. 236. Limeſtone paſtures. Ann. 8.
6. G. *campeſtris*, field. 4. 237. Gravelly paſtures. Ann. 9.

Umbelliferous plants.

ERYNGIUM. Eryngo.

1. E. *maritimum*, ſea. 10. 718. Sandy beach. Per. 7, 8.
2. E. *campeſtre*, field. 1. 57. Waſte ground, rare. Per. 7, 8.

HYDROCOTYLE. White-rot.

1. H. *vulgaris*, marſh. 11. 751. Watery ground. Per. 5, 6.
2. H. *inundata*, floating. 4. 227. Ditches and pools. Bienn ? 5.

SANICULA. Sanicle.

1. S. *europæa*, wood. 2. 98. Groves. Per. 5.

BUPLEURUM. Hare's-ear.

1. B. *rotundifolium*, round-leaved. 2. 99. Chalky fields. Ann. 7.
2. B. *odontites*, narrow-leaved. 35. 2458. Rocks, Devon. Ann. 7.
3. B. *tenuiſſimum*, ſlender. 7. 478. Muddy ſalt-marſhes. Ann. 7, 8.

ECHINOPHORA. Prickly-Sampire.

†1. E. *ſpinoſa*, great. 34. 2413. Sandy ſea-coaſt. Per. 7.

TORDYLIUM. Hart-wort.

†1. T. *officinale*, ſmaller. 34. 2440. Fields, rare. Ann. 6, 7.
2. T. *maximum*, great. 17. 1173. Chalky ground, rare. Ann. 6, 7.

CAUCALIS. Bur-parſley.

1. C. *daucoides*, ſmall. 3. 197. Chalky fields. Ann. 6.
2. C. *latifolia*, great. 3. 198. Chalky fields, rare. Ann. 7.
3. C. *Anthriſcus*, upright. 14. 987. Hedges and banks. Ann. 7.
4. C. *infeſta*, ſpreading. 19. 1314. Fields and hedges. Ann. 7.
5. C. *nodoſa*, knotted. 3. 199. Gravelly banks. Ann. 5, 6.

DAUCUS. Carrot.

1. D. *Carota*, wild. 17. 1174. Borders of fields. Bienn. 6, 7.
2. D. *maritimus*, ſea-coaſt. 36. 2560. Cornwall. Bienn. 7, 8.

" Fruit armed with compreſſed teeth. Leaflets dilated, ſucculent, hairy, with rounded ſegments. Umbels convex when in ſeed."—About 18 inches high, woolly rather than hairy, of a more fleſhy habit than the foregoing. The *umbels* want the remarkable dark-red central abortive *flower*, which is characteriſtic of *D. Carota*. The compreſſed teeth which clothe the *ſeeds* approach to the nature of *D. mauritanicus* and *muricatus*.

BUNIUM. Earth-nut.

1. B. *Bulbocaſtanum*, common. 14. 988. Paſtures. Per. 5, 6.

The *B. Bulbocaſtanum* and *flexuoſum* of Withering, and of Sm. Fl. Brit. 301, prove, on mature examination, to be, as Linnæus conſidered them, one and the ſame ſpecies. The *root* of the former, being near the ſurface, its *ſtem* has no elongated tapering baſe, and if the herb happens to be luxuriant, the leaves of the general *involucrum* are more numerous than otherwiſe.

CONIUM. Hemlock.

1. C. *maculatum*, common. 17. 1191. Hedges. Bienn. 6, 7.

SELINUM. Milky-parſley.

1. S. *paluſtre*, marſh. 4. 229. Wet meadows. Per. 7.

ATHAMANTA. Stone-parſley.

1. A. *Libanotis*, mountain. 2. 138. Chalky paſtures, rare. Per. 8.

PEUCEDANUM. Sulphur-wort

1. P. *officinale*, ſea. 25. 1767. Salt marſhes. Per. 6, 7.
2. P. *Silaus*, meadow. 30. 2142. Moiſt paſtures. Per. 8.

CRITHMUM. Sampire.

1. C. *maritimum*, ſea. 12. 819. Sea cliffs. Per. 8.

HERACLEUM. Cow-parſnep.

1. H. *Sphondylium*, common. 14. 939. Borders of fields. Bienn. 7.

H. *anguſtifolium*, Fl. Brit. 307, proves, on a careful examination, to be only a narrow-leaved variety of this, diſtinct from the true *anguſtifolium* of Linnæus.

LIGUSTICUM. Lovage.

1. L. *ſcoticum*, Scottiſh. 17. 1207. Scottiſh coaſt. Per. 7.
2. L. *cornubienſe*, Corniſh. 10. 683. Thickets, Cornwall. Per. 7.
3. L. *Meum*, ſpignel. 32. 2249. Mountain paſtures. Per. 5.

ANGELICA. Angelica.

*1 A. *Archangelica*, garden. 36. 2561. Wet meadows, rare. Bienn. 9.
2. A. *ſylveſtris*, wild. 16. 1128. Watery places. Per. 7.

SIUM. Water-parſnep.

1. S. *latifolium*, broad-leaved. 3. 204. Rivers and ditches. Per. 7, 8.
2. S. *anguſtifolium*, narrow-leaved. 2. 139. Rivers and ditches. Per. 7, 8.
3. S. *nodiflorum*, procumbent. 9. 639. Ditches and rivulets. Per. 7, 8.
4. S. *repens*, creeping. 20. 1431. Watery ground. Per. 6—8.
5. S. *verticillatum*, whorled. 6. 395. Salt meadows. Per. 7, 8.

SISON. Hone-wort.

1. S. *Amomum*, hedge. 14. 954. Moiſt chalk or marl. Ann. 8.
2. S. *ſegetum*, corn. 4. 228. Chalky fields, rare. Ann. 8.

OENANTHE. Water-Dropwort.

1. O. *fiſtuloſa*, common. 6. 363. Ditches and bogs. Per. 7, 8.
2. O. *pimpinelloides*, parſley. 5. 347. Salt marſhes. Per. 7.
3. O. *peucedanifolia*, ſulphur-wort. 5. 348. Ditches and bogs. Per. 6.
4. O. *crocata*, hemlock. 33. 2313. Watery places. Per. 7.

CORIANDRUM. Coriander.

*1. C. *ſativum*, common. 1. 67. Fields and dunghills, rare. Ann. 6.

PHELLANDRIUM. Water-Hemlock.

1. P. *aquaticum*, common. 10. 684. Ditches and rivers. Bienn. 6, 7.

CICUTA. Cowbane.

1. C. *viroſa*, water. 7. 479. Rivers and ditches. Per. 8.

AETHUSA. Fool's-Parſley.

1. A. *Cynapium*, common. 17. 1192. Cultivated ground. Ann. 7, 8.

SCANDIX. Chervil.

1. S. *odorata*, great or ſweet. 10. 697. Mountain paſtures. Per. 5.
2. S. *Pecten-Veneris*, needle. 20. 1397. Corn-fields. Ann. 6, 7.

*3. S. *Cerefolium*, garden. 18. 1268. Banks and hedges. Ann. 6.

4. S. *Anthriſcus*, rough. 12. 818. Hedges and rubbiſh. Ann. 5.

CHÆROPHYLLUM. Cow-Parſley.

1. C. *ſylveſtre*, ſmooth-ſtalked. 11. 752. Hedges and thickets. Per. 4, 5.
2. C. *temulentum*, rough-ſtalked. 22. 1521. Hedges and groves. Bienn. 6, 7.
3. C. *aureum*, tawny-ſeeded. 30. 2103. Borders of fields, Scotland. Per. 6.

IMPERATORIA. Maſter-wort.

1. I. *Oſtruthium*, great. 20. 1380. Moiſt mountain paſtures. Per. 6.

PASTINACA. Parſnep.

1. P. *ſativa*, wild. 8. 556. Chalky banks. Bienn. 7.

SMYRNIUM. Alexanders.

1. S. *Oluſatrum*, common. 4. 230. Ruins, and ſea cliffs. Bienn. 5.

ANETHUM. Fennel.

1. A. *Fœniculum*, common. 17. 1208. Chalk cliffs. Bienn. 7, 8.

CARUM. Caraway.

*1. C. *Carui*, common. 21. 1503. Meadows and paſtures. Bienn. 6.

PIMPINELLA. Burnet-Saxifrage.

1. P. *ſaxifraga*, common. 6. 407. Dry chalky paſtures. Per. 7, 8.
2. P. *magna*, great. 6. 408. Limeſtone groves. Per. 7, 8.
3. P. *dioica*, dwarf. 17. 1209. Limeſtone rocks, rare. Per. 5, 6.

APIUM. Celery.

1. A. *graveolens*, wild. 17. 1210. Ditches and marſhes. Bienn. 8.

AEGOPODIUM. Gout-weed.

1. A. *Podagraria*, common. 14. 940. Shady cultivated ground. Per. 5, 6.

Ord. 3. *Trigynia.*

VIBURNUM. Guelder-roſe.

1. V. *Lantana*, mealy. 5. 331. Chalky hedges. Shrub. 5.
2. V. *Opulus*, common. 5. 332. Watery groves and hedges. Shrub. 6.

SAMBUCUS. Elder.

1. S. *Ebulus*, dwarf. 7. 475. Waſte ground, rare. Per. 7.
2. S. *nigra*, common. 7. 476. Wood and hedges. Small tree. 6.

STAPHYLEA. Bladder-nut.

*1. S. *pinnata*, common. 22. 1560. Hedges, rare. Shrub. 6.

TAMARIX. Tamariſk.

1. T. *gallica*, common, or French. 19. 1318. South coaſt. Shrub. 7.

CORRIGIOLA. Strap-wort.

1. C. *littoralis*, ſand. 10. 668. South-weſt coaſt. Ann. 7, 8.

Ord. 4. *Tetragynia.*

PARNASSIA. Graſs of Parnaſſus.

1. P. *paluſtris*, common. 2. 82. Boggy moors. Per. 9, 10.

Ord. 5. *Pentagynia.*

STATICE. Sea Lavender.

1. S. *Armeria*, thrift. 4. 226. Mountains, and ſea ſhore. Per. 7, 8.
2. S. *Limonium*, common. 2. 102. Muddy ſea ſhore. Per. 7, 8.
3. S. *reticulata*, matted. 5. 328. Norfolk coaſt. Per. 7, 8.

LINUM. Flax.

1. L. *uſitatiſſimum*, common. 19. 1357. Fields. Ann. 7.
2. L. *perenne*, perennial blue. 1. 40. Chalky hills. Per. 6, 7.
3. L. *anguſtifolium*, narrow-leaved pale. 6. 381. Sand or limeſtone. Per. 7.
4. L. *catharticum*, purging. 6. 382. Dry paſtures. Ann. 6—8.

SIBBALDIA. Sibbaldia.

1. S. *procumbens*, procumbent. 13. 897. Scottiſh mountains. Per. 7.

Ord. 6.

Ord. 6. *Hexagynia.*

Drosera. Sun-dew.

1. D. *rotundifolia*, round-leaved. 13. 867. Turfy bogs. Per. 7, 8.
2. D. *longifolia*, long-leaved. 13. 868. Turfy bogs. Per. 7, 8.
3. D. *anglica*, great. 13. 869. Bogs, rare. Per. 7, 8.

Ord. 7. *Polygynia.*

Myosurus. Mouſetail.

1. M. *minimus*, leaſt. 7. 435. Gravelly corn-fields. Ann. 5.

Claſs 6. Hexandria.

Ord. 1. *Monogynia.*

Galanthus. Snowdrop.

1. G. *nivalis*, common. 1. 19. Meadows and orchards. Per. 2.

Leucojum. Snowflake.

1. L. *æſtivum*, ſummer. 9. 621. Moiſt meadows. Per. 5.

Narcissus. Narciſſus.

1. N. *poeticus*, poetic. 4. 275. Sandy downs. Per. 5.
2. N. *biflorus*, pale. 4. 276. Sandy downs. Per. 4, 5.
3. N. *Pſeudo-narciſſus*, daffodil. 1. 17. Woods and paſtures. Per. 3.

Allium. Garlick.

1. A. *Ampelopraſum*, great round. 24. 1657. Severn iſles. Per. 7.
2. A. *arenarium*, ſand. 19. 1358. Mountain woods. Per. 7.
3. A. *carinatum*, mountain. 24. 1658. Rocks and mountains. Per. 7.
4. A. *oleraceum*, ſtreaked field. 7. 488. Fields. Per. 7.
5. A. *vineale*, crow. 28. 1974. Chalky hills and fields. Per. 7.
6. A. *urſinum*, broad-leaved. 2. 122. Groves and thickets. Per. 5, 6.
7. A. *Schoenopraſum*, chive. 34. 2441. Meadows and paſtures, rare. Per. 6.

Fritillaria. Fritillary.

1. F. *Meleagris*, common. 9. 622. Moiſt paſtures. Per. 4.

Tulipa. Tulip.

1. T. *ſylveſtris*, wild yellow. 1. 63. Chalk-pits, rare. Per. 4.

Ornithogalum. Star of Bethlehem.

1. O. *luteum*, yellow. 1. 21. Groves, rare. Per. 4.
2. O. *pyrenaicum*, ſpiked. 7. 499. Paſtures and hills, rare. Per. 6, 7.
3. O. *umbellatum*, common. 2. 130. Meadows and paſtures. Per. 4, 5.
4. O. *nutans*, drooping. 28. 1997. Dry meadows, rare. Per. 5.

Hyacinthus. Hyacinth.

1. H. *racemoſus*, ſtarch. 27. 1391. Sandy ground, and walks. Per. 5.

Scilla. Squill.

1. S. *verna*, vernal. 1. 23. Sea cliffs. Per. 4.
2. S. *bifolia*, two-leaved. 1. 24. Woods in the weſt. Per. 3, 4.
3. S. *autumnalis*, autumnal. 2. 78. Dry paſtures, rare. Per. 9.
4. S. *nutans*, hare-bell. 6. 377. Groves and paſtures. Per. 5.

Anthericum. Spider-wort.

1. A. *ſerotinum*, mountain. 12. 793. Welſh mountains. Per. 6.

Narthecium. Aſphodel.

1. N. *oſſifragum*, Lancaſhire. 8. 535. Turfy bogs. Per. 7, 8.

Asparagus. Sperage.

1. A. *officinalis*, common. 5. 339. Stony ſea-coaſt. Per. 8.

Convallaria. Lilly of the Valley.

1. C. *majalis*, common. 15. 1035. Groves and thickets. Per. 5.
2. C. *verticillata*, narrow-leaved Solomon's ſeal. 2. 128. Woods, Scotland. Per. 6.
3. C. *Polygonatum*, angular Solomon's ſeal. 4. 280. Woods, rare. Per. 5, 6.
4. C. *multiflora*, common Solomon's ſeal. 4. 279. Woods. Per. 5, 6.

Acorus. Sweet Flag.

1. A. *Calamus*, common. 5. 356. Watery places. Per. 6.

Juncus. Ruſh.

1. J. *acutus*, great ſharp. 23. 1614. Sandy ſea-coaſt. Per. 7.
2. J. *maritimus*, leſſer ſharp. 24. 1725. Muddy ſea-coaſt. Per. 8.
3. J. *glaucus*, hard. 10. 665. Moiſt paſtures. Per. 7.
4. J. *conglomeratus*, common. 12. 835. Moiſt paſtures. Per. 7.
5. J. *effuſus*, ſoft. 12. 836. Moiſt paſtures. Per. 7.
6. J. *filiformis*, leaſt. 17. 1175. Alpine rills. Per. 8.
7. J. *trifidus*, three-leaved. 21. 1482. Alpine bogs. Per. 7.
8. J. *ſquarroſus*, moſs. 13. 933. Sandy heaths. Per. 6, 7.
9. J. *acutiflorus*, ſharp-flowered jointed. 4. 238, (articulatus). Bogs. Per. 6.

"Leaves with knotty joints, ſlightly compreſſed. Stem without joints. Panicle repeatedly forked, denſe. Calyx-leaves all ſharp-pointed."—*Stem* leafy. *Panicle* ſpreading, with upright branches. *Flowers* ſmall.

10. J. *lampocarpus*, ſhining-fruited jointed. 30. 2143. Boggy ground. Per. 6, 7.

"Leaves with knotty joints, compreſſed. Stem without joints. Panicle compound, erect, elongated. Inner calyx-leaves bluntiſh, bordered. Capſule coloured, varniſhed."—*Stem* leafy. *Panicle* tall, many-flowered. *Capſule* large, of a dark chocolate hue, and highly poliſhed.

11. J. *obtuſiflorus*, blunt-flowered jointed. 30. 2144. Marſhes. Per. 7, 8.

"Leaves and ſtem with knotty joints, cylindrical. Panicle repeatedly compound; its branches divaricated and reflexed. Calyx-leaves obtuſe, as long as the capſule."—

Stem tall, but with only two *leaves*. *Flowers* and *capſule* ſmall, browniſh.

12. J. *uliginoſus*, little bulbous. 12. 801. Wet ſandy heaths. Per. 6, 7.
13. J. *bulboſus*, round-fruited. 13. 934. Moiſt paſtures. Per. 7.
14. J. *gracilis*, ſlender ſpreading. 31. 2174. Alpine bogs, rare. Per. 7.

"Leaves linear, flat. Stem forked, racemoſe, taller than the leaves. Flowers ſolitary."

15. J. *bufonius*, toad. 12. 802. Sandy wet places. Ann. 7, 8.
16. J. *biglumis*, two-flowered. 13. 898. Alpine rills, rare. Per. 8.
17. J. *triglumis*, three-flowered. 13. 899. Alpine rills. Per. 7.
18. J. *caſtaneus*, cluſtered alpine. 13. 900. Highland bogs. Per. 7.
19. J. *piloſus*, broad-leaved hairy. 11. 736. Woods and groves. Per. 3, 4.
20. J. *Forſteri*, narrow-leaved hairy. 18. 1293. Groves. Per. 5.
21. J. *ſylvaticus*, wood. 11. 737. Woods and thickets. Per. 5.
22. J. *campeſtris*, hairy field. 10. 672. Barren paſtures. Per. 4, 5.
23. J. *ſpicatus*, ſpiked. 17. 1176. Highland hills. Per. 7.

BERBERIS. Barberry.

1. B. *vulgaris*, common. 1. 49. Chalky banks. Shrub. 5, 6.

FRANKENIA. Sea-Heath.

1. F. *lævis*, ſmooth. 3. 205. Muddy ſalt-marſhes. Per. 7.
2. F. *pulverulenta*, powdery. 31. 2222. Suſſex coaſt. Ann. 7.

PEPLIS. Water-Purſlane.

1. P. *Portula*, common. 17. 1211. Watery places. Ann. 7, 8.

Ord. 2. *Trigynia.*

RUMEX. Dock.

1. R. *ſanguineus*, bloody-veined. 22. 1533. Woods and way ſides. Per. 7.
2. R. *criſpus*, curled. 28. 1998. Rubbiſh and paſtures. Per. 6, 7.
3. R. *acutus*, ſharp. 11. 724. Watery and waſte places. Per. 7.
4. R. *obtuſifolius*, broad-leaved. 28. 1999. Waſte ground. Per. 7, 8.
5. R. *pulcher*, fiddle. 22. 1576. Gravelly paſtures. Per. 8.
6. R. *maritimus*, golden. 11. 725. Salt marſhes. Per. 7, 8.
7. R. *paluſtris*, yellow marſh. 27. 1932. Marſhes and ditches. Per. 7, 8.
8. R. *aquaticus*, great water. 30. 2104. Ditches and rivers. Per. 7, 8.
9. R. *digynus*, mountain ſorrel. 13. 910. Alpine rivulets. Per. 6.
10. R. *Acetoſa*, common ſorrel. 2. 127. Meadows and paſtures. Per. 6.
11. R. *Acetoſella*, ſheep's ſorrel. 24. 1674. Gravelly fields. Per. 6, 7.

TOFIELDIA. Tofieldia.

1. T. *paluſtris*, Scottiſh aſphodel. 8. 536. Alpine rills. Per. 8.

SCHEUCHZERIA. Scheuchzeria.

1. S. *paluſtris*, marſh. 26. 1801. Bogs, Yorkſhire. Per. 6.

TRIGLOCHIN. Arrow-graſs.

1. T. *paluſtre*, marſh. 6. 366. Marſhes. Per. 7.
2. T. *maritimum*, ſea. 4. 255. Muddy ſalt-marſhes. Per. 5—8.

COLCHICUM. Meadow-Saffron.

1. C. *autumnale*, common. 2. 133. *β*. 20. 1432. Rich meadows. Per. 9.

Ord. 3. *Polygynia.*

ALISMA. Water-Plantain.

1. A. *Plantago*, greater. 12. 837. Ditches and pools. Per. 7.
2. A. *Damaſonium*, ſtar-headed. 23. 1615. Gravelly pools, rare. Per. 6, 7.
3. A. *natans*, floating. 11. 775. Alpine lakes, rare. Per. 7, 8.
4. A. *ranunculoides*, ſmall. 5. 326. Watery turfy bogs. P. 8.

Claſs 7. HEPTANDRIA.

Ord. 1. *Monogynia.*

TRIENTALIS. Trientalis.

1. T. *europæa*, chickweed. 1. 15. Woods and mountain heaths. Per. 5, 6.

Claſs 8. OCTANDRIA.

Ord. 1. *Monogynia.*

OENOTHERA. Evening-Primroſe.

1. O. *biennis*, common. 22. 1534. Sandy weſtern coaſt. Bienn. 7—9.

EPILOBIUM. Willow-herb.

1. E. *anguſtifolium*, roſe-bay. 28. 1947. Shady meadows. Per. 7.
2. E. *hirſutum*, great hairy. 12. 838. Watery places. Per. 7.
3. E. *parviflorum*, ſmall-flowered, hoary. 12. 795. Watery places. Per. 7.
4. E. *montanum*, broad ſmooth-leaved. 17. 1177. Groves and ſtony places. Per. 7.
5. E. *roſeum*, pale ſmooth-leaved. 10. 693. Boggy ground, rare. Per. 7.
6. E. *tetragonum*, ſquare-ſtalked. 28. 1948. Marſhes. Per. 7.
7. E. *paluſtre*, round-ſtalked, marſh. 5. 346. Marſhes. Per. 7.
8. E. *alſinifolium*, chickweed-leaved. 28. 2000. Mountain rills. Per. 7.

"Leaves on footſtalks, ovate, acute, toothed. Stigma undivided. Root creeping, matted. Stems decumbent, obtuſely quadrangular."—Mr. Winch has ſhewn this to be the plant of the Cheviot hills, deſcribed by Ray, which has always been taken for *alpinum*.

9. E. *alpinum*, alpine. 28. 2001. Alpine rivulets, Scotland. Per. 6, 7.

Chlora. Yellow-Centaury.

1. C. *perfoliata*, common. 1. 60. Chalky banks. Ann. 7, 8.

Vaccinium. Whortle-berry.

1. V. *Myrtillus*, bilberry. 7. 456. Heaths and woods. Shrub. 5.
2. V. *uliginoſum*, great bilberry. 9. 581. Marſhy heaths. Shrub. 4, 5.
3. V. *Vitis Idæa*, red. 9. 598. Dry ſtony moors. Shrubby. 6.
4. V. *Oxycoccus*, cranberry. 5. 319. Moſſy bogs. Per. 6.

Menziesia. Menzieſia.

1. M. *cærulea*, Scottiſh. 35. 2469. Weſt of Scotland. Shrubby. 6, 7.
2. M. *Dabeoci*, Iriſh. 1. 35. (Erica Dabeoci.) Weſt of Ireland. Shrubby. 6, 7.

Erica. Heath.

1. E. *vulgaris*, common. 15. 1013. Heaths and woods. Shrub. 6, 7.
2. E. *Tetralix*, croſs-leaved. 15. 1014. Bogs. Shrubby. 7, 8.
3. E. *cinerea*, fine-leaved. 15. 1015. Heaths. Shrub. 7, 8.
4. E. *vagans*, Corniſh. 1. 3. Heaths, Cornwall. Shrub. 7, 8.

Daphne. Mezereon.

1. D. *Mezereum*, ſpurge-olive. 20. 1381. Woods, rare. Shrub. 3, 4.
2. D. *Laureola*, ſpurge-laurel. 2. 119. Buſhy places. Shrub. 3.

Acer. Maple.

*1. A. *Pſeudo-platanus*, greater, or ſycamore. 5. 303. Woods. Tree. 5.

2. A. *campeſtre*, common. 5. 304. Woods and hedges. Tree. 5, 6.

Ord. 2. *Trigynia.*

Polygonum. Perſicaria.

1. P. *amphibium*, amphibious. 7. 436. Ponds and ditches. Per. 7, 8.
2. P. *Perſicaria*, ſpotted. 11. 756. Ditches and bogs. Ann. 7, 8.
3. P. *lapathifolium*, pale-flowered. 20. 1382. Dunghills. Ann. 7, 8.
4. P. *Hydropiper*, biting. 14. 989. Watery places. Ann. 9.
5. P. *minus*, ſmall creeping. 15. 1043. Gravelly puddles. Ann. 9.
6. P. *Biſtorta*, great biſtort. 8. 509. Meadows. Per. 6.
7. P. *viviparum*, alpine biſtort. 10. 669. Highland mountains. Per. 6, 7.
8. P. *aviculare*, knot-graſs. 18. 1252. Rubbiſh and ſand. Ann. 4—10.

*9. P. *Fagopyrum*, buck-wheat. 15. 1044. Fields. Ann. 7, 8.

10. P. *Convolvulus*, black bindweed. 14. 941. Corn-fields. Ann. 6, 7.

Ord. 3. *Tetragynia.*

Paris. Herb Paris.

1. P. *quadrifolia*, common. 1. 7. Shady groves. Per. 5.

Adoxa. Moſchatell.

1. A. *Moſchatellina*, tuberous. 7. 453. Groves and banks. Per. 4, 5.

Elatine. Waterwort.

1. E. *Hydropiper*, ſmall. 14. 955. Borders of lakes, rare. Ann. 8.

Claſs 9. Enneandria.

Ord. 1. *Hexagynia.*

Butomus. Flowering-Ruſh.

1. B. *umbellatus*, common. 10. 651. Rivers and ditches. Per. 6, 7.

Claſs 10. Decandria.

Ord. 1. *Monogynia.*

Monotropa. Bird's-neſt.

1. M. *Hypopithys*, yellow. 1. 69. Beech or Fir woods. Per. 6.

Andromeda. Andromeda.

1. A. *polifolia*, marſh. 10. 713. Turfy bogs. Shrubby. 6.

Arbutus. Arbutus.

1. A. *Unedo*, ſtrawberry tree. 34. 2377. Rocks, Ireland. Shrub. 9.
2. A. *alpina*, black-berried alpine. 29. 2030. Stony hills, rare. Shrubby. 5.
3. A. *Uva urſi*, red-berried trailing. 10. 714. Alpine moors. Shrubby. 6.

Pyrola. Winter-green.

1. P. *rotundifolia*, round-leaved. 3. 213. Mountain thickets, rare. Per. 7.
2. P. *media*, intermediate. 28. 1945. North of England, woods. Per. 6.
3. P. *roſea*, roſe-coloured. 36. 2543. North of England, woods. Per. 7.
4. P. *minor*, leſſer. 3. 158? Woods, and mountain thickets. Per. 7.
5. P. *ſecunda*, ſerrated. 8. 517. Alpine woods. Per. 7.
6. P. *uniflora*, ſingle-flowered. 3. 146. Alpine woods, rare. Per. 7.

Ord. 2. *Digynia.*

Chrysosplenium. Golden-Saxifrage.

1. C. *alternifolium*, alternate-leaved. 1. 54. Shady rills, rare. Per. 5.
2. C. *oppoſitifolium*, oppoſite-leaved. 7. 490. Shady rills. Per. 5.

SAXIFRAGA. Saxifrage.

1. S. *ſtellaris*, hairy. 3. 167. Mountain rivulets. Per. 6, 7.
2. S. *nivalis*, cluſtered alpine. 7. 440. Tops of Highland mountains. Per. 7.
3. S. *umbroſa*, London pride. 10. 663. Mountains. Per. 6.
4. S. *hirſuta*, hairy oval-leaved. 33. 2322. Mountains, Ireland. Per. 6.
5. S. *Geum*, kidney-leaved. 22. 1561. Mountains, Ireland. Per. 6.
6. S. *oppoſitifolia*, purple. 1. 9. Alpine rocks. Per. 4.
7. S. *Hirculus*, yellow marſh. 15. 1009. Turfy bogs, very rare. Per. 8.
8. S. *aizoides*, yellow mountain. 1. 39. Mountain rivulets. Per. 7, 8.
9. S. *granulata*, white. 7. 500. Meadows and paſtures. Per. 5.
10. S. *cernua*, drooping bulbous. 10. 664. Weſt alpine rocks. Per. 7.
11. S. *rivularis*, alpine brook. 32. 2275. Alpine rivulets. Per. 6, 7.
12. S. *tridactylites*, rue-leaved. 7. 501. Walls. Ann. 5.
13. S. *cæſpitoſa*, tufted alpine. 12. 794. Alpine rocks, rare. Per. 6.
14. S. *moſchata*, muſky alpine. 33. 2314. Alpine rocks, rare. Per. 6, 7.
15. S. *palmata*, palmate. 7. 455. Rocky mountains. Per. 5, 6.
16. S. *hirta*, trifid hairy. 32. 2291. Highlands of Scotland. Per. 5, 6.
17. S. *platypetala*, broad-petalled. 32. 2276. Snowdon, and Scotland. Per. 6.
18. S. *elongella*, long-ſtalked. 32. 2277. Scottiſh mountains. Per. 6.
19. S. *hypnoides*, moſſy cuſhion. 7. 454. Mountains. Per. 5, 6.
20. S. *pedatifida*, pedatifid. 32. 2278. Highlands of Scotland. Per. 5, 6.

SCLERANTHUS. Knawel.

1. S. *annuus*, annual. 5. 351. Sandy fields, common. Ann. 7.
2. S. *perennis*, perennial. 5. 352. Sandy heaths, rare. Per. 10, 11.

SAPONARIA. Soapwort.

1. S. *officinalis*, common. 15. 1060. Meadows and hedges. Per. 8, 9.

DIANTHUS. Pink.

1. D. *Armeria*, Deptford. 5. 317. Gravelly paſtures. Ann. 7, 8.
2. D. *prolifer*, proliferous. 14. 956. Gravelly banks, rare. Ann. 7.
3. D. *Caryophyllus*, clove. 3. 214. Walls. Per. 7.
4. D. *deltoides*, maiden. 1. 61. Gravelly paſtures. Per. 7—10.
5. D. *cæſius*, mountain. 1. 62. Dry limeſtone rocks, rare. Per. 6, 7.

Ord. 3. *Trigynia*.

CUCUBALUS. Berry-Chickweed.

1. C. *baccifer*, black-fruited. 22. 1577. Angleſea, *Dillenius*. Per. 6, 7.

SILENE. Catchfly.

1. S. *anglica*, Engliſh. 17. 1178. Sandy fields. Ann. 7.
2. S. *quinquevulnera*, variegated. 2. 86. Sandy fields. Ann. 6, 7.
3. S. *nutans*, Nottingham. 7. 465. Calcareous rocks. Per. 6, 7.

S. *paradoxa*, mentioned in the Fl. Brit. 467, is to be excluded, as not really of Britiſh growth. The Dover Catchfly, *Lychnis major noctiflora Dubrenſis perennis*, Raii Syn. 340, has not been found ſince the time of Ray; and the old ſpecimens, preſerved in the Britiſh Muſeum, appear to be ſomething unknown to modern botaniſts, though not ſufficiently perfect to afford ſpecific characters. They are moſt like the Linnæan *Cucubalus viſcoſus*, for which Ray's plant was originally taken by Linnæus and Hudſon.

4. S. *inflata*, bladder. 3. 164. Fields and banks, common. Per. 7.
5. S. *maritima*, ſea. 14. 957. Stony ſhores and mountains. Per. 8, 9.
6. S. *Otites*, Spaniſh. 2. 85. Dry fields and heaths, rare. Per. 7, 8.
7. S. *conica*, corn. 13. 922. Sandy corn-fields. Ann. 7.
8. S. *noctiflora*, night-flowering. 5. 291. Gravelly fields. Ann. 7.

*9. S. *Armeria*, common, or Lobel's. 20. 1398. Fields and banks. Ann. 7, 8.

10. S. *acaulis*, moſs. 16. 1081. Mountains. Per. 6, 7.

STELLARIA. Stitchwort.

1. S. *nemorum*, wood. 2. 92. Moiſt woods, in the north. Per. 5, 6.
2. S. *media*, common chickweed. 8. 537. Waſte and cultivated ground. Ann. 4—10.
3. S. *holoſtea*, greater. 8. 511. Dry groves. Per. 5.
4. S. *graminea*, leſſer. 12. 803. Paſtures and buſhes. Per. 5.
5. S. *glauca*, glaucous marſh. 12. 825. Wet meadows. Per. 6, 7.
6. S. *uliginoſa*, bog. 15. 1075. Watery places. Ann. 6.
7. S. *ſcapigera*, many-ſtalked. 18. 1269. Rivulets, Scotland. Per. 6.
8. S. *ceraſtoides*, alpine. 13. 911. Highland mountains. Per. 6.

ARENARIA. Sandwort.

1. A. *peploides*, ſea. 3. 189. Sandy beach. Per. 6, 7.
2. A. *trinervis*, plantain-leaved. 21. 1483. Groves. Ann. 5, 6.
3. A. *ſerpyllifolia*, thyme-leaved. 13. 923. Banks and walls. Ann. 6, 7.
4. A. *rubra*, purple. 12. 852. Sandy fields. Ann. 7, 8.
5. A. *marina*, ſea ſpurrey. 14. 958. Sandy beach. Ann. 6, 7.
6. A. *tenuifolia*, fine-leaved. 4. 219. Sand and walls. Ann. 6.
7. A. *verna*, vernal. 8. 512. Sparry hills. Per. 5—8.
8. A. *faſtigiata*, level-topped. 25. 1744. Scottiſh mountains. Ann. 6.
9. A. *ciliata*, fringed. 25. 1745. Iriſh mountains. Per. 8.

CHERLERIA. Cherleria.

1. C. *ſedoides*, dwarf. 17. 1212. Highland mountains. Per. 7.

Ord. 4. *Pentagynia.*

Cotyledon. Navelwort.

1. C. *Umbilicus*, common. 5. 325. Shady rocks. Per. 6, 7.
2. C. *lutea*, greater yellow. 22. 1522. Moiſt rocks and walls, rare. Per. 6.

Sedum. Stone-crop.

1. S. *Telephium*, orpine. 19. 1319. Fields and thickets. Per. 8.
2. S. *daſyphyllum*, thick-leaved. 10. 656. Walls and ſtones. Per. 6.
3. S. *anglicum*, Engliſh. 3. 171. Mountains, and ſea ſhore. Ann. 7.
4. S. *acre*, biting. 12. 839. Walls and dry ſand. Per. 6.
5. S. *ſexangulare*, inſipid. 28. 1946. Walls, rare. Per. 6, 7.
6. S. *villoſum*, hairy. 6. 394. Mountain rills. Per. 6, 7.
7. S. *album*, white. 22. 1578. Rocks and walls, rare. Per. 7.
8. S. *reflexum*, yellow. 10. 695. Walls and roofs, common. Per. 7.
9. S. *glaucum*, glaucous. 35. 2477. Barren ſands. Per. 7, 8.
10. S. *rupeſtre*, rock. 3. 170. Rocks, rare. Per. 7.
11. S. *Forſterianum*, Forſterian. 26. 1802. Rocks, Wales. Per. 7.

Oxalis. Wood-Sorrel.

1. O. *Acetoſella*, common. 11. 762. Woods. Per. 4, 5.
2. O. *corniculata*, yellow procumbent. 24. 1726. Shady rocks. Per. 5—10.

Agrostemma. Cockle.

1. A. *Githago*, corn. 11. 741. Corn-fields. Ann. 6, 7.

Lychnis. Campion.

1. L. *Flos cuculi*, ragged robin. 8. 573. Moiſt meadows. Per. 6.
2. L. *Viſcaria*, German catchfly. 11. 788. Rocks, rare. Per. 5, 6.
3. L. *alpina*, red alpine. 32. 2254. Highland rocks. Per. 6, 7.
4. L. *dioica*, red or white. 22. 1579, 1580. Groves, and fields. Per. 5—9.

Cerastium. Chickweed.

1. C. *vulgatum*, broad mouſe-ear. 11. 789. Paſtures and rubbiſh. Ann. 4, 5.
2. C. *viſcoſum*, narrow mouſe-ear. 11. 790. Paſtures and rubbiſh. Per. 5—9.
3. C. *ſemidecandrum*, little mouſe-ear. 23. 1630. Walls and ſand. Ann. 4, 5.
4. C. *tetrandrum*, tetrandrous mouſe-ear. 3. 166. Rocks and ſand, Scotland. Ann. 5, 6.
5. C. *arvenſe*, field. 2. 93. Gravelly fields. Per. 5—8.
6. C. *alpinum*, alpine. 7. 472. Alpine rills. Per. 6, 7.
7. C. *latifolium*, broad rough. 7. 473. Alpine rocks. Per. 6.
8. C. *aquaticum*, water. 8. 538. Watery places. Per. 7.

Spergula. Spurrey.

1. S. *arvenſis*, rough-ſeeded corn. 22. 1535. Sandy fields. Ann. 7, 8.
2. S. *pentandra*, ſmooth-ſeeded corn. 22. 1536. Sandy fields. Ann. 7, 8.
3. S. *nodoſa*, knotted. 10. 694. Moiſt ſandy heaths. Per. 7, 8.
4. S. *ſaginoides*, ſmooth awl-ſhaped. 30. 2105. Highland mountains. Per. 6.
5. S. *ſubulata*, ciliated awl-ſhaped. 16. 1082. Sandy heaths. Per. 7, 8.

Claſs 11. Dodecandria.

Ord. 1. *Monogynia.*

Asarum. Aſarabacca.

1. A. *europæum*, common. 16. 1083. Woods, rare. Per. 5.

Lythrum. Lythrum.

1. L. *Salicaria*, purple. 15. 1061. Watery places. Per. 7, 8.
2. L. *hyſſopifolia*, hyſſop-leaved. 5. 292. Inundated ground. Ann. 8.

Ord. 2. *Digynia.*

Agrimonia. Agrimony.

1. A. *Eupatoria*, common. 19. 1335. Thickets and hedges. Per. 6, 7.

Ord. 3. *Trigynia.*

Reseda. Mignonette.

1. R. *Luteola*, dyer's-weed. 5. 320. Fields and rubbiſh. Ann. 7.
2. R. *lutea*, wild, or baſe rocket. 5. 321. Fields and chalky hills. Ann? 7, 8.

Euphorbia. Spurge.

1. E. *Peplis*, purple. 28. 2002. Sandy ſouth coaſt. Ann. 7, 8.
2. E. *Peplus*, petty. 14. 959. Cultivated ground, common. Ann. 7, 8.
3. E. *exigua*, dwarf. 19. 1336. Corn-fields, rare. Ann. 7.

†4. E. *Lathyris*, caper. 32. 2255. Dry ſtony places, rare. Bienn. 5, 6.

5. E. *Portlandica*, Portland. 7. 441. South coaſt. Per. 8.
6. E. *paralia*, ſea. 3. 195. Sandy ſea ſhore. Per. 8, 9.
7. E. *helioſcopia*, ſun. 13. 883. Cultivated ground. Ann. 7, 8.
8. E. *platyphylla*, warty. 5. 333. Corn-fields, rare. Ann. 7, 8.
9. E. *Eſula*, leafy-branched. 20. 1399. Woods, Scotland. Per. 7.
10. E. *Cypariſſias*, cypreſs. 12. 840. Woods and barren ground. Per. 5, 6.
11. E. *hiberna*, Iriſh. 19. 1337. Fields, rare. Per. 6.
12. E. *amygdaloides*, wood. 4. 256. Woods and groves. Per. 3, 4.
13. E. *Characias*, red. 7. 442. Mountainous places, rare. Shrub. 3, 4.

Ord. 4. *Dodecagynia.*

Sempervivum. Houſeleek.

1. S. *tectorum*, common. 19. 1320. Roofs and walls. Per. 7.

Claſs 12. Icosandria.

Ord. 1. *Monogynia.*

Prunus. Cherry or Plum.

1. P. *Padus*, bird cherry. 20. 1383. Woods and hedges. Tree. 5.
2. P. *Ceraſus*, common cherry. 10. 706. Woods and hedges. Tree. 5.
*3. P. *domeſtica*, common plum. 25. 1783. Hedges. Tree. 4.
4. P. *inſititia*, bullace. 12. 841. Hedges and groves. Tree. 4.
5. P. *ſpinoſa*, ſloe. 12. 842. Hedges and thickets. Shrub. 3, 4.

Ord. 2. *Pentagynia.*

Meſpilus. Medlar.

1. M. *Oxyacantha*, hawthorn. 35. 2504. Hedges and thickets. Small tree. 5, 6.
*2. M. *germanica*, common eatable. 22. 1523. Hedges, rare. Tree. 5.

Pyrus. Pear.

1. P. *communis*, common. 25. 1784. Woods and hedges. Tree. 4.
2. P. *Malus*, apple, or crab. 3. 179. Woods and hedges. Tree. 5.
3. P. *torminalis*, wild ſervice. 5. 298. Woods and hedges. Tree. 4, 5.
4. P. *domeſtica*, true ſervice. 5. 350. Mountain woods, rare. Tree. 5.
5. P. *aucuparia*, mountain aſh. 5. 337. Mountain woods. Tree. 5.
6. P. *pinnatifida*, baſtard mountain aſh. 33. 2331. Rocks, rare. Tree. 5.
7. P. *Aria*, white beam-tree. 26. 1858. Limeſtone rocks. Tree. 5.

Spiræa. Spiræa.

1. S. *ſalicifolia*, willow-leaved. 21. 1468. Wet mountain thickets. Shrub. 7.
2. S. *Filipendula*, dropwort. 4. 284. Dry open paſtures. Per. 7.
3. S. *Ulmaria*, meadow-ſweet. 14. 960. Moiſt meadows. Per. 6. 7.

Ord. 2. *Polygynia.*

Rosa. Roſe.

1. R. *ſpinoſiſſima*, burnet. 3. 187. Sandy heaths. Low ſhrub. 7.
2. R. *rubella*, red-fruited dwarf. 36. 2521. Northumberland. Low ſhrub. 7.
3. R. *involuta*, prickly unexpanded. 29. 2068. Weſtern iſles. Low ſhrub. 6.
4. R. *hibernica*, Iriſh. 31. 2196. Ireland. Shrub. 6—11.
5. R. *arvenſis*, white field. 3. 188. Hedges and thickets. Shrub. 6, 7.
6. R. *villoſa*, apple. 9. 583. Mountain thickets. Shrub. 6.
7. R. *mollis*, ſoft-leaved round-fruited. 35. 2459. Thickets. Low ſhrub. 6.
8. R. *cinnamomea*, cinnamon. 34. 2388. Thickets, Yorkſhire. Shrub. 5.
9. R. *tomentoſa*, dowys-leaved briar. 14. 990. Woods and hedges. Shrub. 6, 7.
10. R. *rubiginoſa*, ſweet briar. 14. 991. Gravelly heaths. Shrub. 6, 7.
11. R. *micrantha*, ſmall-flowered ſweet briar. 35. 2490. Hedges. Shrub. 6, 7.
12. R. *ſcabriuſcula*, roughiſh-leaved briar. 27. 1896. Hedges. Shrub. 6.
13. R. *cæſia*, glaucous-leaved. 33. 2367. Highland valleys. Shrub. 7.
14. R. *canina*, common dog-briar. 14. 992. Hedges. Shrub. 6.
15. R. *collina*, rough-ſtalked dog-briar. 27. 1895. Thickets, Suſſex. 7.
16. R. *dumetorum*, downy-ſtalked dog-briar. 36. 2579. Thickets, Suſſex. 7.

Rubus. Bramble.

1. R. *idæus*, raſpberry. 34. 2442. Woods and thickets. Shrub. 5, 6.
2. R. *ſuberectus*, red-fruited. 36. 2572. Northern woods. Shrub. 6.
3. R. *cæſius*, dew-berry. 12. 826. Groves and hedges. Shrub. 6, 7.
4. R. *corylifolius*, hazel-leaved. 12. 827. Hedges. Shrub. 7.
5. R. *fruticoſus*, common. 10. 715. Hedges. Shrub. 7, 8.
6. R. *ſaxatilis*, ſtone. 32. 2233. Mountain woods. Per. 6.
7. R. *arcticus*, dwarf crimſon. 23. 1585. Stony hills, rare. Per. 5, 6.
8. R. *Chamæmorus*, cloud-berry. 10. 716. Mountain moors. Per. 6.

Fragaria. Strawberry.

1. F. *veſca*, common. 22. 1524. Groves and banks. Per. 5, 6.
2. F. *elatior*, hautboy. 31. 2197. Woods in the ſouth, rare. Per. 6, 9.
3. F. *ſterilis*, barren. 25. 1785. Barren paſtures. Per. 3, 4.

Potentilla. Cinquefoil.

1. P. *fruticoſa*, ſhrubby. 2. 88. Mountain thickets, Yorkſhire. Shrub. 6.
2. P. *anſerina*, ſilver-weed. 12. 861. Boggy meadows. Per. 6, 7.
3. P. *rupeſtris*, ſtrawberry-flowered. 29. 2058. Rocks, Wales. Per. 6, 7.
4. P. *argentea*, hoary. 2. 89. Gravelly paſtures. Per. 6.
5. P. *aurea*, golden. 8. 561. Highland mountains. Per. 7.
6. P. *verna*, ſpring. 1. 37. High open paſtures. Per. 4, 5.
7. P. *opaca*, ſaw-leaved hairy. 35. 2449. Highlands. Per. 6.
8. P. *alba*, white. 20. 1384. Welch mountains. Per. 7, 8.
9. P. *reptans*, common creeping. 12. 862. Meadows and paſtures. Per. 6—8.
10. P. *tridentata*, trifid-leaved. 34. 2389. Highlands. Per. 5, 6.

Tormentilla. Tormentil.

1. T. *officinalis*, common. 12. 863. Heaths and paſtures. Per. 6, 7.
2. T. *reptans*, trailing. 12. 864. Hedges, rare. Per. 6, 7.

GEUM. Avens.

1. G. *urbanum*, common. 20. 1400. Woods and hedges. Per. 5—8.
2. G. *rivale*, water. 2. 106. Moiſt ſhady meadows. Per. 6, 7.

DRYAS. Mountain-avens.

1. D. *octopetala*, white. 7. 451. Alpine moors. Per. 7, 8.

COMARUM. Marſh-cinquefoil.

1. C. *paluſtre*, common. 3. 172. Spongy bogs. Per. 6, 7.

Claſs 13. POLYANDRIA.

Ord. 1. *Monogynia.*

ACTÆA. Bane-berries.

1. A. *ſpicata*, herb chriſtopher. 13. 918. Mountain groves, rare. Per. 5, 6.

CHELIDONIUM. Celandine.

1. C. *majus*, common. 22. 1581. Shady banks. Per. 5, 6.

GLAUCIUM. Horned-poppy.

1. G. *luteum*, yellow. 1. 8. Sandy ſea-coaſt. Per. 7, 8.
†2. G. *phoeniceum*, ſcarlet. 20. 1433. Sandy fields. Ann. 6, 7.
3. G. *violaceum*, violet. 3. 201. Chalky fields, rare. Ann. 5, 6.

PAPAVER. Poppy.

1. P. *hybridum*, mongrel. 1. 43. Chalky fields, rare. Ann. 7.
2. P. *Argemone*, long-rough-headed. 9. 643. Corn-fields. Ann. 6, 7.
3. P. *dubium*, long-ſmooth-headed. 9. 644. Sandy fields. Ann. 6—8.
4. P. *Rhoeas*, common red. 9. 645. Corn-fields. Ann. 6, 7.
5. P. *ſomniferum*, white. 30. 2145. Sandy fen-banks. Ann. 7.
6. P. *cambricum*, yellow. 1. 66. Shady rocks. Per. 6.

NYMPHÆA. Water-lily.

1. N. *alba*, white. 3. 160. Pools, rivers and lakes. Per. 7.

NUPHAR. Yellow water-lily.

1. N. *lutea*, common. 3. 159. Pools and rivers. Per. 7.
2. N. *minima*, leaſt, 32. 2292. Alpine lakes. Per. 7.

TILIA. Lime-tree.

1. T. *europæa*, common. 9. 610. Woods and hedges. Tree. 7.
2. T. *parvifolia*, ſmall-leaved. 24. 1705. Woods. Tree. 8.

CISTUS. Ciſtus.

1. C. *marifolius*, hoary dwarf. 6. 396. Rocks, rare. Dwarf ſhrub. 5, 6.
2. C. *guttatus*, ſpotted-flowered. 8. 544. Sandy paſtures, rare. Ann. 6. 7.
3. C. *ledifolius*, ledum-leaved. 34. 2414. Sandy paſtures, rare. Ann. 6, 7.
4. C. *ſurrejanus*, dotted-leaved. 31. 2207. Chalk hills, rare. Shrub. 7, 8.
5. C. *Helianthemum*, common dwarf. 19. 1321. Gravelly banks. Shrub. 7, 8.
6. C. *tomentoſus*, downy. 31. 2208. Highland hills. Shrubby 7.
7. C. *polifolius*, white mountain. 19. 1322. Open downs. rare. Shrubby 6, 7.

Ord. 2. *Pentagynia.*

PÆONIA. Pæony.

1. P. *corallina*, entire-leaved. 22. 1513. Severn iſles. Per. 5, 6.

DELPHINIUM. Larkſpur.

1. D. *Conſolida*, field. 26. 1839. Sandy fields. Ann. 6, 7.

AQUILEGIA. Columbine.

1. A. *vulgaris*, common. 5. 297. Meadows and paſtures. Per. 7.

STRATIOTES. Water-aloe.

1. S. *aloides*, common. 6. 379. Ditches and pools. Per. 7.

Ord. 3. *Polygynia.*

ANEMONE. Anemone.

1. A. *Pulſatilla*, paſque-flower. 1. 51. Chalky hills. Per. 4, 5.
2. A. *nemoroſa*, common wood. 5. 355. Groves and heaths. Per. 4, 5.
3. A. *apennina*, blue mountain. 15. 1062. Groves, rare. Per. 4.
4. A. *ranunculoides*, yellow wood. 21. 1484. Groves, rare. Per. 4.

CLEMATIS. Traveller's joy.

1. C. *Vitalba*, common. 9. 612. Hedges, chalky ſoil. Shrub. 7.

THALICTRUM. Meadow-rue.

1. T. *alpinum*, alpine. 4. 262. Alpine bogs. Per. 6.
2. T. *minus*, leſſer. 1. 11. Calcareous paſtures. Per. 6, 7.
3. T. *majus*, greater. 9. 611. Mountain thickets. Per. 6, 7.
4. T. *flavum*, common. 6. 367. Moiſt meadows. Per. 7.

ADONIS. Pheaſant's-eye.

1. A. *autumnalis*, corn. 5. 308. Corn-fields. Ann. 5—10.

RANUNCULUS. Crowfoot.

1. R. *Flammula*, leſſer ſpear-wort. 6. 387. Watery places. Per. 6—9.
2. R. *Lingua*, great ſpear-wort. 2. 100. Ditches. Per. 7.
3. R. *gramineus*, graſſy. 33. 2306. Alpine meadows. Per. 5, 6.
4. R. *Ficaria*, pile-wort. 9. 584. Groves and banks. Per. 4.
5. R. *auricomus*, wood. 9. 624. Dry groves. Per. 4, 5.
6. R. *ſceleratus*, water. 10. 681. Watery places. Ann. 6—8.
7. R. *alpeſtris*, alpine white. 34. 2390. Alpine rills. Per. 5.
8. R. *bulboſus*, bulbous. 8. 515. Meadows and paſtures. Per. 5.
9. R. *hirſutus*, pale hairy. 21. 1504. Waſte and cultivated ground. Ann. 6—10.

R. *parvulus* of Linnæus, and Fl. Brit. 593, found below Briſtol hot-wells by Mr. Dyer, and by ſeveral botaniſts at Montpellier, proves a ſtarved variety of our *hirſutus*, a ſpecies unnoticed by Linnæus. Mr. Curtis, in deſcribing the latter, had not adverted to the tuberculated ſeeds, by which it, in all its varieties, is readily and eſſentially diſtinguiſhed from *bulboſus*.

10. R. *repens*, creeping. 8. 516. Meadows and rubbiſh. Per. 6—8.
11. R. *acris*, upright meadow. 10. 652. Meadows and paſtures. Per. 6, 7.
12. R. *arvenſis*, corn. 2. 135. Corn-fields. Ann. 6.
13. R. *parviflorus*, ſmall-flowered. 2. 120. Gravelly fields. Ann. 5, 6.
14. R. *hederaceus*, ivy-leaved. 28. 2003. Inundated places. Per. 5 – 8.
15. R. *aquatilis*, white floating. 2. 101. Ditches, pools, and rivers. Per. 5, 6.

TROLLIUS. Globe-flower.

1. T. *europæus*, common. 1. 28. Mountain groves. Per. 5, 6.

HELLEBORUS. Hellebore.

1. H. *viridis*, green. 3. 200. Chalky woods, rare. Per. 4.
2. H. *fœtidus*, ſtinking. 9. 613. Chalky banks. Per. 3, 4.

CALTHA. Marſh-marigold.

1. C. *paluſtris*, common. 8. 506. Wet meadows. Per. 5.
2. C. *radicans*, creeping. 31. 2175. Bogs, Scotland. Per. 6.

Claſs 14. DIDYNAMIA.

Ord. 1. *Gymnoſpermia.*

AJUGA. Bugle.

1. A. *reptans*, common. 7. 489. Moiſt groves. Per. 5.
2. A. *alpina*, alpine. 7. 477. Mountains. Per. 7.
3. A. *pyramidalis*, pyramidal. 18. 1270. Highland hills. Per. 5, 6.
4. A. *Chamæpitys*, ground pine. 2. 77. Sandy fields. Ann. 4, 5.

TEUCRIUM. Germander.

1. T. *Scorodonia*, wood. 22. 1543. Woods and heaths. Per. 7.
2. T. *Scordium*, water. 12. 828. Boggy meadows, rare. Per. 7, 8.
3. T. *Chamædrys*, wall. 10. 680. Old walls. Per. 7.

NEPETA. Cat-mint.

1. N. *cataria*, common. 2. 137. Chalky banks. Per. 7.

VERBENA. Vervain.

1. V. *officinalis*, common. 11. 767. Paſtures and rubbiſh. Per. 7.

MENTHA. Mint.

1. M. *ſylveſtris*, horſe. 10. 686. Moiſt waſte ground. Per. 8, 9.
2. M. *rotundifolia*, round-leaved. 7. 446. Moiſt ground, rare. Per. 8, 9.
3. M. *viridis*, ſpear. 34. 2424. Wet meadows. Per. 8.
4. M. *piperita*, pepper. 10. 687. Watery places. Per. 8, 9.
5. M. *odorata*, bergamot. 15. 1025. Wet ground, rare. Per. 7, 8.
6. M. *hirſuta*, hairy. 7. 447, 448, (ſativa). Watery places. Per. 8, 9.
7. M. *acutifolia*, fragrant ſharp-leaved. 34. 2415. River banks, rare. Per. 9.
8. M. *rubra*, tall red. 20. 1413. Wet hedges. Per. 9.
9. M. *gentilis*, buſhy red. 30. 2118. Wet waſte ground, rare. Per. 8.
10. M. *gracilis*, narrow-leaved. 7. 449, (gentilis). Waſte ground. Per. 8.
11. M. *arvenſis*, corn. 30. 2119. Wet corn-fields. Per. 6—9.
12. M. *agretis*, rugged field. 30. 2120. Fields. Per. 8.
13. M. *Pulegium*, penny-royal. 15. 1026. Watery paſtures. Per. 9.

GLECHOMA. Ground-ivy.

1. G. *hederacea*, common. 12. 853. Woods and hedges. Per. 4. 5.

LAMIUM. Dead-nettle.

1. L. *album*, white. 11. 768. Waſte ground. Per. 5—9.
2. L. *maculatum*, ſpotted. 36. 2550. Banks, rare. Per. 4.
3. L. *purpureum*, red. 11. 769. Waſte and cultivated ground. Ann. 5—9.
4. L. *inciſum*, cut-leaved. 27. 1933. Sandy fields. Ann. 5.
5. L. *amplexicaule*, henbit. 11. 770. Sandy fields. Ann. 2—6.

GALEOPSIS. Hemp-nettle.

1. G. *Ladanum*, red. 13. 884. Chalky fields. Ann. 8, 9.
2. G. *villoſa*, downy. 33. 2353. Sandy fields, rare. Ann. 7, 8.
3. G. *Tetrahit*, common. 3. 207. Corn-fields. Ann. 7, 8.
4. G. *verſicolor*, large-flowered. 10. 667. Sandy fields. Ann. 7, 8.

GALEOBDOLON. Weaſel-ſnout.

1. G. *luteum*, yellow. 11. 787. Moiſt groves. Per. 5.

BETONICA. Betony.

1. B. *officinalis*, wood. 16. 1142. Woods and thickets. Per. 7, 8.

STACHYS. Wound-wort.

1. S. *ſylvatica*, hedge. 6. 416. Hedges and groves. Per. 7, 8.
2. S. *ambigua*, ambiguous. 30. 2089. North of Scotland. Per. 9.
3. S. *paluſtris*, marſh. 24. 1675. Wet meadows. Per. 8.
4. S. *germanica*, downy. 12. 829. Chalky fields. Per. 7.
5. S. *arvenſis*, corn. 17. 1154. Gravelly fields. Ann. 7, 8.

BALLOTA. Black-horehound.

1. B. *nigra*, ſtinking. 1. 46. Hedges and rubbiſh. Per. 7, 8.

MARRUBIUM. White-horehound.

1. M. *vulgare*, aromatic. 6. 410. Dry waſte ground. Per. 7.

LEONURUS. Motherwort.

1. L. *Cardiaca*, common. 4. 286. Gravelly banks. Per. 7, 8.

CLINOPODIUM. Baſil.

1. C. *vulgare*, wild. 20. 1401. Gravelly or chalky banks. Per. 8.

ORIGANUM. Marjoram.

1. O. *vulgare*, common. 16. 1143. Calcareous thickets. Per. 7, 8.

THYMUS. Thyme.

1. T. *Serpyllum*, wild. 22. 1514. Heaths and hills. Per. 7, 8.
2. T. *Acinos*, baſil. 6. 411. Sandy fields. Ann. 7. 8.
3. T. *Calamintha*, common calamint. 24. 1676. Gravelly banks. Per. 7, 8.
4. T. *Nepeta*, leſſer calamint. 20. 1414. Chalky banks. Per. 8.

MELITTIS. Baſtard-balm.

1. M. *Meliſſophyllum*, reddiſh. 9. 577. Woods, weſt of England. Per. 5, 6.
2. M. *grandiflora*, purple and white. 9. 636. Woods, weſt of England. Per. 5.

SCUTELLARIA. Scull-cap.

1. S. *galericulata*, common. 8. 523. Watery places. Per. 7, 8.
2. S. *minor*, leſſer. 8. 524. Wet gravelly heaths. Per. 8.

PRUNELLA. Self-heal.

1. P. *vulgaris*, common. 14. 961. Meadows and paſtures. Per. 7, 8.

Ord. 2. *Angioſpermia.*

BARTSIA. Bartſia.

1. B. *alpina*, alpine purple. 6. 361. Alpine rills. Per. 7.
2. B. *viſcoſa*, yellow viſcid. 15. 1045. Marſhes, rare. Ann. 7, 8.
3. B. *Odontites*, red. 20. 1415. Meadows and paſtures. Ann. 7, 8.

RHINANTHUS. Yellow-rattle.

1. R. *Criſta-galli*, common. 10. 657. Meadows. Ann. 6.

EUPHRASIA. Eye-bright.

1. E. *officinalis*, common. 20. 1416. Heaths and paſtures. Ann. 7—9.

MELAMPYRUM. Cow-wheat.

1. M. *criſtatum*, creſted. 1. 41. Fields and groves, rare. Ann. 7.
2. M. *arvenſe*, purple. 1. 53. Wheat fields, Norfolk. Ann. 7.
3. M. *pratenſe*, common. 2. 113. Groves and thickets. Ann. 7, 8.
4. M. *ſylvaticum*, wood. 12. 804. Alpine woods. Ann. 7, 8.

LATHRÆA. Tooth-wort.

1. L. *Squamaria*, greater. 1. 50. Dry woods. Per. 4.

PEDICULARIS. Louſe-wort.

1. P. *paluſtris*, marſh. 6. 399. Marſhy meadows. Per. 6, 7.
2. P. *ſylvatica*, paſture. 6. 400. Mountain heaths. Per. 6, 7.

ANTIRRHINUM. Snapdragon.

*1. A. *Cymbalaria*, ivy-leaved. 7. 502. Old walls. Per. 5—11.

2. A. *ſpurium*, round-leaved fluellin. 10. 691. Fields. Ann. 7—9.
3. A. *Elatine*, ſharp-pointed fluellin. 10. 692. Fields. Ann. 7—9.
4. A. *repens*, creeping pale-blue toadflax. 18. 1253. Chalky hills. Per. 7—9.
5. A. *Linaria*, common yellow toadflax. 10. 658. Hedges, &c. Per. 6, 7.
   β, with regular pentandrous flowers. 4. 260. See PELORIA.
6. A. *minus*, leaſt. 28. 2014. Sandy fields. Ann. 6—8.

*7. A. *majus*, great. 2. 129. Old walls. Per. 7, 8.

8. A. *Orontium*, leſſer. 17. 1155. Sandy or chalky fields. Ann. 7, 8.

SCROPHULARIA. Figwort.

1. S. *nodoſa*, knotty-rooted. 22. 1544. Woods and hedges. Per. 7.
2. S. *aquatica*, water. 12. 854. Watery places. Per. 7.
3. S. *Scorodonia*, balm-leaved. 31. 2209. Wet hedges, rare. Per. 7, 8.
4. S. *vernalis*, yellow. 8. 567. Lanes and hedges, rare. Bienn. 4, 5.

DIGITALIS. Fox-glove.

1. D. *purpurea*, purple. 19. 1297. Paſtures and thickets. Bienn. 6, 7.

LINNÆA. Linnæa.

1. L. *borealis*, two-flowered. 7. 433. Stony woods, Scotland, rare. Per. 6.

SIBTHORPIA. Sibthorpia.

1. S. *europæa*, Corniſh moneywort. 10. 649. Moiſt ground, Cornwall. Per. 7, 8.

LIMOSELLA. Mud-wort.

1. L. *aquatica*, little. 5. 357. Muddy ground. Ann. 7, 8.

OROBANCHE. Broom-rape.

1. O. *major*, greater. 6. 421. On broom or furze. Per. 6, 7.
2. O. *elatior*, tall. 8. 568. On various roots. Per. 7, 8.
3. O. *minor*, leſſer. 6. 422. On clover roots. Ann? 7, 8.
4. O. *rubra*, red fragrant. 25. 1786. Baſaltic rocks, Ireland. Per. 8.
5. O. *cærulea*, purple. 6. 423. Paſtures near the ſea. Per. 7.
6. O. *ramoſa*, branched. 3. 184. On hemp. Ann. 8, 9.

Claſs 15. TETRADYNAMIA.

Ord. 1. *Siliculoſa.*

VELLA. Creſs-rocket.

1. V. *annua*, annual. 21. 1442. Sandy fields, rare. Ann. 6.

SUBULARIA. Awl-wort.

1. S. *aquatica*, water. 11. 732. In alpine lakes. Ann. 7.

DRABA. Whitlow-graſs.

1. D. *verna*, common. 9. 586. Walls and paſtures. Ann. 3, 4.
2. D. *aizoides*, yellow alpine. 18. 1271. Rocks, South Wales. Per. 3.
3. D. *hirta*, ſimple-haired. 19. 1338. Alpine rocks. Per. 5, 6.

4. D. *incana*, twiſted-podded. 6. 388. Limeſtone rocks. Bienn. 5, 6.
5. D. *muralis*, ſpeedwell-leaved. 13. 912. Shady hills. Ann. 5.

ALYSSUM. Alyſſum.

*1. A. *ſativum*, gold of pleaſure. 18. 1254. Fields. Ann. 6.
2. A. *maritimum*, ſweet. 25. 1729. Sea-coaſt, rare. Per. 8, 9.

LEPIDIUM. Pepper-wort.

1. L. *latifolium*, broad-leaved. 3. 182. Sea-coaſt. Per. 7.
2. L. *ruderale*, narrow-leaved. 23. 1595. Sea-coaſt. Bienn. 6.
3. L. *campeſtre*, mithridate. 20. 1385. (Thlaſpi). Fields, Ann. 7.
4. L. *hirtum*, hairy. 26. 1803. (Thlaſpi). Fields, rare. Per. 6.

HUTCHINSIA. Hutchinſia.

Brown in Ait. Hort. Kew. v. 4. 82.

Eſſ. Ch. Pouch entire; valves tumid. Seeds two in each cell. Filaments ſimple.

1. H. *petræa*, rock. 2. 111. (Lepidium petræum). Limeſtone. Bienn. 3, 4.

Leaves pinnatifid, entire. Petals ſhorter than the calyx. Stigma ſeſſile.

Named, by Mr. R. Brown, in honour of Miſs Hutchins, of Bantry, in Ireland; a lady whoſe diſcoveries in the moſt difficult parts of practical botany, well entitle her to commemoration. The genus is diſtinguiſhed from *Draba* and *Subularia*, in having but two, inſtead of many, ſeeds in each cell; and moreover from the former in having tumid, not nearly flat valves; from the latter in not having linear cotyledons. *Lepidium* has properly an emarginate pouch, with keeled valves, and ſolitary ſeeds. Other ſpecies of *Hutchinſia* are *Iberis rotundifolia* and *Lepidium alpinum* of Linnæus.

TEESDALIA. Teeſdalia.

Brown in Ait. Hort. Kew. v. 4. 83.

Eſſ. Ch. Pouch emarginate, inverſely heart-ſhaped. Seeds two in each cell. Filaments each bearing a ſcale, at the inſide, near the baſe.

1. T. *nudicaulis*, naked-ſtalked. 5. 327. (Iberis nudicaulis). Gravelly paſtures. Ann. 5.

Petals equal.

This genus is dedicated, by Mr. Brown, to the memory of the late Mr. Robert Teeſdale, F.L.S. Another ſpecies is the exotic *Lepidium nudicaule* of Linnæus, differing in having equal petals, and but four ſtamens. See TEESDALIA hereafter in its proper place.

THLAPSI. Mithridate Muſtard.

1. T. *arvenſe*, penny creſs. 24. 1659. Fields, rare. Ann. 6, 7.
2. T. *perfoliatum*, perfoliate. 33. 2354. Limeſtone quarries. Ann. 4, 5.
3. T. *alpeſtre*, alpine. 2. 81. Limeſtone hills. Per. 6. 7.
4. T. *Burſa-paſtoris*, ſhepherd's purſe. 21. 1485. Common. Ann. 3—9.

COCHLEARIA. Scurvy-graſs.

1. C. *officinalis*, common. 8. 551. Mountains, and ſea-coaſt. Ann. 5.
2. C. *groenlandica*, Greenland. 34. 2403. Highlands. Ann. 8
3. C. *anglica*, Engliſh. 8. 552. Muddy ſea ſhores. Ann. 5.
4. C. *danica*, Daniſh. 10. 696. Muddy ſhores, rare. Ann. 5, 6.
5. C. *Armoracia*, horſe-radiſh. 33. 2323. Watery places. Per. 5.

CORONOPUS. Wart-creſs.

1. C. *Ruellii*, common. 24. 1660. Waſte ground. Ann. 6—8.
2. C. *didyma*, leſſer. 4. 248. Weſt of England. Ann. 7.

IBERIS. Candy-tuft.

1. I. *amara*, bitter. 1. 52. Chalky fields, rare. Ann. 7.

ISATIS. Woad.

1. I. *tinctoria*, dyer's. 2. 97. Fields, rare. Bienn. 7.

BUNIAS. Sea Rocket.

1. B. *Cakile*, common. 4. 231. Sandy ſhore. Ann. 6—9.

CRAMBE. Kale.

1. C. *maritima*, ſea. 13. 924. Sandy ſea-coaſt. Per. 5, 6.

Ord. 2. *Siliquoſa*.

DENTARIA. Coral-wort.

1. D. *bulbifera*, bulbiferous. 5. 309. Shady places, rare. Per. 4, 5.

CARDAMINE. Ladies'-ſmock.

1. C. *bellidifolia*, daiſy-leaved. 33. 2355. Mountains, rare. Per. 8.
2. C. *impatiens*, impatient. 2. 80. Stony mountains. Ann. 5, 6.
3. C. *hirſuta*, hairy. 7. 492. Waſte and cultivated ground. Ann. 3—6.
4. C. *pratenſis*, meadow. 11. 776. Meadows and paſtures. Per. 4, 5.
5. C. *amara*, bitter. 14. 1000. Watery places, rare. Per. 4, 5.

SISYMBRIUM. Rocket.

1. S. *Naſturtium*, water-creſs. 12. 855. Running waters. Per. 6, 7.
2. S. *ſylveſtre*, creeping water. 33. 2324. Inundated gravel. Per. 6—9.
3. S. *terreſtre*, annual water. 25. 1747. Watery places. Ann. 6—9.
4. S. *amphibium*, great water. 26. 1840. Rivers. Per. 6—8.
5. S. *tenuifolium*, greater wall. 8. 525. Walls and rubbiſh. Per. 7—10.
6. S. *murale*, ſpreading wall. 16. 1090. Sandy waſtes. Ann. 8—10.
7. S. *monenſe*, dwarf ſea. 14. 962. Sandy coaſts, rare. Per. 6, 7.
8. S. *Sophia*, flix-weed. 14. 963. Waſte ground. Ann. 7.
9. S. *Irio*, London. 23. 1631. Rubbiſh and walls. Ann. 7, 8.

ERYSIMUM. Hedge-muſtard.

1. E. *officinale*, common. 11. 735. Waſte places, and roads. Ann. 6, 7.

2. E. *Barbarea*, bitter winter-creſs. 7. 443. Rubbiſh and ditches. Per. 5—8.
3. E. *præcox*, early winter-creſs. 16. 1129. Watery places. Bienn. 4—10.
4. E. *Alliaria*, garlick. 12. 796. Hedges, common. Bienn. 5.
5. E. *cheiranthoides*, treacle. 14. 942. Fields and willow-beds. Ann. 7.

CHEIRANTHUS. Stock.

1. C. *fruticuloſus*, wall-flower. 27. 1934. Old walls. Per. 5, 6.
2. C. *incanus*, hoary ſhrubby. 27. 1935. Sea cliffs, rare. Shrubby. 5.
3. C. *ſinuatus*, ſea. 7. 462. Welch coaſt. Bienn. 8.

HESPERIS. Dame's-violet.

†1. H. *inodora*, ſcentleſs. 11. 731. Banks of rivulets, rare. Per. 5, 6.

ARABIS. Wall-creſs.

1. A. *thaliana*, common. 13. 901. Walls and banks. Ann. 4.
2. A. *ſtricta*, Briſtol rock. 9. 614. Rocks, Briſtol. Per. 5.
3. A. *hiſpida*, alpine rock. 7. 469. (Cardamine haſtulata). Rocks. Per. 6, 7.
4. A. *Turrita*, tower. 3. 178. Walls, rare. Bienn. 5.

TURRITIS. Tower-muſtard.

1. T. *glabra*, ſmooth. 11. 777. Gravelly banks. Ann. 5, 6.
2. T. *hirſuta*, hairy. 9. 587. Rocks and walls. Per. 5.
3. T. *alpina*, alpine. 25. 1746. Weſt of Ireland. Bienn. 7.

BRASSICA. Cabbage.

1. B. *orientalis*, perfoliate. 26. 1804. Fields and cliffs, Ann. 6.
2. B. *campeſtris*, field. 32. 2234. Fields. Ann. 6.
3. B. *Napus*, rape, or navew. 30. 2146. Fields and banks. Bienn. 5.
4. B. *Rapa*, turnep. 31. 2176. Fields. Bienn. 4.
5. B. *oleracea*, ſea. 9. 637. Sea cliffs. Bienn. 5, 6.

SINAPIS. Muſtard.

1. S. *arvenſis*, charlock. 25. 1748. Fields, common. Ann. 5.
2. S. *alba*, white. 24. 1677. Fields. Ann. 6.
3. S. *nigra*, common. 14. 969. Fields and banks. Ann. 6.

RAPHANUS. Radiſh.

1. R. *Raphaniſtrum*, wild. 12. 856. Corn-fields. Ann. 6, 7.
2. R. *maritimus*, ſea. 23. 1643. Sea-coaſt. Bienn. 6.

Claſs 16. MONADELPHIA.

Ord. 1. *Pentandria.*

ERODIUM. Stork's-bill.

1. E. *cicutarium*, hemlock. 25. 1768. Rubbiſh and ſand. Ann. 6—8.
2. E. *moſchatum*, muſky. 13. 902. Mountain paſtures. Ann. 6, 7.
3. E. *maritimum*, ſea. 9. 646. Sandy coaſt. Per. 5—9.

Ord. 2. *Decandria.*

GERANIUM. Crane's-bill.

1. G. *phæum*, duſky. 5. 322. Mountain thickets. Per. 5, 6.
2. G. *nodoſum*, knotty. 16. 1091. Mountains, rare. Per. 5—8.
3. G. *ſylvaticum*, wood. 2. 121. Mountain thickets. Per. 6, 7.
4. G. *pratenſe*, crowfoot-leaved. 6. 404. Hilly paſtures. Per. 6, 7.
5. G. *robertianum*, ſtinking. 21. 1486. Rubbiſh and banks. Ann. 5—10.
6. G. *lucidum*, ſhining. 2. 75. Walls and ſtony places. Ann. 5—8.
7. G. *molle*, dove's-foot. 11. 778. Paſtures and rubbiſh. Ann. 4—8.
8. G. *puſillum*, ſmall-flowered. 6. 385. Gravelly ground. Ann. 6—9.
9. G. *pyrenaicum*, mountain. 6. 405. Meadows and paſtures. Per. 7.
10. G. *rotundifolium*, round-leaved. 3. 157. Gravelly banks. Ann. 6, 7.
11. G. *diſſectum*, jagged-leaved. 11. 753. Barren banks. Ann. 5, 6.
12. G. *columbinum*, long-ſtalked. 4. 259. Chalky banks. Ann. 6, 7.
13. G. *ſanguineum*, bloody. 4. 272. Rocks and hills. Per. 7—9.

Ord. 3. *Polyandria.*

ALTHÆA. Marſh-mallow.

1. A. *officinalis*, common. 3. 147. Sea marſhes. Per. 7—9.

MALVA. Mallow.

1. M. *ſylveſtris*, common. 10. 671. Hedges and rubbiſh. Per. 5—8.
2. M. *rotundifolia*, dwarf. 16. 1092. β. 4. 241. Rubbiſh. Ann. 6—9.
3. M. *moſchata*, muſk. 11. 754. Gravelly banks. Per. 7, 8.

LAVATERA. Tree-mallow.

1. L. *arborea*, ſea. 26. 1841. Sea-coaſt, rare. Bienn. 7—10.

Claſs 17. DIADELPHIA.

Ord. 1. *Hexandria.*

FUMARIA. Fumitory.

1. F. *ſolida*, ſolid bulbous. 21. 1471. Northern woods. Per. 4, 5.
2. F. *lutea*, yellow. 9. 588. Old walls. Per. 5.
3. F. *officinalis*, common. 9. 589. Cultivated ground. Ann. 5—8.
4. F. *parviflora*, ſmall-flowered. 9. 590. Fields, in the ſouth. Ann. 8, 9.
5. F. *capreolata*, ramping. 14. 943. Fields, rare. Ann. 6—9.
6. F. *claviculata*, white climbing. 2. 103. Gravelly thickets. Ann. 6, 7.

Ord. 2. *Octandria.*

POLYGALA. Milkwort.

1. P. *vulgaris*, common. 2. 76. Sunny paſtures. Per. 6, 7.

Ord. 3. *Decandria.*

SPARTIUM. Broom.

1. S. *ſcoparium*, common. 19. 1339. Dry hills and fields. Shrub. 5, 6.

GENISTA. Green-weed.

1. G. *tinctoria*, dyer's. 1. 44. Paſtures and thickets. Shrub. 7, 8.
2. G. *piloſa*, hairy. 3. 208. Barren heaths, rare. Shrubby. 5.
3. G. *anglica*, needle. 2. 132. Moiſt heaths. Low ſhrub. 5, 6.

ULEX. Furze.

1. U. *europæus*, common. 11. 742. Heaths and ſandy downs. Shrub. 5—12.
2. U. *nanus*, dwarf. 11. 743. Elevated heaths. Shrub. 8—10.

ONONIS. Reſt-harrow.

1. O. *arvenſis*, common. 10. 682. Barren paſtures, &c. Per. 6—8.

ANTHYLLIS. Kidney-vetch.

1. A. *vulneraria*, ladies'-finger. 2. 104. Chalky hills. Per. 6—8.

PISUM. Pea.

1. P. *maritimum*, ſea. 15. 1046. Stony ſea beach. Per. 7.

OROBUS. Bitter-vetch.

1. O. *tuberoſus*, heath. 17. 1153. Heaths and thickets. Per. 5, 6.
2. O. *ſylvaticus*, wood. 8. 518. Mountain woods. Per. 5, 6.

LATHYRUS. Lathyrus.

1. L. *Aphaca*, yellow vetchling. 17. 1167. Gravelly banks, rare. Ann. 6—8.
2. L. *Niſſolia*, crimſon graſſy. 2. 112. Buſhy places. Ann. 5.
3. L. *hirſutus*, rough-podded. 18. 1255. Fields, rare. Ann. 7.
4. L. *pratenſis*, yellow meadow. 10. 670. Meadows and paſtures. Per. 7, 8.
5. L. *ſylveſtris*, narrow-leaved. 12. 805. Moiſt thickets. Per. 7, 8.
6. L. *latifolius*, broad-leaved. 16. 1108. Woods, rare. Per. 7, 8.
7. L. *paluſtris*, marſh. 3. 169. Wet thickets. Per. 7, 8.

VICIA. Vetch.

1. V. *ſylvatica*, wood. 2. 79. Mountain thickets. Per. 7, 8.
2. V. *Cracca*, tufted. 17. 1168. Meadows and hedges. Per. 7, 8.
3. V. *ſativa*, common. 5. 334. Fields and graſſy places. Ann 5, 6.
4. V. *lathyroides*, ſpring. 1. 30. Gravelly fields. Ann. 4, 5.
5. V. *lutea*, rough-podded yellow. 7. 481. Stony beach. Per. 8.
6. V. *hybrida*, hairy-flowered yellow. 7. 482. Thickets, rare. Per. 6.
7. V. *lævigata*, ſmooth-podded ſea. 7. 483. Stony beach, rare. Per. 8.
8. V. *ſepium*, buſh. 22. 1515. Buſhy places, common. Per. 5, 6.
9. V. *bithynica*, rough-podded purple. 26. 1842. Paſtures, rare. Per. 7, 8.

ERVUM. Tare.

1. E. *tetraſpermum*, ſmooth. 17. 1223. Moiſt fields. Ann. 6.
2. E. *hirſutum*, hairy. 14. 970. Fields and meadows. Ann. 6.

ORNITHOPUS. Bird's-foot.

1. O. *perpuſillus*, common. 6. 369. Gravel or ſand. Ann. 5.

HIPPOCREPIS. Horſe-ſhoe-vetch.

1. H. *comoſa*, tufted. 1. 31. Chalky hills. Per. 5—8.

HEDYSARUM. Saint-foin.

1. H. *Onobrychis*, common. 2. 96. Chalky hills. Per. 6, 7.

ASTRAGALUS. Milk-vetch.

1. A. *glycyphyllos*, ſweet. 3. 203. Chalky thickets. Per. 6.
2. A. *hypoglottis*, purple mountain. 4. 274. Chalk or ſand. Per. 6, 7.
3. A. *uralenſis*, hairy mountain. 7. 466. Scottiſh hills. Per. 7.
4. A. *campeſtris*, yellowiſh mountain. 36. 2522. Highlands. Per. 7.

TRIFOLIUM. Trefoil.

1. T. *officinale*, melilot. 19. 1340. Buſhy places. Ann. 6, 7.
2. T. *ornithopodioides*, bird's-foot. 15. 1047. Gravelly heaths. Ann. 6, 7.
3. T. *repens*, white clover. 25. 1769. Meadows, common. Per. 5—9.
4. T. *ſubterraneum*, ſubterraneous. 15. 1048. Gravelly paſtures. Ann. 5.
5. T. *ochroleucum*, ſulphur-coloured. 17. 1224. Dry paſtures. Per. 6, 7.
6. T. *pratenſe*, common purple clover. 25. 1770. Meadows and paſtures. Per. 5—9.
7. T. *medium*, zigzag. 3. 190. Chalky or gravelly paſtures. Per. 7.
8. T. *maritimum*, teaſel-headed. 4. 220. Muddy ſea ſhore. Ann. 6, 7.
9. T. *ſtellatum*, ſtarry-headed. 22. 1545. South coaſt. Ann. 7.
10. T. *arvenſe*, hare's-foot. 14. 944. Sandy fields. Ann. 7, 8.
11. T. *ſcabrum*, rough. 13. 903. Chalk or ſand. Ann. 5, 6.
12. T. *glomeratum*, round-headed. 15. 1063. Gravelly paſtures. Ann. 6.
13. T. *ſtriatum*, ſoft knotted. 26. 1843. Barren ground. Ann. 6.
14. T. *ſuffocatum*, ſuffocated. 15. 1049. Sea ſand. Ann. 6, 7.
15. T. *fragiferum*, ſtrawberry-headed. 15. 1050. Moiſt paſtures. Per. 7, 8.
16. T. *procumbens*, hop. 14. 945. Dry gravelly paſtures. Ann. 6, 7.

17. T. *minus*, leſſer yellow. 18. 1256. Gravelly ground. Ann. 6, 7.

18. T. *filiforme*, ſlender yellow. 18. 1257. Moiſt gravel. Ann. 6, 7.

Lotus. Bird's-foot Trefoil.

1. L. *corniculatus*, common. 30. 2090. Paſtures, common. Per. 6—8.

2. L. *major*, greater. 30. 2091. Wet buſhy places. Per. 7, 8.

3. L. *diffuſus*, ſlender. 13. 925. Rocks, ſouth coaſt. Per? 5, 6.

Medicago. Medick.

*1. M. *ſativa*, purple, or lucerne. 25. 1749. Meadows and paſtures. Per. 6, 7.

2. M. *falcata*, yellow. 15. 1016. Gravelly and chalky banks. Per. 7.

3. M. *lupulina*, black. 14. 971. Meadows and paſtures. Ann. 5 – 8.

4. M. *maculata*, ſpotted. 23. 1616 (polymorpha). Gravelly banks. Ann. 5, 6.

5. M. *muricata*, flat-toothed. Pluk. Phyt. t. 113. f. 6. Suffolk coaſt. Ann. 6.

6. M. *minima*, little bur. Fl. Dan. t. 211. Chalky ground. Ann. 6.

Claſs 18. Polyadelphia.

Ord. 1. *Polyandria.*

Hypericum. St. John's-wort.

1. H. *calycinum*, large-flowered. 29. 2017. Thickets, Ireland. Shrubby. 7—9.

2. H. *Androſæmum*, tutſan. 18. 1225. Woods, rare. Per. 7, 8.

3. H. *quadrangulum*, ſquare. 6. 370. Moiſt meadows. Per. 7, 8.

4. H. *perforatum*, perforated. 5. 295. Buſhy places. Per. 7, 8.

5. H. *dubium*, imperforate. 5. 296. Mountain thickets. Per. 7, 8.

6. H. *humifuſum*, trailing. 18. 1226. Paſtures and groves. Per. 7.

7. H. *montanum*, mountain. 6. 371. Buſhy hills. Per. 7.

8. H. *barbatum*, bearded. 28. 1986. Thickets, Scotland. Per. 9, 10.

9. H. *hirſutum*, hairy. 17. 1156. Chalky banks. Per 6, 7.

10. H. *pulchrum*, ſmall upright. 18. 1227. Clay heaths. Per. 7.

11. H. *elodes*, marſh. 2. 109. Spongy bogs. Per. 7, 8.

Claſs 19. Syngenesia.

Ord. 1. *Polygamia æqualis.*

Tragopogon. Goat's-beard.

1. T. *pratenſis*, yellow. 7. 434. Graſſy paſtures. Bienn. 6.

2. T. *porrifolius*, purple. 9. 638. Moiſt meadows, rare. Bienn. 5, 6.

Picris. Ox-tongue.

1. P. *echioides*, briſtly. 14. 972. Clay paſtures and banks. Ann. 6, 7.

2. P. *hieracioides*, hawkweed. 3. 196. Gravel or chalk. Bienn. 7, 8.

Sonchus. Sow-thiſtle.

1. S. *cæruleus*, blue. 34. 2425. Highland paſtures, rare. Per. 7, 8.

2. S. *paluſtris*, tall marſh. 13. 935. Banks of rivers. Per. 7, 8.

3. S. *arvenſis*, corn. 10. 674. Corn-fields, on clay. Per. 8.

4. S. *oleraceus*, common. 12. 843. Fields, banks, and rubbiſh. Ann. 7—9.

Lactuca. Lettuce.

1. L. *viroſa*, ſtrong-ſcented. 28. 1957. Chalky banks. Bienn. 8, 9.

2. L. *Scariola*, prickly. 4. 268. Rubbiſh, rare. Bienn. 8.

3. L. *ſaligna*, leaſt. 10. 707. Chalky banks. Bienn. 8.

Prenanthes. Wall-Lettuce.

1. P. *muralis*, ivy-leaved. 7. 457. Walls, or chalky groves. Per. 7.

Leontodon. Dandelion.

1. L. *Taraxacum*, common. 8. 510. Meadows and paſtures. Per. 4—7.

2. L. *paluſtre*, marſh. 8. 553. Moiſt meadows. Per. 6, 7.

Apargia. Hawkbit.

Schreb. 527. *Willd. Sp. Pl.* v. 3. 1547. *Sm. Prodr. Fl. Græc. Sibth.* v. 2. 130. *Ait. Hort. Kew.* v. 4. 445. Hedypnois; *Hudſ.* 340. *Sm. Fl. Brit.* 823.

Eſſ. Ch. Receptacle naked, dotted. Calyx imbricated. Seed-down feathery, ſeſſile, unequal.

1. A. *hiſpida*, rough. 8. 554. (Hedypnois hiſpida). Chalky paſtures. Per. 7.

Stalks radical, ſingle-flowered. Leaves toothed, rough. Florets hairy at the orifice, glandular at the extremity.

2. A. *hirta*, deficient. 8. 555. (H. hirta). Gravelly paſtures. Per. 7, 8.

Stalks radical, ſingle-flowered. Leaves toothed, rough. Calyx nearly ſmooth. Outer row of ſeeds naked.

3. A. *Taraxici*, alpine. 16. 1109. (H. Taraxici). Alpine rills. Per. 8.

Stalks radical, moſtly ſingle-flowered. Leaves with reverſed teeth, ſmooth. Calyx hairy.

4. A. *autumnalis*, autumnal. 12. 830. (H. autumnalis). Paſtures. Per. 8.

Stalk radical, branched; ſubdiviſions ſcaly. Leaves lanceolate, ſmoothiſh; toothed or pinnatifid.

Willdenow has, in all, 17 ſpecies of this genus, among which are *Leontodon alpinum*, Jacq. Auſtr. t. 93; *L. haſtile*, Linn. Sp. Pl. 1123: *L. tuberoſum*, ibid: *Hieracium incanum*, Jacq. Auſtr. t. 287: *Leontodon criſpum*, Villars Dauph. v. 3. 84. t. 25: *L. coronopifolium*, Desfont. Atlant. v. 2. 229. t. 214: and *L. hiſpidum*, Cavan. Ic. t. 149; the latter named *Apargia hiſpanica*, Willd. n. 14. See Hedypnois.

Hieracium. Hawkweed.

1. H. *alpinum*, alpine ſingle-flowered. 16. 1110. Alpine rocks. Per. 7.

2. H. *Piloſella*, mouſe-ear. 16. 1093. Paſtures and walls. Per. 5—7.

3. H. *dubium*, branching mouſe-ear. 33. 2332. Hills, rare. Per. 7, 8.

†4. H. *Auricula*, orange mouſe-ear. 33. 2368. Mountains? Per. 7, 8.

5. H. *aurantiacum*, great orange. 21. 1469. Woods, Scotland. Per. 6, 7.
6. H. *murorum*, wall. 29. 2082. Rocks and walls. Per. 6.
7. H. *maculatum*, ſtained-leaved. 30. 2121. Mountain rocks. Per. 6.
8. H. *ſylvaticum*, wood. 29. 2031. Rocks and walls, common. Per. 6, 7.
9. H. *pulmonarium*, lungwort. 33. 2307. Rocks, Scotland. Per. 7.
10. H. *Lawſoni*, glaucous hairy. 29. 2083. North of England. Per. 7.
11. H. *paludoſum*, ſuccory-leaved mountain. 16. 1094. Mountain rills. Per. 7.
12. H. *molle*, ſoft-leaved. 31. 2210. Woods, Scotland. Per. 7, 8.
13. H. *cerinthoides*, honeywort-leaved. 34. 2378. Rocks, Scotland. Per. 8.
14. H. *villoſum*, ſhaggy alpine. 34. 2379. Highlands. Per. 8.
15. H. *ſabaudum*, ſhrubby broad-leaved. 5. 349. Groves. Per. 8, 9.
16. H. *denticulatum*, ſmall-toothed. 30. 2122. Woods, Scotland. Per. 8, 9.
17. H. *prenanthoides*, rough-bordered. 32. 2235. Woods, Scotland. Per. 8.
18. H. *umbellatum*, narrow-leaved. 25. 1771. Stony groves. Per. 8, 9.

CREPIS. Hawk's-beard.

1. C. *fœtida*, ſtinking. 4. 406. Chalky paſtures, rare. Bienn. 6, 7.
2. C. *pulchra*, ſmall-flowered. 33. 2325. Rocks, Scotland. Ann. 6—9.
3. C. *tectorum*, ſmooth. 16. 1111. Paſtures and rubbiſh. Ann. 6—9.
4. C. *biennis*, rough. 3. 149. Chalky paſtures. Bienn. 6, 7.

HYPOCHÆRIS. Cat's-ear.

1. H. *maculata*, ſpotted. 4. 225. Chalky downs. Per. 7.
2. H. *glabra*, ſmooth. 8. 575. Gravelly fields. Ann. 6—8.
3. H. *radicata*, long-rooted. 12. 831. Meadows and paſtures. Per. 6—8.

LAPSANA. Nipple-wort.

1. L. *communis*, common. 12. 844. Fields and rubbiſh. Ann. 6, 7.
2. L. *puſilla*, little. 2. 95. (Hyoſeris minima). Gravelly fields. Ann. 6.

Stem none. Stalks ſubdivided; ſwelling and hollow at the ſummit. Leaves obovate. The *ſeeds* have an elevated border, which is unlike the true *Lapſana*, but this plant is perhaps better placed here than elſewhere. See LAPSANA.

CICHORIUM. Succory.

1. C. *Intybus*, wild. 8. 539. Gravel or chalk. Per. 7, 8.

ARCTIUM. Bur-dock.

1. A. *Lappa*, common. 18. 1228. Waſte places. Bienn. 7, 8.
2. A. *Bardana*, woolly-headed. 35. 2478. Waſte hilly ground. Bienn. 7, 8.

SERRATULA. Saw-wort.

1. S. *tinctoria*, common. 1. 38. Groves and thickets. Per. 7, 8.
2. S. *alpina*, alpine. 9. 599. Alpine rocks. Per. 7, 8.

CARDUUS. Thiſtle.

1. C. *nutans*, muſk. 16. 1112. Gravelly or chalky fields. Ann. 7, 8.
2. C. *acanthoides*, curled or welted. 14. 973. Waſte ground. Ann. 6, 7.
3. C. *tenuiflorus*, ſlender-flowered. 6. 412. Banks, rare. Ann. 6, 7.
4. C. *marianus*, milk. 14. 976. Banks and hedges. Ann. 8.

CNICUS. Plume-thiſtle.

1. C. *lanceolatus*, ſpear. 2. 107. (Carduus lanceolatus). Banks. Bienn. 6—9.
2. C. *paluſtris*, marſh. 14. 974. (Card. paluſtris). Moiſt paſtures. Bienn. 7, 8.
3. C. *arvenſis*, creeping. 14. 975. (Card. arvenſis). Fields and roads. Per. 7.
4. C. *eriophorus*, woolly-headed. 6. 386. (Card. erioph.) Chalk or gravel. Bienn. 8.
5. C. *tuberoſus*, tuberous. 36. 2562. Woods, Wiltſhire. Per. 8.
6. C. *heterophyllus*, melancholy. 10. 675 (Card. heteroph.) Mountain paſtures. Per. 7, 8.
7. C. *pratenſis*, meadow. 3. 177 (Card. prat.) Moiſt paſtures. Per. 6.
8. C. *acaulis*, dwarf. 3. 161 (Card. acaulis). Gravel or chalk. Per. 7, 8.

ONOPORDUM. Cotton-thiſtle.

1. O. *Acanthium*, common. 14. 977. Gravelly banks. Bienn. 7.

CARLINA. Carline-thiſtle.

1. C. *vulgaris*, common. 16. 1144. Dry ſandy fields. Bienn. 6.

BIDENS. Bur-marygold.

1. B. *tripartita*, trifid. 16. 1113. Ditches and puddles. Ann. 8, 9.
2. B. *cernua*, nodding. 16. 1114. Watery places. Ann. 9.

EUPATORIUM. Hemp-agrimony.

1. E. *cannabinum*, common. 6. 428. Watery boggy places. Per. 7, 8.

CHRYSOCOMA. Goldy-locks.

1. C. *Linoſyris*, flax-leaved. 35. 2505. Sea cliffs, Devonſhire. Per. 9.

SANTOLINA. Cotton-weed.

1. S. *maritima*, ſea. 2. 141. Sandy beach, rare. Per. 8, 9.

Ord. 2. *Polygamia-ſuperflua.*

TANACETUM. Tanſy.

1. T. *vulgare*, common. 18. 1229. Hills and way ſides. Per. 7, 8.

PLANTS.

Artemisia. Mugwort.

1. A. *campeſtris*, field ſouthernwood. 5. 338. Sandy fields, rare. Per. 8.
2. A. *maritima*, drooping ſea wormwood. 24. 1706. Muddy ſea ſhore. Per. 8.
3. A. *gallica*, upright ſea wormwood. 14. 1001 (maritima). Muddy ſhores. Per. 8.
Radical leaves capillary. Cluſters erect.
4. A. *Abſinthium*, common wormwood. 18. 1230. Rubbiſh. Per. 8.
5. A. *vulgaris*, common. 14. 978. Waſte ground, hedges, &c. Per. 8.
†6. A. *cæruleſcens*, blueiſh. 34. 2426. Sea ſhore, Lincolnſhire. *Hudſon.* Per. 8.

Gnaphalium. Cudweed.

1. G. *luteo-album*, Jerſey. 14. 1002. Sandy ground, Jerſey. Ann. 7, 8.
2. G. *margaritaceum*, American. 29. 2018. Meadows, rare. Per. 8.
3. G. *dioicum*, mountain. 4. 267. Dry mountain paſtures. Per. 6, 7.
4. G. *ſylvaticum*, Highland. 13. 913. Alpine paſtures. Per. 8.
5. G. *rectum*, upright wood. 2. 124. Sandy thickets. Per. 8.
6. G. *ſupinum*, dwarf. 17. 1193. Micaceous mountains. Per. 7.
7. G. *uliginoſum*, marſh. 17. 1194. Sandy puddles. Ann. 8.
8. G. *gallicum*, narrow-leaved. 33. 2369. Gravelly fields, rare. Ann. 7, 8.
9. G. *minimum*, leaſt. 17. 1157. Barren gravelly fields. Ann. 7.
10. G. *germanicum*, common. 14. 946. Gravelly fields. Ann. 7, 8.

Conyza. Spikenard.

1. C. *ſquarroſa*, plowman's. 17. 1195. Calcareous paſtures. Bienn. 7, 8.

Erigeron. Flea-bane.

*1. E. *canadenſe*, Canada. 29. 2019. Fields and rubbiſh. Ann. 8, 9.
2. E. *acre*, blue. 17. 1158. Dry gravelly ground. Bienn. 7, 8.
3. E. *alpinum*, alpine. 7. 464. Alpine rills, Scotland. Per. 7.
4. E. *uniflorum*, pale mountain. 34. 2416. Highlands. Per. 7.

Stems moſtly ſingle-flowered. Calyx hairy. Florets of the radius erect, ſomewhat tubular.

Tussilago. Colt's-foot.

1. T. *Farfara*, common. 6. 429. Moiſt chalk. Per. 3, 4.
2. T. *hybrida*, tall butter-bur. 6. 430. Moiſt meadows, rare. Per. 4.
3. T. *Petaſites*, common butter-bur. 6. 431. Moiſt meadows. Per. 4.

Senecio. Ragwort.

1. S. *vulgaris*, common groundſel. 11. 747. Fields and rubbiſh. Ann. 3—10.
2. S. *viſcoſus*, ſtinking. 1. 32. Chalky banks, rare. Ann. 7—10.
3. S. *lividus*, green-ſcaled. 35. 2515. Barren heaths. Ann. 9, 10.
4. S. *ſylvaticus*, mountain. 11. 748. Gravelly thickets. Ann. 7, 8.
5. S. *ſqualidus*, inelegant. 9. 600. Walls, Oxford. Ann. 6—10.
6. S. *tenuifolius*, hoary. 8. 574. Chalky hedges. Per. 7, 8.
7. S. *Jacobæa*, common. 16. 1130. Paſtures and meadows. Per. 7, 8.
8. S. *aquaticus*, marſh. 16. 1131. Marſhes. Per. 7, 8.
9. S. *paludoſus*, fen. 10. 650. Fens, rare. Per. 6, 7.
10. S. *ſaracenicus*, broad-leaved. 31. 2211. Moiſt hills. Per. 7, 8.

Aster. Star-wort.

1. A. *Tripolium*, ſea. 2. 87. Muddy ſea ditches. Per. 8, 9.

Solidago. Golden-rod.

1. S. *Virgaurea*, common. 5. 301. Groves and heaths. Per. 7—9.

Inula. Inula.

1. I. *Helenium*, elecampane. 22. 1546. Moiſt paſtures, rare. Per. 7, 8.
2. I. *dyſenterica*, common fleabane. 16. 1115. Watery places. Per. 8.
3. I. *pulicaria*, ſmall fleabane. 17. 1196. Sandy puddles. Ann. 9.
4. I. *crithmoides*, ſamphire-leaved. 1. 68. Muddy ſalt-marſhes. Per. 8.

Cineraria. Flea-wort.

1. C. *paluſtris*, marſh. 3. 151. Ditches and bogs. Per. 6, 7.
2. C. *integrifolia*, mountain. 3. 152. Chalky hills. Per. 5—7.

Doronicum. Leopard's-bane.

1. D. *Pardalianches*, great. 9. 630. Mountain paſtures, rare. Per. 5.

Bellis. Daiſy.

1. B. *perennis*, common. 6. 424. Paſtures. Per. 3—12.

Chrysanthemum. Ox-eye.

1. C. *Leucanthemum*, great white. 9. 601. Paſtures and fields. Per. 6, 7.
2. C. *ſegetum*, yellow corn. 8. 540. Cultivated fields. Ann. 6—8.

Pyrethrum. Feverfew.

1. P. *Parthenium*, common. 18. 1231. Rubbiſh. Per. 6, 7.
2. P. *inodorum*, corn. 10. 676. Gravelly fields. Ann. 8, 9.
3. P. *maritimum*, ſea. 14. 979. Sea-coaſt, rare. Per. 7.

Matricaria. May-weed.

1. M. *Chamomilla*, wild chamomile. 18. 1232. Fields and dunghills. Ann. 5—7.

Anthemis. Chamomile.

1. A. *maritima*, ſea. 33. 2370. Stony beach, rare. Ann. 7.
2. A. *nobilis*, common. 14. 980. Gravelly paſtures. Per. 8, 9.

3. A. *arvenſis*, corn. 9. 602. Gravelly fields. Ann. or Bienn. 6, 7.
4. A. *Cotula*, ſtinking. 25. 1772. Fields, common. Ann. 6, 7.
5. A. *tinctoria*, ox-eye. 21. 1472. Stony banks, rare. Per. 7, 8.

ACHILLEA. Yarrow.

1. A. *Ptarmica*, gooſe-tongue. 11. 757. Moiſt buſhy places. Per. 7, 8.
2. A. *ſerrata*, ſerrated. 36. 2531. Derbyſhire. Per. 8.

Leaves linear-lanceolate, ſeſſile, downy, deeply ſerrated; laciniated at the baſe. Corymbs nearly ſimple. Fragrant; the *flowers* ſmaller than thoſe of *Ptarmica*, and yellowiſh.

3. A. *Millefolium*, common. 11. 758. Paſtures, common. Per. 6—8.
4. A. *tomentoſa*, woolly yellow. 36. 2532. Paſtures, Scotland and Ireland. Per. 8.

Ord. 3. *Polygamia-fruſtranea.*

CENTAUREA. Knapweed.

1. C. *Jacea*, brown radiated. 24. 1678. Paſtures, Suſſex and Ireland. Per. 8, 9.
2. C. *nigra*, black leſſer. 4. 278. Paſtures, every where. Per. 6—8.
3. C. *Cyanus*, blue-bottle. 4. 277. Corn-fields, common. Ann. 7, 8.
4. C. *Scabioſa*, greater. 1. 56. Borders of fields. Per. 7, 8.
5. C. *Iſnardi*, Jerſey. 32. 2256. Paſtures, Jerſey. Per. 7, 8.
6. C. *Calcitrapa*, red ſtar-thiſtle. 2. 125. Gravelly ſandy ground. Ann. 7, 8.
7. C. *ſolſtitialis*, yellow ſtar-thiſtle. 4. 243. Fields, rare. Ann. 7, 8.

Claſs 20. GYNANDRIA.

Ord. 1. *Monandria.*

The natural family of the *Orchideæ*, of which this order entirely conſiſts, has lately received ſome freſh corrections from the able pen of Mr. R. Brown, given by Mr. Aiton in his new edition of the Hortus Kewenſis, v. 5, claſs *Gynandria*. By theſe we have profited in the following arrangement, where we have adopted ſeveral of Mr. Brown's new genera; only deriving their diſtinctions from characters ſomewhat different from his. It is a ſtrong proof of the validity of ſuch genera, that they will ſtand this teſt. We exclude the marks taken from the abſence, preſence, or number, of the minute pouches whence the maſſes of pollen originate; not ſo much on account of the difficulty of having recourſe to thoſe parts in practice, but becauſe the diſtinctions founded thereon do not appear to lead to the knowledge of natural genera. On the contrary, they rather ſhew the danger of taking any technical character as an infallible guide throughout. We have therefore not adopted the *Gymnadenia*, nor the *Habenaria* of this ingenious writer, becauſe they ſeem to us naturally to belong to *Orchis*. Nevertheleſs, we readily ſubmit our opinion to the correction of thoſe who, on mature enquiry, may think otherwiſe. What is to become of Willdenow's HABENARIA, ſee that article, muſt be decided by the future ſtudy of exotic *Orchideæ*, ſcarcely known ſufficiently at preſent, to any European botaniſt, to enable him to form an opinion. See ORCHIDEÆ, ORCHIS, OPHRYS, NEOTTIA, EPIPACTIS and MALAXIS.

The *Orchideæ* are diſpoſed in three very natural ſections, which give the leading diſtinctions of the genera. 1ſt. Anther united to, or rather a continuation of, the column; terminal, in a manner, though ſometimes ſurmounted by a point. 2d. Anther parallel to the ſtigma, and oppoſite to that part. 3d. Anther a terminal vertical moveable lid, either permanent or deciduous. Mr. Brown ſubdivides this third ſection, according to the anther being permanent or not, which ſeems to us unneceſſary.

Section 1.

ORCHIS. Orchis.

Eſſ. Ch. Nectary with a poſterior ſpur.

1. O. *bifolia*, butterfly. 1. 22. Woods, eſpecially on chalk. Per. 6.

Bulbs undivided. Lip of the nectary lanceolate, entire; ſpur very long. Lateral calyx-leaves ſpreading, deflexed. This is referred to *Habenaria* by Mr. Brown, becauſe the maſſes of pollen originate from two diſtant glands, which are naked, or deſtitute of a pouch at the baſe. The *flowers* are ſnow-white, with ſome touches of green, and ſmell powerfully, in an evening only, like a very ſweet honeyſuckle.

2. O. *pyramidalis*, pyramidal. 2. 110. Chalky paſtures. Per. 7.

Bulbs undivided. Lip of the nectary in three equal entire ſegments, with two prominences above; ſpur elongated, thread-ſhaped. This and the ſix following, having the gland, or glands, of their maſſes of pollen encloſed in a ſingle pouch, belong to the true genus of *Orchis*. *Br.*

The *flowers* of *O. pyramidalis* are crimſon, fragrant, compoſing a ſhort, denſe, pyramidal ſpike.

3. O. *Morio*, meadow. 29. 2059. Moiſt paſtures. Per. 5, 6.

Bulbs undivided. Lip of the nectary four-cleft, crenate; ſpur obtuſe, aſcending. Calyx many-ribbed.

Leaves without ſpots. *Flowers* purple or crimſon. The three *calyx-leaves* cohere together, in the form of a hood, and are ribbed with green.

4. O. *maſcula*, early purple. 9. 631. Meadows and groves. Per. 4, 5.

Bulbs undivided. Lip of the nectary four-cleft, crenate; ſpur obtuſe. Lateral calyx-leaves reflexed upward.

The *leaves* are ſpotted with black. *Flowers* purple, ſcentleſs. *Calyx-leaves* with only three ribs, of their own colour. The *ſtalk*, *bracteas*, and *germens* are purple.

5. O. *uſtulata*, dwarf. 1. 18. Chalky hills. Per. 6.

Bulbs undivided. Lip of the nectary four-cleft, rough, with prominent points; ſpur obtuſe, one-third the length of the germen.

Three inches high. *Calyx* almoſt black. *Lip* purple, with entire lobes. *Flowers* ſmall.

6. O. *militaris*, narrow-lipped military. 27. 1873. Chalk hills. Per. 5.

Bulbs undivided. Lip of the nectary five-cleft, rough; ſegments linear. Calyx and petals taper-pointed, confluent.

A foot high. *Leaves* light green, unſpotted. *Flowers* roſe-coloured, their *calyx* paler, or whitiſh. This whole plant, like the following, while drying, exhales a powerful ſcent of melilot, woodruff, or new hay.

7. O. *fuſca*, broad-lipped military. 1. 16. (O. militaris). Chalk hills. Per. 5.

Bulbs undivided. Lip of the nectary five-cleft, rough; ſegments dilated. Calyx-leaves confluent. Petals linear.

Larger. *Calyx* dark brown externally. *Petals* and *nectary* pink or purple.

8. O. *hircina*, lizard. 1. 34. (Satyrium hircinum). Thickets on chalk hills, very rare. Per. 7.

Bulbs undivided. Lip of the nectary three-cleft, downy; middle ſegment extremely long, linear, twiſted, emarginate.

Largeſt and ſcarceſt. Britiſh plant of this tribe, often a yard high, with from twenty to ſixty *flowers*, whoſe ſmell is fetid, and goat-like. *Spur* ſhortiſh, green, like the *calyx* and *anther*. *Lip* two inches long, purpliſh-lead-coloured, with a white ſpeckled downy diſk.

9. O. *albida*, white mountain. 8. 505. (Satyr. albidum). Hills. Per. 6.

Bulbs cluſtered, in three pairs. Lip of the nectary in three deep acute ſegments; ſpur one-third the length of the germen.

A foot high, ſlender. *Flowers* ſmall, numerous, in a denſe ſpike, white, with a green lip, nearly inodorous.—This and the next are made *Habenariæ* by Mr. Brown.

10. O. *viridis*, green frog. 2. 94. (Satyr. viride). Meadows. Per. 6, 7.

Bulbs cluſtered. Lip of the nectary linear, with three terminal teeth; the middle one ſmalleſt; ſpur very ſhort, emarginate.

Five inches high. *Flowers* green, ſhorter than their *bracteas*. *Lip* browniſh.

11. O. *latifolia*, marſh. 33. 2308. Wet meadows. Per. 5, 6.

Bulbs cluſtered. Lip of the nectary crenate, obſcurely three-cleft; ſpur conical. Bracteas longer than the flowers.

Stem hollow. *Leaves* unſpotted. *Flowers* crimſon, more or leſs deeply coloured.

12. O. *maculata*, ſpotted palmate. 9. 632. Paſtures and groves. Per. 6, 7.

Bulbs palmate, ſpreading. Lip of the nectary crenate, three-lobed; ſpur cylindrical, ſhorter than the germen.

More ſlender. *Stem* ſolid. *Leaves* ſpotted. *Flowers* white, ſtained and dotted with violet.

13. O. *conopſea*, aromatic. 1. 10. Meadows and paſtures. Per. 6.

Bulbs palmate. Lip of the nectary in three entire ſegments; ſpur briſtle-ſhaped, twice as long as the germen.

Leaves narrow, unſpotted. *Flowers* rather ſmall, crimſon, with a rich ſpicy odour.

This ſpecies alone conſtitutes Mr. Brown's genus of *Gymnadenia*, ſo called from γυμνος, *naked*, and αδην, *a gland*, becauſe the glands ſupporting the maſſes of pollen are naked. or deſtitute of a pouch, and ſtand cloſe together. In this laſt character alone the genus is made to differ from *Habenaria*, whoſe naked glands are more or leſs diſtant from each other. It ſeems to us that *Habenaria nigra*, this *Gymnadenia*, and *Orchis pyramidalis*, are ſo nearly akin, that no aſſumed character ought to ſeparate them, and that they all truly belong to the genus *Orchis*.

Aceras. Man-Orchis.

Brown in Ait. Hort. Kew. v. 5. 191.

Eſſ. Ch. Calyx converging. Nectary plane, without a ſpur.—This genus of Mr. Brown's, whoſe name expreſſes the want of a ſpur, is well diſtinguiſhed by that character from *Orchis*, with which it agrees in having one common pouch for the glands of the pollen. By this laſt mark Mr. Brown diſtinguiſhes it, on the other hand, from the true *Ophrys*, of which we ſhall preſently ſpeak. We readily admit the genus, as a moſt natural one, only preferring the more eaſy characters taken from the ſhape of the lip, and poſture of the calyx.

1. A. *anthropophora*, green. 1. 29. (Ophrys anthropophora). Chalk. Per. 6.

Lip of the nectary longer than the germen. *Br.*

The *bulbs* are globoſe. *Leaves* unſpotted. *Spike* rather long, of numerous ſcentleſs *flowers*, whoſe cloſed *calyx* is green, moſtly bordered with brown. *Lip* long, dependent, yellow, without ſpots; its ſegments four, ſhaped like thoſe of the *Orchis militaris*, but generally without the ſmall intermediate tooth.

Herminium. Muſk-Orchis.

Brown in Ait. Hort. Kew. v. 5. 191.

Eſſ. Ch. Calyx ſpreading. Petals three-lobed, ſhaped like the nectary, which has no ſpur.

This genus, and its name, are revived from the early works of Linnæus. The application of the latter, derived, as it ſeems, from ἕρμα or ἕρμιν, *a baſis*, or *foundation*, is not evident to us. The glands of the pollen are naked and diſtinct, ſo that it differs from *Habenaria* of Mr. Brown, as his *Aceras* does from *Orchis*, in the want of a ſpur. We moſt readily adopt the genus, only preferring, inſtead of a character derived from the glands, the ſtriking one of the three-lobed *petals*, and their uniformity with the *lip*, the very ſame uniformity which characteriſes the Weſt Indian orchideous genus of *Stelis*.

1. H. *monorchis*, ſmall. 1. 71. (Ophrys monorchis). Chalk hills. Per. 6.

Leaves radical, two, lanceolate. *Br.*

Three inches high. *Bulbs* round, one of them remote. *Leaves* light green. *Flowers* ſmall, pale yellow, muſky.

Ophrys. Inſect-Orchis.

Eſſ. Ch. Calyx ſpreading. Nectary convex, without a ſpur.

See the article Ophrys, where we have given Mr. Brown's characters of this moſt natural genus. We wiſh to ſtrengthen, not to invalidate them, by thoſe which, in conformity to our plan, we have taken from the poſition of the *calyx*, and ſhape of the *lip*. See Aceras juſt mentioned.

1. O. *muſcifera*, fly. 1. 64. Chalky paſtures, ſparingly. Per. 6.

Lip of the nectary four-lobed, elongated, ſomewhat downy; its diſk poliſhed. Column obtuſe.

Bulbs ovate. *Stem* a foot high. *Leaves* unſpotted. *Spike* lax. *Calyx* green. *Petals* linear, of a dull deep purple. *Lip* of the ſame colour, with a blueiſh, ſhining, broad, tranſverſe ſtripe in the middle. The *column* has no terminal point.

2. O. *apifera*, bee. 6. 383. Chalky paſtures. Per. 7.

Lip of the nectary five-cleft, inflated; its ſmall terminal ſegment awl-ſhaped, recurved. Column with a hooked point.

Rather larger, with broader *leaves*. *Flowers* much larger. *Calyx* pale purple, with green ribs. *Petals* oblong, green, fringed with white. *Lip* reſembling the body of a bee, very prominent and convex, hairy, elegantly variegated with brown and yellow; its margin bent backward, the little terminal point only being recurved forward.

3. O. *aranifera*, ſpider. 1. 65. Chalk-pits. Per. 4.

Lip of the nectary villous, three-lobed, emarginate, pointleſs, deflexed. Column acute.

Of more humble growth than the laſt, with a green *calyx*, and yellowiſh-green *petals*. The *lip* is like the body of a ſpider, brown, with two principal longitudinal paler ſtripes, the margin pale, and bent backward, deſtitute of the pointed appendage ſeen in the *apifera*.

The *O. arachnoides*, Andr. Repoſ. t. 470, a native of Italy and Switzerland, not yet obſerved in Britain, is a very diſtinct ſpecies from all theſe. Haller has figured it in his *Hiſtoria*, t. 24, by the name of *Orchis fuciflora;* but his account and ſynonyms are much confuſed. Andrews confounds it with our *aranifera*, which is Curtis's *fucifera*, not *fuciflora*. Its character conſiſts in the ſmallneſs of the reddiſh *petals*, which are not one-third the ſize of the white *calyx-leaves;* and eſpecially in the margin of the very broad *lip* being dilated, and, as well as the pointed appendage, reflexed. This ſpecies is omitted in *Hort. Kew.* We have received it long ago from the garden of John Walker, eſq. of Arno's grove, Southend.

Section 2.

NEOTTIA. Lady's Traces.

Eſſ. Ch. Calyx converging, embracing with its baſe the nectary, which has no ſpur. Petals converging. Column without a border. See NEOTTIA.

1. N. *ſpiralis*, ſpiral. 8. 541. (Ophrys ſpiralis.) Paſtures. Per. 8, 9.
2. N. *repens*, creeping. 5. 289. (Satyrium repens.) Alpine woods. Per. 7.

This laſt is made a diſtinct genus by Mr. Brown, on account of a pouch under the *lip;* and named *Goodyera*, after the venerable and accurate contributor to the ſecond edition of Gerarde's herbal. We lament that we are not ſufficiently ſatisfied of its difference from *Neottia;* to which it is in habit too ſtrictly allied, in our opinion, to be ſeparated by the character above-mentioned.

Our *N. pubeſcens*, n. 17, is another ſpecies of Mr. Brown's *Goodyera*.

LISTERA. Tway-blade.

Brown in Ait. Hort. Kew. v. 5. 201.

Eſſ. Ch. Calyx ſpreading. Nectary without a ſpur, not embraced by the calyx. Petals ſpreading. Column without a border.

A very diſtinct genus, ſeparated from the *Ophrys* of Linnæus, and from the *Epipactis* of Swartz and his followers. (See EPIPACTIS, n. 10 and 11.) This genus is named in memory of Dr. Martin Liſter, the celebrated conchologiſt, whoſe papers in the Philoſophical Tranſactions, relating to the vaſcular ſyſtem of plants, and the ſeeds of muſhrooms, entitle him to botanical commemoration.

1. L. *ovata*, common. 22. 1548. (Ophrys ovata.) Woods and thickets. Per. 6.
2. L. *cordata*, heart-leaved. 5. 358. (Ophrys cordata.) Mountain heaths. Per. 7.

Section 3.

EPIPACTIS. Helleborine.

Eſſ. Ch. Anther permanent. Nectary tumid underneath, contracted in the middle. See EPIPACTIS.

1. E. *latifolia*, broad-leaved. 4. 269. (Serapias latifolia.) Mountainous woods. Per. 7, 8.
2. E. *paluſtris*, marſh. 4. 270. (Serap. paluſtris.) Boggy meadows. Per. 7, 8.
3. E. *grandiflora*, white. 4. 271. (Serap. grandifl.) Chalky woods. Per. 6.
4. E. *enſifolia*, narrow-leaved. 7. 494. (Serap. enſif.) Mountain woods. Per. 6.
5. E. *rubra*, purple. 7. 437. (Serap. rubra.) Mountain woods, rare. Per. 6.
6. E. *Nidus avis*, bird's neſt. 1. 48. (Ophrys Nidus avis.) Chalky woods. Per. 6.

MALAXIS. Tender Tway-blade.

Eſſ. Ch. Anther deciduous. Nectary undivided, ſeſſile, flat underneath. Petals ſpreading. See MALAXIS.

It ſeems beſt not to make the reverſed poſition of the flower, an eſſential part of the generic character.

1. M. *paludoſa*, marſh. 1. 72. Turfy bogs. Per. 7.
2. M. *Loeſelii*, lily-leaved. 1. 47. (Ophrys Loeſelii.) Sandy bogs. Per. 7.

CORALLORRHIZA. Coral-root.

Eſſ. Ch. Anther deciduous. Nectary elongated underneath. Petals ſpreading. Column unconnected.

1. C. *innata*, ſpur-leſs. 22. 1547. (Ophrys corallorr.) Boggy woods. Per. 7.

Spur of the nectary ſhort, combined with the germen. Root very much branched.

This intereſting and rare little plant has hitherto been found in Scotland only, of the Britiſh dominions. Roots ſent in moſs from Edinburgh, by Mr. E. J. Maughan, bloſſomed in our garden. Theſe are of a fleſhy ſubſtance, much branched and divaricated, ſpreading horizontally; they ſtill exhale, after having been ſeven years dried, a very ſweet ſmell, like Vanilla. The ſlender *ſtem*, a ſpan high, is inveſted with a few *ſheaths*, but deſtitute of *leaves*, and bears a looſe ſpike of a few ſmall yellowiſh *flowers*. Mr. Brown, who has finally eſtabliſhed this genus, detected the minute and concealed ſpur. We have a number of exotic ſpecies, eſpecially from the Eaſt Indies, which ſeem to belong to Corallorrhiza. Their fleſhy tuberous *roots*, and leafleſs ſcaly *ſtems*, are peculiar; and, like other ſpecies from North America, ſome of theſe plants have an evident ſpur, others an obſolete or concealed one.

Ord. 2. *Diandria*.

CYPRIPEDIUM. Ladies'-ſlipper.

Eſſ. Ch. Calyx ſpreading. Petals ſpreading. Nectary inflated. Column with a poſterior appendage.

1. C. *Calceolus*, common. 1. 1. Northern woods, rare. Per. 6.

Stem leafy. Appendage of the column elliptical, obtuſe, channelled. Petals flat.

The figure in Engl. Bot. unfortunately repreſents the appendage as if angular and acute; inſomuch that it has been ſuppoſed to have been drawn from an American ſpecies, known by that character; but this ſuppoſition is refuted by a compariſon of the plants. (See CYPRIPEDIUM.) The *calyx*, as we deem it, of this genus is conſidered by authors as compoſed of three leaves, like all the reſt of the *Orchideæ;* though the two lowermoſt are, for the moſt part, nearly united into one.

Ord. 3. *Hexandria*.

ARISTOLOCHIA. Birthwort.

1. A. *Clematitis*, common. 6. 398. Thickets and rubbiſh. Per. 7, 8.

Claſs

Claſs 21. Monoecia.

Ord. 1. *Monandria.*

Zannichellia. Horned Pondweed.

1. Z. *paluſtris*, common. 26. 1844. Ditches and pools. Ann. 7.

Ord. 2. *Triandria.*

Typha. Reed-mace.

1. T. *latifolia*, great. 21. 1455. Pools and ditches. Per. 7.

2. T. *anguſtifolia*, leſſer. 21. 1456. Pools, rare. Per. 6, 7.

3. T. *minor*, dwarf. 21. 1457. Marſhes, rare. Per. 7.

Sparganium. Bur-reed.

1. S. *ramoſum*, branched. 11. 744. Rivers and ditches. Per. 7, 8.

2. S. *ſimplex*, unbranched. 11. 745. Waters, on gravel. Per. 7, 8.

3. S. *natans*, floating. 4. 273. Rivers and pools. Per. 7.

Carex. Sedge.

1. C. *dioica*, common ſeparate-headed. 8. 543. Bogs. Per. 5, 6.

2. C. *Davalliana*, prickly ſeparate-headed. 30. 2123. Marſhes. Per. 5, 6.

3. C. *pulicaris*, flea. 15. 1051. Marſhes. Per. 6.

4. C. *pauciflora*, few-flowered. 29. 2041. Alpine bogs. Per. 6.

5. C. *ſtellulata*, little prickly. 12. 806. Marſhes. Per. 5, 6.

6. C. *curta*, white. 20. 1386. Watery places, rare. Per. 6.

7. C. *elongata*, elongated. 27. 1920. Marſhes, Yorkſhire. Per. 6.

8. C. *ovalis*, oval-ſpiked. 5. 306. Marſhes. Per. 6.

9. C. *remota*, remote. 12. 832. Moiſt groves. Per. 5, 6.

10. C. *axillaris*, axillary cluſtered. 14. 993. Bogs, rare. Per. 5, 6.

11. C. *incurva*, curved. 13. 927. Sandy mouths of rivers, rare. Per. 7, 8.

12. C. *arenaria*, ſea. 13. 928. Sandy coaſt, abundantly. Per. 6.

13. C. *intermedia*, ſoft brown. 29. 2042. Marſhes. Per. 5, 6.

14. C. *diviſa*, bracteated marſh. 16. 1096. Salt marſhes. Per. 5, 6.

15. C. *muricata*, greater prickly. 16. 1097. Moiſt meadows. Per. 5, 6.

16. C. *divulſa*, grey. 9. 629. Moiſt ſhady places. Per. 5.

17. C. *vulpina*, great ſpiked. 5. 307. Marſhes. Per. 5.

18. C. *teretiuſcula*, leſſer panicled. 15. 1065. Marſhes. Per. 5.

19. C. *paniculata*, great panicled. 15. 1064. Bogs. Per. 6.

20. C. *digitata*, fingered. 9. 615. Woods, on limeſtone. Per. 5.

21. C. *clandeſtina*, dwarf ſilvery. 30. 2124. Sunny rocks. Per. 5.

22. C. *pendula*, great pendulous. 33. 2315. Moiſt hedges. Per. 5, 6.

23. C. *ſtrigoſa*, looſe pendulous. 14. 994. Groves. Per. 4, 5.

24. C. *ſylvatica*, pendulous wood. 14. 995. Woods, frequent. Per. 5, 6.

25. C. *depauperata*, ſtarved wood. 16. 1098. Woods, rare. Per. 5, 6.

26. C. *Mielichoferi*, looſe-ſpiked rock. 32. 2293. Alpine rocks. Per. 8.

Sheaths not half the length of the flower-ſtalk. Female ſpikes three, diſtant, erect, lax and ſlender. Fruit ovate, triangular, bluntly cloven, twice the length of the obtuſe ſcale.

Willdenow, in Sp. Pl. v. 4. 276, gives a citation of Schkuhr's *Carices*, fig. 198, and adds that this is Hoppe's *C. alpina.* It has however nothing to do with *alpina* of Wahlenberg; ſee Carex, n. 97.

27. C. *capillaris*, capillary. 29. 2069. Highland mountains. Per. 7, 8.

28. C. *rariflora*, looſe alpine. 35. 2516. Lofty Highland mountains. Per. 7.

Sheaths extremely ſhort. Female ſpikes nearly linear, pendulous; their ſcales looſely imbricated. Fruit obovate, with three blunt angles and depreſſed ſides. Root creeping.

Wahlenberg makes this a variety of *limoſa*, n. 30, with which it agrees in the creeping *root*, ſhort *ſheaths*, and drooping female *ſpikes;* but differs in its obovate, triangular, (not broad and compreſſed), *fruit;* much ſmaller ſize; and lax blacker *ſcales.*

29. C. *Pſeudo-cyperus*, baſtard-cyperus. 4. 242. Marſhes. Per. 6.

30. C. *limoſa*, green and gold. 29. 2043. Spongy boggy pools. Per. 6.

31. C. *uſtulata*, ſcorched alpine. 34. 2404. Alpine rivulets. Per. 7. See Carex, n. 127.

32. C. *atrata*, black. 29. 2044. Alpine meadows. Per. 6, 7.

33. C. *pulla*, ruſſet. 29. 2045. Alpine paſtures. Per. 7.

34. C. *palleſcens*, pale. 31. 2185. Meadows and groves. Per. 5, 6.

35. C. *flava*, yellow. 18. 1294. Marſhes. Per. 5, 6.

36. C. *fulva*, tawny. 18. 1295. Marſhes. Per. 6, 7.

37. C. *Oederi*, Oederian. 25. 1773. Moiſt meadows. Per. 7.

38. C. *extenſa*, long-bracteated. 12. 833. Sea-coaſt. Per. 6.

39. C. *diſtans*, looſe. 18. 1234. Marſhes. Per. 6.

40. C. *binervis*, green-ribbed. 18. 1235. Dry heaths. Per. 6.

41. C. *præcox*, vernal. 16. 1099. Open paſtures, common. Per. 4.

42. C. *pilulifera*, round-headed. 13. 885. Paſtures and heaths. Per. 4, 5.

43. C. *tomentoſa*, downy-fruited. 29. 2046. Meadows, rare. Per. 6.

44. C. *rigida*, rigid. 29. 2047. Lofty mountains. Per. 6, 7.

45. C. *panicea*, pink-leaved. 21. 1505. Moiſt meadows. Per. 5, 6.

46. C. *recurva*, glaucous heath. 21. 1506. Paſtures and heaths. Per. 5, 6.

C. Micheliana, Fl. Brit. 1004. E. B. 32. 2236, is now found to be only a variety of *recurva*, with ſmooth fruit, and ſeveral male ſpikes.

47. C. *cæſpitoſa*, tufted bog. 21. 1507. Marſhes. Per. 5.

48. C. *ſtricta*, glaucous ſtraight-leaved. 13. 914. Marſhes. Per. 4.

49. C. *acuta*, ſlender-ſpiked. 9. 580. Watery places. Per. 5.
50. C. *paludoſa*, leſſer common. 12. 807. Watery places. Per. 5.
51. C. *riparia*, great common. 9. 579. Watery places. Per. 4, 5.
52. C. *lævigata*, ſmooth-ſtalked beaked. 20. 1387. Bogs. Per. 5.
53. C. *veſicaria*, ſhort-ſpiked bladder. 11. 779. Marſhes. Per. 5.
54. C. *ampullacea*, ſlender-beaked bladder. 11. 780. Bogs. Per. 5.
55. C. *hirta*, hairy. 10. 685. Boggy meadows. Per. 5, 6.
56. C. *filiformis*, ſlender-leaved. 13. 904. Bogs, rare. Per. 6.

KOBRESIA. Kobreſia.

1. K. *caricina*, ſedgy. 20. 1410. Moiſt mountains. Per. 8.

ERIOCAULON. Pipewort.

1. E. *ſeptangulare*, jointed. 11. 733. Lakes, Scotland and Ireland. Per. 9.

Ord. 3. *Tetrandria.*

LITTORELLA. Shore-weed.

1. L. *lacuſtris*, plantain. 7. 468. Sandy puddles. Per. 6.

BETULA. Birch.

1. B. *alba*, common. 31. 2198. Sandy or mountain woods. Tree. 4, 5.
2. B. *nana*, dwarf. 33. 2326. Boggy mountain heaths. Shrub. 5.
3. B. *Alnus*, alder. 21. 1508. Watery meadows. Tree. 3.

BUXUS. Box.

1. B. *ſempervirens*, common. 19. 1341. Chalky hills. Shrub. 4.

URTICA. Nettle.

1. U. *pilulifera*, Roman. 3. 148. Rubbiſh on the coaſt. Ann. 6, 7.
2. U. *urens*, ſmall. 18. 1236. Cultivated ground. Ann. 6—10.
3. U. *dioica*, great. 25. 1750. Waſte ground. Per. 7, 8.

Ord. 4. *Pentandria.*

XANTHIUM. Bur-weed.

1. X. *ſtrumarium*, ſmall burdock. 36. 2544. Dunghills, rare. Ann. 8, 9.

AMARANTHUS. Amaranth.

1. A. *Blitum*, wild. 31. 2212. Dunghills, rare. Ann. 8.

BRYONIA. Bryony.

1. B. *dioica*, red-berried. 7. 439. Hedges. Per. 5—9.

Ord. 5. *Polyandria.*

CERATOPHYLLUM. Hornwort.

1. C. *demerſum*, common. 14. 947. Ditches, frequent. Per. 8, 9.
2. C. *ſubmerſum*, unarmed. 10. 679. Ditches, rare. Per. 9.

MYRIOPHYLLUM. Water-millfoil.

1. M. *ſpicatum*, ſpiked. 2. 83. Ditches and ponds. Per. 7, 8.
2. M. *verticillatum*, whorled. 4. 218. Ponds, rare. Per. 7.

SAGITTARIA. Arrow-head.

1. S. *ſagittifolia*, common. 2. 84. Rivers and ditches. Per. 7, 8.

ARUM. Cuckow-pint.

1. A. *maculatum*, ſpotted. 19. 1298. Thickets and woods. Per. 5.

POTERIUM. Garden-Burnet.

1. P. *Sanguiſorba*, common. 12. 860. Chalky hills. Per. 7.

QUERCUS. Oak.

1. Q. *Robur*, common Britiſh. 19. 1342. Woods and hedges. Tree. 4.
2. Q. *ſeſſiliflora*, ſeſſile-fruited. 26. 1845. Woods. Tree. 4, 5.

FAGUS. Beech.

1. F. *Caſtanea*, ſweet cheſnut. 13. 886. Woods. Tree. 5.
2. F. *ſylvatica*, common. 26. 1846. Chalky hills. Tree. 4, 5.

CARPINUS. Horn-beam.

1. C. *Betulus*, common. 29. 2032. Woods, on clay. Tree. 5.

CORYLUS. Nut.

1. C. *Avellana*, haſel. 11. 723. Woods and hedges. Small tree. 3, 4.

Ord. 6. *Monadelphia.*

PINUS. Fir.

1. P. *ſylveſtris*, common Scotch. 35. 2460. Scottiſh hills. Tree. 5.

Claſs 22. DIOECIA.

Ord. 1. *Diandria.*

SALIX. Willow.

1. S. *purpurea*, bitter purple. 20. 1388. Marſhes, rare. Shrub. 3.
2. S. *Helix*, roſe. 19. 1343. Marſhes. Small tree. 3, 4.
3. S. *Lambertiana*, Boyton. 19. 1359. Banks of rivers. Small tree. 3, 4.
4. S. *Forbiana*, baſket oſier. 19. 1344. Oſier holts. Shrub. 4.
5. S. *rubra*, green oſier. 16. 1145. Oſier holts. Small tree. 4, 5.
6. S. *Croweana*, broad-leaved monadelphous. 16. 1146. Marſhes. Small tree. 4, 5.
7. S. *triandra*, long-leaved triandrous. 20. 1435. Meadows. Tree. 5 and 8.
8. S. *lanceolata*, ſharp-leaved triandrous. 20. 1436. Meadows. Tree. 4, 5.
9. S. *amygdalina*, almond-leaved. 27. 1936. Marſhes. Tree. 4, 5.

10. S. *decipiens*, varniſhed. 27. 1936. Woods and hedges. Tree. 5.

11. S. *Ruſſelliana*, Bedford. 26. 1808. Woods and meadows. Tall tree. 4, 5.

12. S. *fragilis*, crack. 26. 1807. Meadows and marſhes. Tree. 4, 5.

13. S. *pentandra*, bay-leaved. 26. 1805. Banks of rivers. Tree. 5, 6.

14. S. *nigricans*, dark broad-leaved. 17. 1213. Meadows. Small tree. 4.

15. S. *bicolor*, ſhining dark-green. 26. 1806. Woods. Shrub. 4, 5.

†16. S. *petiolaris*, dark long-leaved. 16. 1147. Marſhes. Shrub. 4.

17. S. *phylicifolia*, tea-leaved. 28. 1958. Highlands of Scotland. Shrub. 5

S. radicans, Fl. Brit. 1053, proves to be the ſame ſpecies.

18. S. *Arbuſcula*, little tree. 19. 1366. Mountains of Scotland. Shrub. 4.

19. S. *vitellina*, yellow. 20. 1389. Marſhy meadows. Tree. 5.

20. S. *tenuifolia*, thin-leaved. 31. 2186. Stony hills. Shrub. 5, 6.

21. S. *malifolia*, apple-leaved. 23. 1617. Hills? Shrub. 5.

22. S. *myrſinites*, green whortle-leaved. 19. 1360. Highlands. Shrub. 5, 6.

23. S. *prunifolia*, plum-leaved. 19. 1361. Highlands. Shrub. 4, 5.

24. S. *venuloſa*, veiny-leaved. 19. 1362. Highlands. Shrub. 4, 5.

25. S. *vacciniifolia*, bilberry-leaved. 33. 2341. Scotland. Shrub. 4.

26. S. *carinata*, folded-leaved. 19. 1363. Highlands. Shrub. 4.

27. S. *Dickſoniana*, broad-leaved mountain. 20. 1390. Highlands. Shrub. 4.

S. myrtilloides, Fl. Brit. 1056, but not of Linnæus.

28. S. *herbacea*, leaſt. 27. 1907. Micaceous mountains. Small ſhrub. 6.

29. S. *reticulata*, wrinkled. 27. 1908. Highlands. Small ſhrub. 6.

30. S. *arenaria*, downy mountain. 26. 1809. Highlands. Shrub. 5.

31. S. *glauca*, glaucous mountain. 26. 1810. Highlands. Shrub. 5.

32. S. *Stuartiana*, ſhaggy mountain. 36. 2586. Highlands. Shrub. 7.

33. S. *argentea*, ſilky ſand. 19. 1364. Sandy ſea-coaſt. Shrub. 5.

34. S. *proſtrata*, proſtrate dwarf. 28. 1959. Moiſt hills. Small ſhrub. 5, 6.

35. S. *fuſca*, browniſh dwarf. 28. 1960. Mountainous heaths. Small ſhrub. 5.

36. S. *parvifolia*, ſmall-leaved dwarf. 28. 1961. Moiſt meadows. Shrub. 5.

37. S. *adſcendens*, aſcending dwarf. 28. 1962. Moiſt heaths. Shrub. 5.

38. S. *repens*, creeping dwarf. 3. 183. Sandy moiſt heaths. Small ſhrub. 5.

39. S. *roſmarinifolia*, roſemary-leaved. 19. 1365. Moiſt ſand. Shrub. 4, 5.

40. S. *cinerea*, grey. 27. 1897. Woods. Small tree. 5.

41. S. *aurita*, round-eared ſallow. 21. 1487. Woods. Shrub. 4, 5.

42. S. *aquatica*, common water ſallow. 20. 1437. Wet thickets. Small tree. 4.

43. S. *oleifolia*, olive-leaved ſallow. 20. 1402. Woods and hedges. Tree. 3.

44. S. *rupeſtris*, ſilky rock. 33. 2342. Highland rocks. Small ſhrub. 4.

45. S. *Anderſoniana*, green mountain ſallow. 33. 2343. Scotland. Shrub. 5.

46. S. *Forſteriana*, glaucous mountain ſallow. 33. 2344. Scotland. Small tree. 5.

47. S. *cotinifolia*, quince-leaved. 20. 1403. Woods. Shrub. 4.

48. S. *hirta*, hairy branched. 20. 1404. Woods. Small tree. 4, 5.

49. S. *ſphacelata*, withered-pointed. 33. 2333. Scotland. Tree. 4, 5.

50. S. *caprea*, great round-leaved ſallow. 21. 1488. Dry woods. Tree. 4.

51. S. *acuminata*, long-leaved ſallow. 20. 1434. Moiſt woods. Tree. 4.

52. S. *ſtipularis*, auricled oſier. 17. 1214. Oſier holts. Tree. 3.

53. S. *molliſſima*, velvet oſier. 21. 1509. Oſier holts. Small tree. 4.

54. S. *viminalis*, common oſier. 27. 1898. Oſier holts, &c. Tree. 4, 5.

55. S. *alba*, common white. 34. 2430. Woods and meadows. Tree. 4, 5.

56. S. *cærulea*, blue. 34. 2431. Moiſt meadows. Large tree. 5.

Ord. 2. *Triandria*.

EMPETRUM. Crake-berry.

1. E. *nigrum*, black. 8. 526. Mountain moors. Small ſhrub. 5.

RUSCUS. Butcher's-broom.

1. R. *aculeatus*, common. 8. 560. Woods and thickets. Per. 3, 4.

Ord. 3. *Tetrandria*.

VISCUM. Miſſeltoe.

1. V. *album*, white. 21. 1470. On trees. Small ſhrub. 5.

HIPPOPHAË. Sallow-thorn.

1. H. *rhamnoides*, ſea. 6. 425. Sandy cliffs. Small tree. 5.

MYRICA. Gale.

1. M. *Gale*, ſweet. 8. 562. Spongy bogs. Shrub. 5.

Ord. 4. *Pentandria*.

HUMULUS. Hop.

1. H. *Lupulus*, common. 6. 427. Thickets and hedges. Per. 7.

Ord. 5. *Hexandria*.

TAMUS. Black-bryony.

1. T. *communis*, common. 2. 91. Woods and hedges. Per. 6.

Ord. 6. *Octandria.*

Populus. Poplar.

1. P. *alba*, white. 23. 1618. Moiſt woods, or hills. Tree. 3.
2. P. *caneſcens*, grey. 23. 1619. Watery meadows. Tree. 3.
3. P. *tremula*, aſpen. 27. 1909. Boggy woods. Tree. 3, 4.
4. P. *nigra*, black. 27. 1910. Watery weadows. Tree. 3.

Rhodiola. Roſe-root.

1. R. *roſea*, mountain. 8. 508. Alpine rocks. Per. 5, 6.

Ord. 7. *Enneandria.*

Mercurialis. Mercury.

1. M. *perennis*, perennial. 26. 1872. Groves and thickets. Per. 4, 5.
2. M. *annua*, annual. 8. 559. Rubbiſh. Ann. 7—9.

Hydrocharis. Frog-bit.

1. H. *Morſus ranæ*, common. 12. 808. Ditches. Per. 7.

Ord. 8. *Monadelphia.*

Juniperus. Juniper.

1. J. *communis*, common. 16. 1100. Chalky downs. Shrub. 5.

Taxus. Yew.

1 T. *baccata*, common. 11. 746. Woods and rocks. Tree. 3, 4.

Claſs 23. Polygamia.

Ord. 1. *Monoecia.*

Atriplex. Orache.

1. A. *portulacoides*, ſhrubby. 4. 261. Muddy ſea-coaſt. Small ſhrub. 7, 8.
2. A. *laciniata*, froſted ſea. 3. 165. Sandy coaſt. Ann. 7.
3. A. *patula*, ſpreading halberd-leaved. 13. 936. Rubbiſh. Ann. 6—8.
4. A. *anguſtifolia*, ſpreading narrow-leaved. 25. 1774. Rubbiſh. Ann. 6—8.
5. A. *erecta*, upright ſpear-leaved. 31. 2223. Fields, rare. Ann. 8.
6. A. *littoralis*, graſs-leaved ſea. 10. 708. Muddy coaſt. Ann. 8, 9.
7. A. *pedunculata*, ſtalked ſea. 4. 232. Muddy coaſt, rare. Ann 8, 9.

Pallas in his Travels, Engliſh edition v. 1. 291, calls this laſt ſpecies *Ceratocarpus ſalinus*.

Claſs 24. Cryptogamia.

Ord. 1. *Filices.*

Equisetum. Horſe-tail.

Seven ſpecies, chiefly found in moiſt or watery places. Perennial. 4—8.

Botrychium. Moon-wort.

Swartz Syn. Fil. 8.

Eſſ. Ch. Capſules without a ring, globoſe, even, ſeſſile on a compound flattened ſtalk.

1. B. *Lunaria*, common. 5. 318. (Oſmunda Lunaria). Paſtures. Per. 6.

Frond pinnate, flowering from its baſe; leaflets creſcent-ſhaped, crenate.

A ſpan high, ſmooth, pale green, ſimply pinnate, with about ſix pair of *leaflets*, and one branched *ſpike*.

Osmunda. Oſmund-royal.

1. O. *regalis*, common. 3. 209. Shady bogs. Per. 6, 7.

Lycopodium. Club-moſs.

Six ſpecies. Heathy mountainous places. Per. 6—8.

Polypodium. Polypody.

Four ſpecies. Walls or dry hills. Per. 5—10.

Aspidium. Shield-fern.

Twelve ſpecies. Rocks, heaths, bogs, or ſhady places. Per. 5—7.

This genus differs from *Polypodium*, only in having a membranous *involucrum* to the dots of fructification. See Polypodium.

Asplenium. Spleenwort.

Eight ſpecies. Rocks or walls. Per. 3—10.

Scolopendrium. Hart's-tongue.

1. S. *vulgare*, common. 16. 1150. Moiſt ſhady places. Per. 7.
2. S. *Ceterach*, ſcaly. 18. 1244. Rocks and walls. Per. 4—10.

Blechnum. Blechnum.

1. B. *boreale*, northern. 17. 1159. Dry ſtony heaths. Per. 7.

Pteris. Brake.

1. P. *aquilina*, common. 24. 1679. Paſtures and woods. Per. 7.
2. P. *criſpa*, rock. 17. 1160. Stony hills in the north. Per. 7.

Adiantum. Maiden-hair.

1. A. *Capillus-Veneris*, true. 22. 1564. Marine rocks, rare. Per. 5—9.

Cyathea. Cup-fern.

Three ſpecies. Rocks or walls. Per. 6. 7.

Woodsia. Briſtle-fern.

Brown Tr. of Linn. Soc. v. 11. 170. *t.* 11.

1. W. *hyperborea*, alpine. 29. 2023. (Polypodium hyperboreum.) Rocks. Per. 6.

Trichomanes. Hair-fern.

1. T. *breviſetum*, ſhort-briſtled. 20. 1417. (Hymenophyllum alatum.) Wet rocks in Yorkſhire and Ireland, rare. Per. 5, 6.

Hymenophyllum. Filmy-fern.

1. H. *Tunbridgenſe*, Tunbridge. 3. 162. Moiſt rocks. Per. 5, 6.

Pilularia. Pillwort.

1. P. *globulifera*, pepper-graſs. 8. 521. Moiſt heaths. Per. 6, 7.

Isoetes. Quillwort.

1. I. *lacuſtris*, mountain. 16. 1084. Alpine lakes. Per. 5, 6.

Ord. 2. *Muſci.*

Sphagnum. Bog-moſs.

Four ſpecies. Clear watery bogs. Per. 6.

Buxbaumia. Buxbaumia.

1. B. *aphylla*, naked-ſtalked. 23. 1596. Barren heaths, rare. Ann. 12—2.
2. B. *folioſa*, leafy. 5. 329. Shady rocks. Ann. 7.

Phascum. Earth-moſs.

Seventeen ſpecies. Banks, heaths and woods. Ann. 3—5.

Gymnostomum. Beardleſs moſs.

Twenty ſpecies. Banks, rocks, and mountains. Ann. or per. 3—8.

Splachnum. Gland-moſs.

Thirteen ſpecies. Mountains or bogs, on dung. Ann. 5, 6.

Andræa. Andræa.

Fl. Brit. 1178. *Hooker Tr. of Linn. Soc. v.* 10. 381. See Andreæ, John.

Eſſ. Ch. Capſule oblong, of four valves, whoſe points adhere to the lid. Fringe none.

1. A. *rupeſtris*, duſky rock. 18. 1277. Moiſt alpine rocks. Per. 6.

Leaves lanceolate, keeled, ſickle-ſhaped, leaning one way, without a rib.

2. A. *Rothii*, black mountain. 31. 2162. Dry rocks. Per. 6.

Leaves lanceolate, keeled, ſickle-ſhaped, with a mid-rib, leaning one way. Sheath-ſcales without a rib.

3. A. *alpina*, chocolate alpine. 18. 1278. Alpine rocks. Per. 6.

Leaves ovate-oblong, concave, ribleſs, imbricated every way.

4. A. *nivalis*, tall ſlender. 33. 2334. Lofty alpine rocks. Per. 6.

Leaves looſely imbricated, lanceolate, curved towards one ſide, ſingle-ribbed, as well as the ſheath-ſcales.

This laſt is three inches, or more, in height, being much taller, and more branched, than any of the reſt. The character of the genus was totally miſtaken by Hedwig and others, the valves of the capſule being ſuppoſed the fringe, till Mr. W. J. Hooker corrected the character, as above. See Fringe *of Moſſes*.

Tetraphis. Four-toothed-moſs.

1. T. *pellucida*, tranſparent. 15. 1020. Wet ſhady places. Ann. 3, 4.

Capſule cylindrical. Leaves ovate, acute, ſingle-ribbed.

2. T. *ovata*, duſky. 22. 1422. (Grimmia Browniana.) Sand rocks. Ann. 3.

Capſule ovate. Radical leaves ſtrap-ſhaped, obtuſe, ribleſs.

Great diverſity of opinion has exiſted reſpecting the genus of this moſs, referred to *Orthotrichum* in Fl. Brit. 1269, and incorrectly drawn, as to the fringe, in Engl. Bot. A German botaniſt, named Funk, has ſhewn that part to conſiſt of four teeth only. This ſpecies muſt be allowed to accord very ill in habit with the firſt.

Encalypta. Extinguiſher-moſs.

Five ſpecies. Banks and rocks. Per. 3—8.

Grimmia. Grimmia.

Thirty-one ſpecies. Banks, rocks, and trees. Moſtly per. 4—7.

From theſe is to be deducted *G. Forſteri*, 31. 2225, as being the ſame with *Mnium conoideum*. See Grimmia and Mnium.

Dicranum. Fork-moſs.

Forty-eight ſpecies. Woods, hills and bogs. Moſtly per. 4—8.

From this genus, as it ſtands in Fl. Brit., four ſpecies are to be deducted; *calliſtomum*, n. 15, as being the ſame with *rigidulum*, Engl. Bot. 20. 1439; *pulvinatum*, n. 21, removed to *Grimmia*, 24. 1728; *ſciuroides*, n. 22, removed to *Pterogonium*, 27. 1903; and *viridiſſimum*, n. 34, removed to *Gymnoſtomum*, 22. 1583. Their place is ſupplied by four others; *Bruntoni*, 35. 2509; *Starkii*, 31. 2227; *latifolium*, 35. 2492; and *virens*, 31. 1462.

Trichostomum. Fringe-moſs.

Eighteen ſpecies. Rocks, heaths or water. Per. 4—8.

T. cirratum, Fl. Brit. n. 6, is to be expunged, as not differing from *Dicranum polyphyllum*, 17. 1217.

Tortula. Screw-moſs.

Nineteen ſpecies. Banks, heaths and walls. Per. 3—12.

Orthotrichum. Briſtle-moſs.

Eleven ſpecies. Trees, wet rocks, &c. Per. 1—4.

O. Brownianum, Fl. Brit. 1269, is *Tetraphis ovata*.

Pterogonium. Wing-moſs.

Six ſpecies. Trees and rocks. Per. 4, 5.

We poſtpone remarks on this genus till it comes in its proper place. See Pterogonium.

Neckera. Neckera.

Six ſpecies. Trees and rocks. Per. 2—4.

Among them is the following very curious moſs, diſcovered ſince our article Neckera was publiſhed.

N. *ſplachnoides*. Pear-fruited Neckera. 36. 2564.

Stem branched, ſpreading. Leaves lanceolate, pointed, flat, ſpreading every way; thoſe of the ſheath ſix, in two rows. Fruit-ſtalk granulated above. Capſule erect, contracted at the baſe. Veil fringed.

Found by Dr. Taylor on the Secawn mountain near Dublin.

Hypnum. Feather-moſs.

Eighty-one ſpecies. Trees, rocks and bogs. Per. 2—10.

From the 77 ſpecies in Fl. Brit. are to be removed *lucens*, n. 25, which is *Hookeria lucens;* and *filamentoſum*, n. 42, which has been ſhewn by Dr. Swartz to be the ſame as *dubium*, n. 74. Six are added in their ſtead; *pratenſum*, Turn. Muſc. Hib. 161; *ſileſianum*, Engl. Bot. 28. 2016; *Thuringicum*, Turn. Muſc. Hib. 181; *ſquarroſulum*, 24. 1709; *fallax*, 30. 2127; and *Criſta-caſtrenſis*, 30. 2108.

Hookeria. Hookeria.

1. H. *lucens*, ſhining. 27. 1902. Shady bogs. Per. 4—7.

Fontinalis. Water-moſs.

Three ſpecies. Running waters. Per. 7, 8.

Funaria. Cord-moſs.

1. F. *hygrometrica*, twiſting. 5. 342. (Bryum hygrometricum). Sandy ground. Ann. 4, 5.

Stem none. Leaves concave, converging, entire, acute. Capſule obovate. Lid convex.

2. F. *Muhlenbergii*, hair-pointed. 21. 1497. Mountain heaths. Ann. 4, 5.

Stem ſhort, ſimple. Leaves concave, finely ſerrated, hair-pointed. Capſule oblique. Lid ſlightly conical.

3. F. *Templetoni*, long-fruited. 36. 2524. Ireland. Per. 5?

Stem elongated, ſomewhat branched. Leaves ſpreading, ovate, entire, acute. Capſule obovate, tapering at the baſe.

Bartramia. Bartramia.

Eſſ. Ch. Capſule ſpherical, at length furrowed. Outer fringe of 16 tapering teeth; inner a plaited membrane.

The original *Bartramia* being referred to *Triumfetta*, this genus of moſſes has been dedicated to the memory of Mr. John Bartram, the venerable correſpondent of Linnæus, Collinſon, Fothergill and other naturaliſts, who during his travels in North America, contributed greatly to enrich the gardens and muſeums of Europe. See the end of the article Bryum. We here ſubjoin a more ample liſt of Britiſh ſpecies.

1. B. *Halleriana*, lateral. 14. 997. Mountain rivulets. Per. 6, 7.

Fruit-ſtalks lateral, curved, ſhorter than the linear-awl-ſhaped, ſingle-ribbed, even leaves.

2. B. *pomiformis*, apple. 14. 998. Shady rocks and banks. Per. 4, 5.

Fruit-ſtalks erect, ſurmounting the ſtems. Leaves awl-ſhaped, ſingle-ribbed.

3. B. *criſpa*, frizzled. 22. 1526. Northumberland. Per. 4, 5.

Fruit-ſtalks erect, ſurmounting the ſtems. Leaves linear-awlſhaped, broad at the baſe, curled when dry. Capſule rather oblique. Lid obtuſely conical.

4. B. *ithyphylla*, ſtraight-leaved. 24. 1710. Wales and north of England. Per. 5.

Fruit-ſtalks ſurmounting the ſtems. Leaves capillary, with a very broad baſe, entire; very ſtraight when dry.

5. B. *gracilis*, tall ſlender. 26. 1826. Highlands. Per. 7, 8.

Fruit-ſtalks erect, ſurmounting the ſtems. Leaves lanceolate, revolute, ſingle-ribbed; ſerrated towards the point. Stems elongated.

6. B. *fontana*, fountain. 6. 390. (Bryum fontanum). Boggy mountains. Per. 6, 8.

Fruit-ſtalks erect, much taller than the cluſtered, erect, thread-ſhaped branches. Leaves ovate, entire.

7. B. *marchica*, bog. 29. 2074. Highland water-falls. Per.

Fruit-ſtalks erect, taller than the ſtems. Leaves lanceolate, finely ſerrated, imbricated in five rows. Branches cluſtered, ſlender, upright.

8. B. *arcuata*, curve-ſtalked. 18. 1237. Mountain bogs, rare. Per. 7.

Fruit-ſtalks recurved. Leaves lanceolate, furrowed, finely ſerrated. Branches ſcattered, ſpreading.

Mnium. Spring-moſs.

1. M. *androgynum*, narrow-leaved. 18. 1238. Shady wet places. Per. 3, 4.

2. M. *cuinodeum*, club-fruited. 18. 1239. Trees. Per.

3. M. *paluſtre*, greater forked. 6. 391. (Bryum paluſtre.) Bogs. Per. 5—7.

Bryum. Thread-moſs.

Thirty-four ſpecies. Heaths, bogs, mountains. Moſtly per. 3—9.

A full account of the thirty-three ſpecies of Fl. Brit. is given by our excellent predeceſſor, the Rev. Mr. Wood; ſee Bryum. From theſe we have only to remove the *inclinans*, n. 23, which Mr. F. Eagle has diſcovered to be no other than *Dicranum virens*, E. B. 21. 1462.—*B. cylindricum*, n. 6, is *longicollum*, Swartz Muſc. Suec. 49. t. 6. f. 13. *Webera longicolla* of Hedwig.—*B. marginatum*, n. 20, is *ſerratum*, Schrad. Spicil. 71. Two ſpecies are to be added.

B. *triquetrum*, long ſtalked. 34. 2394. Bogs, Ireland. Per. 7.

Stem ſubdivided. Branches ſimple, erect. Leaves ſpreading in three rows, ovato-lanceolate, ſharp-pointed, finely ſerrated. Capſule ſlender-pear-ſhaped, oblique and incurved. Lid conical. The *fruitſtalks* exceed all other Britiſh moſſes in length, extending to three or four inches.

B. *obtuſifolium*, blunt-leaved. Turn. Muſc. Hib. 116. t. 11. f. 1. Ireland.

"Stem nearly ſimple. Leaves ovate, obtuſe, concave, converging. Capſule obovate, oblique. Lid boſſed." This is one of the very few moſſes of which ſpecimens have not yet been procured for delineation in *Engl. Bot.*

Polytrichum. Hair-moſs.

Sixteen ſpecies. Heaths and mountains. Per. or ann. 3—8. See Polytrichum hereafter.

Ord. 3. *Hepaticæ*.

Jungermannia. Jungermannia.

Above ſeventy ſpecies, now illuſtrating by Mr. W. J. Hooker, in an elegant and learned monograph. Sixty-eight are figured in *Engl. Bot.*

Blasia. Blaſia.

1. B. *puſilla*, dwarf. 19. 1328. Damp ſandy places. Ann. 10, 11.

Targionia. Targionia.

1. T. *hypophylla*, dotted. 4. 287. Shady banks, rare. Per. 3, 4.

Sphærocarpus. Bladder-grain.

1. P. *terreſtris*, reticulated. 5. 299. Turnip and clover fields. Ann. 11.

Marchantia. Marchantia.

Five ſpecies. Shady places, or rocks. Per. Various ſeaſons.

Riccia. Riccia.

Four ſpecies. Sandy heaths, or in ponds. Ann? 8—12.

R. fruticuloſa is a *Jungermannia*, probably not diſtinct from *furcata*. See E. B. 35. 2514.

Anthoceros. Horn Liverwort.

1. A. *punctatus*, jagged-leaved. 22. 1537. Damp ſandy ground. Ann. 6.

2. A. *major*, broad-leaved. 22. 1538. With the former. Ann. 6.

A. lævis of Linnæus, who erroneouſly ſuppoſed it had no warts, or male flowers.

3. A. *multifidus*, fine-cut. Dill. t. 68. f. 4. Highland rocks. *Dickſon.*

Ord. 4. *Algæ*.

This order begins with the natural family of Lichenes; (ſee that article.) Of theſe, 391 are figured in *Engl. Bot.*; but ſeveral ſtill remain for further examination. An ample view of numerous ſpecies, both native and exotic, may be found under the article Lichen; and their terminology, phyſiology, and generic diſtribution, under Lichenes.

The following, except the firſt genus, which is of an amphibious nature, are aquatic, or ſubmerſed, *Algæ*.

Tremella. Jelly-bladder.

About twenty ſpecies, found on rotten wood, in water, or on the ground, after much wet.

Ulva. Laver.

About thirty-five ſpecies. In freſh or ſalt water. Ann. or per. Various ſeaſons.

Fucus. Fucus.

About ninety ſpecies. In ſalt water. Ann. or per. Various ſeaſons.

Rivularia. Rivularia.

Eleven ſpecies are figured in Engl. Bot. Freſh or ſalt water.

Conferva. Conferva.

About 180 ſpecies. Freſh or ſalt water, at various ſeaſons. Above 130 are figured in Engl. Bot.

Vaucheria. Vaucheria.

Three or four, not very well defined, ſpecies, found in freſh water. See Engl. Bot. v. 25.

Byssus. Byſſus.

Hudſon has nineteen ſpecies of this genus, but the number is much leſſened in conſequence of ſubſequent enquiries; inſomuch that it is hard to ſay what really conſtitutes a *Byſſus* at all. The fibrous kinds are generally reducible to *Conferva*, the powdery ones to *Lepraria*. Some of the latter indeed, having occaſionally produced ſhields, prove themſelves either *Lecideæ* or *Parmeliæ*. See Lichenes.

Ord. 5. *Fungi*.

Withering, who excels in this obſcure department of Britiſh botany, deſcribes about 556 ſpecies of *Fungi*, diſpoſed in ſeventeen genera. Of theſe *Agaricus*, conſiſting of 282 ſpecies, is the principal. The diſtribution of the reſt has been ſo much altered by following writers, and eſpecially by Perſoon, that it would be uſeleſs to enter into any details concerning Withering's generic arrangement. The number of known Britiſh ſpecies is alſo greatly augmented ſince his time; ſo that perhaps they might be eſtimated between 750 and 800. A great part of them are figured in Sowerby and Bolton. This order is purpoſely excluded from the *Engliſh Botany*, becauſe it would have overloaded the Cryptogamic department of that work. It has met with few votaries, as yet, in this country. In Germany the *Fungi* have received particular attention. See Fungi.

Thus at the end of the Vegetable, like the Animal, Kingdom, our knowledge vaniſhes amongſt undiſtinguiſhable, almoſt imperceptible, tribes, whoſe confines blend with each other. The imperfection which we proudly attribute to ſuch as we cannot underſtand, rather belongs to our own limited powers, or to our ſuperficial enquiries. The accuracy and minuteneſs of inveſtigation, amongſt naturaliſts of the preſent day, ſo far tranſcends what was uſual thirty years ago, that the cryptogamic claſs, like the inſect tribes, has diſplayed a new world, as it were, to the curious enquirer, and has ſmoothed the way for ſucceeding obſervers; who in their turn need apprehend no deficiency of occupation or entertainment.

Plants, in *Agriculture*, vegetable productions, of which there are numerous kinds, ſuch as herbs of various ſorts, comprehending all the different graſſes, leguminous vegetables, and eſculents of other deſcriptions; trees, including thoſe of the large or timber kind, and thoſe of a more low or ſhrubby growth, whether under the name of ſhrubs, or under-ſhrubs. But properly, in an agricultural point of view, they chiefly comprehend ſuch graſſes or plants of that nature as are employed as the food of animals, and ſuch trees or other plants as are capable of being applied to the purpoſes of timber, or made uſe of in the buſineſs of huſbandry. And it may be farther obſerved with reſpect to plants, that moſt of them are hermaphrodite, containing the male and female parts in the ſame flower; others have flowers on the ſame ſtems, ſome of which are male, and others female. Some likewiſe produce flowers over the whole without being followed by any fruit, while others of the ſame ſort bear fruit with flowers, in conſequence of which they are diſtinguiſhed into male and female plants. There are many of this ſort, as the hop, hemp, and the poplar tree. The female flowers are only followed by fruit, the hermaphrodites, in reſpect to this, being conſidered among the female. Plants are capable of being fecundated from very conſiderable diſtances, which is a circumſtance that the farmer ſhould carefully keep in mind in ſaving the ſeeds of particular ſorts of plants, as all the cabbage tribe, and many others.

They require nouriſhment and air as well as animals to ſupport, and keep them in a proper ſtate of healthy growth, the former of which is principally drawn from the earth or the ſurrounding atmoſphere. The gaſeous materials are chiefly drawn from the atmoſphere by the upper ſurfaces of their leaves, while the oxygen gas or *pure air* is given out during the ſun-ſhine by their under ſurfaces. It is evident, therefore, that the means of ſupport are provided in two different ways, by the radical or root fibres of the plant taking up one part and the leaves drinking up another, the former from the earth, and the latter from the air that ſurrounds them. See Food *of Plants*, and Manure.

Moſt of the plants which are the principal objects of agriculture, are either raiſed and increaſed from the ſeeds, or the cuttings or other parts of roots, in the fields where they are to grow, as in all the grain and graſs kinds, as well as in the potatoe; but there are a few in which the young plants, or offſets, are made uſe of, being ſet out in ſomewhat the garden method, and in which great care ſhould conſtantly be taken that they are good in their kinds, and perfect in their nature and different parts. Theſe are chiefly of the cabbage, madder, and other ſimilar kinds.

Wheat plants are likewiſe ſometimes tranſplanted, but the practice is by no means in any degree of a general nature.

In regard to the plants of the tree kind, which are frequently a good deal employed, they are ſometimes raiſed and provided from the ſeeds in the places where they are to grow ; and at others reared and procured from the nurſery grounds in the proper ſtate for uſe in the forming of woods, plantations, and other ſorts of wooded lands.

In the practice of planting, experience for a long time has ſufficiently ſhewn, that where there is any degree of natural ſhelter or protection in the ſituation, and particularly where the ground has been properly prepared for the purpoſe, that ſuch plants as have been tranſplanted in the nurſery, and which are from a foot and a half to two or three feet in height, are the moſt ſuitable to be made uſe of in this intention. And it is directed by Mr. Loudon and others, that in performing the buſineſs, they ſhould be placed from four to ſix feet diſtant from each other, being put into the ſoil in an irregular manner. But that in expoſed ſituations and ſpots, where ſhelter and protection are only to be gained by putting them in in a thick or cloſe method, or by that of planting nurſes, tranſplanted plants which are under a foot and a half in height ſhould alone be had recourſe to, being planted out from two feet and a half to four feet apart in ſuch plantations. The ſpace or diſtance between the plants in both theſe inſtances, muſt of neceſſity vary very greatly, according to the nature of the kind, and other circumſtances. Alſo the borders and margins of large plantations, as well as narrow ſtripes and patches, ought to be thicker, or more cloſely planted with thoſe ſorts of plants, than the inſides of great extents, though in the ſame expoſures ; but, on the contrary, where the ground is of a deep loamy quality, they may be put at wider diſtances, than where it is more thin and gravelly in its nature. Likewiſe in making very extenſive plantations, it frequently becomes a matter of importance in ſetting out the plants, to place them in rows, as in this way they may be cultivated with much greater facility when they approach towards the growth of trees. For in many inſtances, the neceſſary cultivation, by ſuch means, can be readily given with advantage by the plough and the horſe-hoe ; and not unfrequently different kinds of vegetables and roots may be introduced between the rows with great propriety and benefit, as thoſe of the turnip, cabbage, onion, potatoe, carrot, and various other ſorts.

It is contended that in all common plantations, the plants of theſe deſcriptions ſhould be put into the ground with ſome degree of irregularity ; but that wherever ornament is the leaſt had in view, it ſhould always be done in a manner, *irregularly irregular ;* they ſhould be grouped, or, in the more plain language of thoſe engaged in the buſineſs, planted out juſt as if they had grown up by accident from the ſeed : or in ſuch a manner as is ſeen in natural foreſts, where, in ſome parts, perhaps two or three trees appear to ſpring from one root, and in others quite thin and more detached. As by this means an endleſs variety of compoſition is produced, and at the ſame time an equal quantity of timber afforded, as the ſame would have yielded, if planted out in the moſt regular manner in reſpect to the diſtances. In proof of the truth of which, the above writer has adduced the common mode of thinning fields of young turnip plants, that have not ſprung ſufficiently thick. Some of the plants of which, it is aſſerted, may ſtand at two feet, others not above two inches ſeparate from each other ; but that wherever two are cloſe together, by being unencumbered all round, they grow more vigorouſly than the others ; and as the bulk ſwells, puſh each other aſunder ; ſo that in a ſhort time the whole ſurface of the field is covered. The ſame thing, it is contended, takes place in natural woods. Suppoſe two ſpaces, containing twenty ſquare yards each, and in each ſpace two trees ; but in one the trees to be planted three feet aſunder, and the other three yards : when ten years growth has taken place, the bulk and height produced upon each of the ſpaces would be exactly alike in every reſpect.

In regard to the methods of introducing or inſerting the plants, in making plantations with them, they are in ſome meaſure different. The modes either by pitting them in or ſlit-planting are probably the beſt, as being the moſt generally practiſed ; they may, however, be put in by the dibble, though it is a practice which can ſeldom be had recourſe to with propriety or much ſucceſs. With the pine and fir tribe of plants, the mode of planting is moſtly conſidered as more cheap and expeditious, than that of ſowing the ſeeds ; but in raiſing large and extenſive woods and foreſts, or other ſorts of plantations, where moſt kinds of deciduous trees are required, and eſpecially the oak and the aſh, which ſhould be the moſt generally grown, they ought to be produced from the ſeeds by ſowing them in the ſituations where the plants are finally to remain and become trees. The ſeed of the oak put into the earth at the ſame time with a plant of the ſame kind five or ſix years old, will, it is ſuppoſed, over-top it in the courſe of ſeven years, and frequently ſooner ; beſides, they are believed by ſome to laſt much longer, and ultimately to produce much better and more valuable timber. In all places where the ground is fully and properly prepared, and in which it is deſirable to raiſe oak plants, for becoming trees, it will be found the beſt method to ſow the ſeeds, as this can be done at leſs than a fifth of the expence of planting out the young plants, and beſides, the trees will turn to advantage, either as timber or undergrowth much more expeditiouſly. And farther, as the oak is a particularly valuable ſort of tree for its bark equally as well as for the timber, it ought to be univerſally raiſed ; and were the above mode more generally attended to, there would be found a ſaving, even in the firſt place, of from three to four pounds the acre, which, to thoſe who plant largely, would be of great conſequence.

Plants, in *Gardening*, young living vegetables of any kind, which are raiſed or produced from a ſeed or in any other manner. Plants are of many different ſorts and deſcriptions, as well as employed for a variety of different uſes, and in a great diverſity of intentions. They may, however, in the view of their garden culture, be principally conſidered as of the herbaceous, ſhrubby, and tree kinds, and as being annual, biennial, and perennial in their nature, and the time of their continuance.

Every plant may be ſaid to conſiſt of a root, that ſtrikes down into the ground, or into ſome other body in ſome way or other, and which ſends off numerous ramifications, which ſerve the purpoſe of fixing it in the earth or other ſituation, and at the ſame time to ſupply it with food or nouriſhment for its growth, increaſe, and continuance. There is likewiſe a ſtalk, ſtem, or trunk, which riſes upwards into the atmoſphere, and which is compoſed of a bark in the outer parts, a ſubſtance which is called *alburnum,* more internally a woody material, and a medullary matter, that is termed *pith,* in the inſide of the whole. From this ſtem or trunk are formed and ſent off the different branches and twigs, which contain the leaves and flowers, and which are very different in different ſorts of plants. Beſides which, all plants are furniſhed and provided with different ſorts of veſſels for conveying their ſap, juices, and other kinds of fluids, and endued with ſeveral different powers, motions, and properties, which ſerve their different habits of growth, and the uſes and intentions which they are to fulfil. See Vegetable, and Vegetation.

The mode of growth and increaſe in plants, after they have been evolved and ſprung up from ſeeds, or in any other manner, is deſcribed ſomewhat in this way by a late writer upon the ſtructure and economy of plants; the root part of a plant at firſt advances more rapidly than the ſtem; as it has been found that an oak plant a foot and a half high has a root four feet in length, and that, if the principal root be in any way mutilated, the plant emits radicles in every direction; which always grow faſter than if the root had remained perfect. Such radicles at firſt do not receive any conſiderable increaſe; but ſoon afterwards augment into a body almoſt equal to the principal root, and then protrude new radical ſhoots in a lateral direction. Alſo, that the roots are prolonged at the extreme apex or point, as will be perfectly evident, if any root be coloured with varniſh or any other ſubſtance of a ſimilar kind in different places; and it is, likewiſe, well known, that the radicles always ſhoot out in that part where the earth is the moſt humid, ſo that walls are not unfrequently thrown down or overturned by their power of penetrating towards moiſt places, or ſituations where the ſoil is the moſt ſoft in its nature.

But the trunk of a plant is expanded throughout its whole length, and not at the apex only, as in the caſe of the root; for if the tender ſtem of a plant, at the beginning of ſpring, be coloured over with varniſh, or any other matter of the ſame kind, and marked in different places, the marks will, after a few months, be found to have receded in the ſeveral different parts when formed.

It is found that, in the growth, in an *annual* plant, the expanſion of the ſtem in length continues until the explication of the flowers has fully taken place; at which time the fibres that conſtitute the ſtalk, begin to grow hard, and to be indurated, and ultimately in a gradual manner to become dry and firm.

But in a *perennial* plant the increaſe of the ſtem continues until the leaves fall, or are deſtroyed in the autumnal ſeaſon; during which time a germ or bud ariſes in the apex, in which the rudiment of the new ſtem, during winter, increaſes ſlowly until the following ſpring; when caſting off its winter involucra, it continues the increaſe of the ſtem in the ſame way as the inferior part increaſed during the former year: for in that place where a bud is ſeated, a tumour extends, which is ſo continued with the new ſtem as ſcarcely to leave any veſtige behind it.

It is remarked, that the increaſe of the ſtem in breadth does not ariſe from the dilatation of the ligneous or woody layers, but from the generation of new layers, which are annually depoſited by the veſſels of the bark. This is ſaid to be fully explained and illuſtrated by the following experiments. "If the ring of the bark be torn from the trunk of a tree, and the ligneous cylinder of the naked part be perfectly ſurrounded with a leaf of tin, and the whole (after having replaced the cut-out ring of the bark) be covered with the tree plaſter; then, upon cutting the tree ſome years after, it will appear that the ligneous cylinder, covered with tin, has received no increaſe, and that the tin, inſerted between the ligneous cylinder and the new ligneous ſtrata, is complete. Theſe ligneous ſtrata appear to be generated from the cortex; for if metallic threads be inſerted obliquely into the cortex, they are after ſome years found in the wood itſelf, and not in the cortex or bark of the tree or plant."

It is ſhewn by attentive obſervation, that the trunk of a tree receives two ligneous or woody layers in the courſe of the year; but that the thickneſs of theſe layers is not the ſame every year; for it is the greateſt when the tree is of a middle age, and the warmer the ſummer the more ſlender is the bark.

It would ſeem, that the bark is protruded by the vital or living power of the veſſels, which are placed in the wood of the tree or plant.

And the generation of the branches is ſuppoſed to be from the corona, or plexus of veſſels, which is ſituated between the wood and medulla, or pith, from whence they proceed. Each germ or bud produces a new branch, ſo that it may be ſaid to give birth to a new plant, which was ſhut up and laid concealed in that particular bud; for the branch contains every part which is eſſentially neceſſary to form a new plant, as is evident from cutting off a branch, and planting it in the ground, by which means a perfect tree or plant is produced, and ſoon grows up. The veſſels, it is believed, principally protrude where there is the leaſt reſiſtance in the bark, as in the axilla of the leaves, the nodes, and the joints; the ſame is noticed in reſpect to the branches of the root, and explains the reaſon, why the propagation of plants does not ſucceed by the ſlip or branch, unleſs a node, joint, or germ remain in them. Alſo why, if a branch of a tree or plant, that is yet adhering to it, be plaſtered or covered round with earth or moiſt dung, there proceeds from it a root into theſe ſubſtances. And why the ancients falſely attributed the generation or production of boughs to the medulla or pith of the tree; as in trees which are deſtitute of this ſubſtance, it is ſeen that no branches are produced or brought forth.

Further, the generation or production of leaves in plants originates from the veſſels of the bark only; for, the bark being ſeparated from the wood, no connection of the leaves with the wood can be obſerved; and the bark alone, if put into water, produces leaves.

Laſtly, in the generation or production of the flowers of plants, the exterior bark, or epidermis, would ſeem to proceed into the cups, the alburnum into the corolla, and the ſeries of veſſels into the other parts of them.

Plants are likewiſe found to be of very different kinds and qualities, in reſpect to their powers of bearing fruit, or of becoming prolific, as well as that of their differing in ſo many other particulars, as in their natures, modes of growth, and various other points of conſequence.

Many of them have the male and female parts in the ſame individual flower, whence they are commonly denominated hermaphrodite plants; and there are others, which have the male and female flowers in a ſtate of intermixture on the ſame ſtem or branch, as is the caſe with the cucumber and melon, as well as ſome other kinds of plants. Some have alſo the flowers all over them without any fruit being produced, while others of the ſame kind, at the ſame time, have flowers, and produce fruit, which afford the diſtinction of male and female plants. But as thoſe of the female ſort only produce fruit, thoſe of the firſt mentioned kind are conſtantly conſidered to be of this nature.

A perfect knowledge of theſe circumſtances is of great advantage in the buſineſs of practical gardening, as it can be applied to many uſeful purpoſes in providing fruit, as well as good ſeeds of different kinds.

Much of the labour and attention of the horticulturiſt is likewiſe employed in the raiſing and providing plants of the herbaceous kind, which are extremely numerous, and not a few of them of conſiderable importance, in the view of food, requiring to be cultivated and produced in a regular and conſtant manner. They differ greatly, however, in their natures and qualities, as well as in their management and means of production. There are ſome, which have but little ſtem, being chiefly of a leafy deſcription; others, in which the ſame part is far more conſiderable, but of a fleſhy, tender nature; and ſtill others in which the ſtalks are tough, hard, and of rather a ligneous quality.

Whenever herbaceous plants of any of theſe kinds are to be raiſed, it is almoſt conſtantly done from the young plants, after they have had ſome little growth from the ſeeds, and are in a perfect condition in every reſpect. This method is purſued in all the different kinds of cabbages, cauliflowers, brocolies, and lettuces, as well as with endive, celery, and many others. But there are ſome which are raiſed from ſeeds without being tranſplanted in the above manner, and a few from offsets or ſlips, and by dividing the roots or other parts.

In the ſhrubby and tree kinds, the plants are moſtly increaſed from ſeeds, cuttings, layers, and ſlips.

All plants poſſeſs, by means of their living principles, the proper and neceſſary degrees of heat, by which they vegetate, increaſe, and are enabled to reſiſt the over-abundant cold or heat, which may at any time ſurround them; but they differ very materially in this reſpect, ſome having a much greater power of doing it than others. There are ſome which have alſo a remarkable capability of reſiſting cold in their roots; and others, which are equally remarkable in reſiſting heat. The kidney bean is an example of the former kind, and that of the cucumber of the latter: for if a green leaf of the former vegetable be introduced into the frozen juice of ſpinach, it quickly becomes thawed; and if a veſſel full of water be expoſed in a bed of cucumbers, the water ſpeedily becomes warm, but the cucumbers remain cold to the touch; and if one be eaten the ſtomach is found to be cooled, as if it had taken ice. And the ſame thing has been found in reſpect to fruits, while growing upon the trees. The ſtate of heat in plants would therefore ſeem to proceed from the matter of heat, which is taken from the ſurrounding air; and hence it is, that the ſhades of all ſorts of trees are ſo cooling in their nature.

Plants, *Foſſile.* Many ſpecies of tender and herbaceous plants are found at this day, in great abundance, buried at conſiderable depths in the earth, and converted, as it were, into the nature of the matter they lie among; foſſile wood is often found very little altered, and often impregnated with ſubſtances of almoſt all the different foſſile kinds, and lodged in all the ſeveral ſtrata, ſometimes firmly imbedded in hard matter, ſometimes looſe: but this is by no means the caſe with the tenderer and more delicate ſubjects of the vegetable world. Theſe are uſually immerſed either in a blackiſh ſlaty ſubſtance, found lying over the ſtrata of coal, or elſe in looſe nodules of ferruginous matter of a pebble-like form, and they are always altered into the nature of the ſubſtance they lie among: what we meet with of theſe are principally of the fern kind: and what is very ſingular, though a very certain truth, is, that theſe are principally the ferns of American growth, not thoſe of our own climate. The moſt frequent foſſile plants are the polypody, ſpleenwort, oſmund, trichomanes, and the ſeveral larger and ſmaller ferns; but beſide theſe there are alſo found pieces of the equiſetums, or horſe-tails, and joints of the ſtellated plants, as the clivers, madder, and the like; and theſe have been too often miſtaken for flowers; ſometimes there are alſo found complete graſſes, or parts of them, as alſo reeds and other watery plants; ſometimes the ears of corn, and not unfrequently the twigs or bark, and impreſſions of the bark, and fruit of the pine or fir kind, which have been, from their ſcaly appearance, miſtaken for the ſkins of fiſhes; and ſometimes, but that very rarely, we meet with moſſes and ſea-plants.

Many of the ferns not unfrequently found, are of very ſingular kinds, and ſome ſpecies yet unknown to us; and the leaves of ſome appear ſet at regular diſtances, with round protuberances and cavities. The ſtones which contain theſe plants ſplit readily, and are often found to contain, on one ſide, the impreſſion of the plant; and on the other the prominent plant itſelf: and, beſide all that have been mentioned, there have been frequently ſuppoſed to have been found with us ears of common wheat, and of the maize or Indian corn; the firſt being in reality no other than the common endmoſt branches of the firs, and the other the thicker boughs of various ſpecies of that and of the pine kind, with their leaves fallen off; ſuch branches in ſuch a ſtate cannot but afford many irregular tubercles and papillæ, and, in ſome ſpecies, ſuch as are more regularly diſpoſed.

Theſe are the kinds more obvious in England; and theſe are either immerſed in the ſlaty ſtone which conſtitute whole ſtrata, or in flattened nodules, uſually of about three inches broad, which readily ſplit into two pieces on being ſtruck.

They are moſt common in Kent, on coal-pits, near Newcaſtle, and the foreſt of Dean, in Glouceſterſhire; but are more or leſs found about almoſt all our coal-pits, and many of our iron-mines.

Though theſe ſeem the only ſpecies of plants found with us, yet in Germany there are many others, and thoſe found in different ſubſtances. A whitiſh ſtone, a little harder than chalk, frequently contains them; they are found alſo often in a grey ſlaty ſtone, of a firmer texture, not unfrequently in a blackiſh one, and at times in many others; nor are the bodies themſelves leſs various here than the matter in which they are contained; the leaves of trees are found in great abundance, among which thoſe of the willow, poplar, whitethorn, and pear-trees, are the moſt common; ſmall branches of box, leaves of the olive-tree, and ſtalks of garden thyme, are alſo found there; and ſometimes ears of the various ſpecies of corn, and the larger as well as the ſmaller moſſes in great abundance.

Theſe ſeem the tender vegetables, or herbaceous plants, certainly found thus immerſed in hard ſtone, and buried at great depths in the earth: others of many kinds there are alſo named by authors; but as in bodies ſo imperfect, errors are eaſily fallen into, theſe ſeem all that can be aſcertained beyond mere conjecture. Hill's Hiſt. of Foſſils. See Petrifaction.

Plants, *Marine.* See Sea-*Plants.*

PLANUM, Os, in *Anatomy*, the ſmooth orbital plate of the ethmoid bone. See Cranium.

PLAPPERT, in *Commerce*, a money of account in Switzerland; 15 plapperts, or ſkillings, being = 12 groſchen, or gros, = 10 Swiſs batzes = 9 good batzes = 1 livre, and containing 36 creutzers = 90 rappen = 180 pfenings.

PLAQUET, in *Ancient Armour*, a plate which was occaſionally added to the breaſt-plate, in order to ſtrengthen it.

PLAS, in *Biography*, two brothers, born in Spain, celebrated performers on the hautbois, who, like the two Bezozzis of Turin, always lived, practiſed, and performed together, as one and the ſame being. They left Madrid in 1752, and arrived at Paris the ſame year, where their performance excited equal wonder and extacy. Their tone, expreſſion, taſte, and execution, were as exactly ſimilar as double ſtops on the ſame inſtrument.

In 1761 they went into Germany, and were engaged in the chapel of the duke of Wirtemberg, and in his houſhold as chamber muſicians.

PLASCHKEN, in *Geography*, a town of Pruſſian Lithuania; 9 miles N.W. of Tilſit.

PLASEMBURG, a town of Tranſylvania, near Hermanſtadt.

PLASENCIA, or Placencia, a town of Spain, in the province of Guipuſcoa; 20 miles N. of Vittoria.

Plasencia, a town of Spain, in the province of Eſtramadura, ſituated in the middle of mountains, in a narrow valley, tolerably fertile, nine leagues long, and watered by the river Xerte. The town ſtands on the banks of this river, and is partly ſurrounded by it, as if in a peninſula. Its ſituation is alſo embelliſhed by an agreeable promenade. Plaſencia is a ſuffragan of San Jago, and its dioceſe comprehends a cathedral, chapter, and 152 pariſhes. This town is the chief place of a corregidoret, and contains ſeven pariſh churches, three convents of monks, and ſeveral chapels or oratories. Here is a fine aqueduct, which conveys water from the diſtance of two leagues, and has upwards of 80 arches; 95 miles W.S.W. of Madrid. N. lat. 40° 3′. W. long. 5° 9′.

PLASH, in *Rural Economy*, the bough or ſtem which is laid down by means of a nick or cut being made on the upper ſide of it, in repairing or reſtoring old hedge-fences.

PLASHER, a perſon of the labouring kind, whoſe buſineſs is the making or repairing of hedge-fences by means of plaſhing.

PLASHING of hedges, the operation or proceſs by which this ſort of work is performed in reſtoring old run up open hedges. The uſual mode of executing it is as follows; the ſtronger ſtems are ſelected, at as regular diſtances as poſſible, and generally at about thirty inches apart. Theſe are called the ſtakes; and are commonly headed over at four or five feet above the ſurface, according to the general ſtrength of the hedge in queſtion, ſo as they may all range in line, and at one height. The more pliable branches and ſmall twigs are interwoven, in the baſket manner, among the ſtakes, from top to bottom, as cloſely as poſſible. Such as will not bend in a pliable manner, and afterwards remain in due poſition, are ſnagged half through with the bill, to make them more obedient. The ſtrong ſtems that cannot be laid in, and are not wanted for ſtakes, are cut cloſe by the ſurface. In places where ſtems ſtrong enough, and fit for ſtakes, are wanting, the deficiency is ſupplied by dead ſtakes. After the plaſhing is finiſhed, the hedge is dreſſed ſmooth on both ſides with the bill, or ſome other ſimilar inſtrument. This is a method that is much practiſed in Hertfordſhire and ſome other counties. See Fence.

The principal objection to this mode, which is certainly the cheapeſt and moſt eaſily performed, is, that the ſtakes, or cut-over ſtems, ſhoot forth ſtrongly to the detriment of the under part of the hedge, which, by over-ſhadowing, they retard in growth, and keep naked of ſpray; and which probably ſuggeſted an improvement, which is that of cutting none over at all, but weaving in the tops of the ſtakes along with the plaſhes. The propriety of this mode is at once evident; for, beſides that the above complaint cannot poſſibly attach, the ſtems cut by the ſurface ſend up a ſtrong growth, which, intermixing with the plaſhes, renders the whole more cloſe and impenetrable than would otherwiſe be the caſe.

In caſes where two rows of quicks have been planted, according to the common method, at the diſtance of a foot from each other, the *back* row being plaſhed in ſome of the above modes, and the front one being cut down to the ſtub, would be the moſt effectual method of preſerving the preſent, and producing a new fence. It is, however, conceived, that this operation can only be effectually and *handſomely* performed in caſes where there is a good portion of ſpray and long pliable ſhoots or branches; and when the edge has, if not youth, at leaſt vigour on its ſide, to ſend forth a luxuriant growth, and cover the naked appearance the plaſhes would otherwiſe have. And that for the more handſome performance of this buſineſs, there is alſo a ſeaſon more ſuitable than another, which is the fall, or beginning of winter, as at this ſeaſon the ſhoots are more pliable than in ſpring, when the ſap begins to riſe and circulate; at which time the ſhoots of all plants are moſt brittle. After the hedge is plaſhed, the ditch, provided there be one, ſhould be ſcoured out, and dreſſed up; and that where the fence is properly attended to, in regard to pruning and cutting, it may laſt for many years.

The manner of executing this ſort of work in the Hertfordſhire mode has been fully explained in ſpeaking of the nature of reſtoring fences.

This ſort of practice is ſometimes neceſſary to be had recourſe to in gardens where the outward fences have been ſuffered to run up in rude growth, naked and open at the bottoms; they being reformed and reduced to order by proper trimming, thinning, cutting, and laying down the general ſtems and branches in a ſlanting manner lengthways, according to the ranges of the hedges, being interwoven between other ſtems which are left upright; the work being aſſiſted by ſuitably nicking, cutting, or gaſhing the different parts on their upper ſides; and the whole of the ſmaller lateral branches being plaſhed in, ſo as to cloſe all the lower vacancies, and thicken every part regularly from the bottom to the top, to the height of from three to four feet, or a little more, according to circumſtances.

This proceſs is occaſionally performed to any kind of deciduous common hedges, ſuch as thoſe of white-thorn, black-thorn, elm, poplar, beech, or other ſorts; and in proceeding in the work, it is frequently neceſſary, eſpecially in very diſorderly rough edges, previouſly to trim or lop off much of the outward and over-growing rude branches of them, as well as the large naked wood and obviouſly ſuperabundant growths, both above and below; carefully bringing down ſuch branches or other parts as are left in an exact and regular manner, plaſh after plaſh, until the whole buſineſs is finiſhed.

PLASM, Plasma, is ſometimes uſed for a mould, wherein any metal, or ſuch like running matter, which will afterwards harden, is caſt to receive its figure.

PLASO, in *Botany*, Rheede Hort. Mal. v. 6. 29. t. 16, 17, is a very noble papilionaceous and leguminous ſhrub, or tree, referred by Lamarck to *Erythrina*, with the ſpecific name of *monoſperma*. Juſſieu, Gen. 357, mentions it under that genus, with a hint, extremely well founded, of its probably conſtituting a new one. Of this the celebrated Daniſh botaniſt, Koenig, who gathered in India two ſpecies of the genus in queſtion, was aware. He named it *Butea*, after that diſtinguiſhed lover of botany, the firſt earl of Bute; either not knowing, or not recollecting, that another genus was called *Stuartia* by Linnæus, in honour of this nobleman, and was univerſally received under that denomination. Dr. Roxburgh has however publiſhed the *Butea*, and it is adopted by Willdenow, Sp. Pl. v. 3. 917, as well as in Ait. Hort. Kew. v. 4. 252, and by the late Rev. Mr. Wood, in our 5th vol. See Butea.

The name is altogether inadmiſſible on the ground above mentioned, one genus being abundantly ſufficient to commemorate any one perſon whatever, nor has there ever been a ſimilar example, among claſſical writers of the Linnæan ſchool. *Butea* may nevertheleſs remain as a memorial of the late marchioneſs of Bute, who paid much attention to botany, and is mentioned as having introduced ſeveral plants from the gardens of Madrid, into thoſe of England.

PLASS, in *Geography*, a town of Bohemia, in the circle of Rakonitz; 18 miles S.W. of Rakonitz.

PLASSEY, a town of Hindooſtan, in Bengal, near which colonel Clive defeated the troops of Surajah Dowlah in 1757; 25 miles S. of Moorſhedabad.

PLASTER, or PLAISTER, in *Building*, a compoſition of lime, ſometimes with hair, ſometimes with ſand, &c. to parget or cover the nudities of a building.

There is alſo a plaſter of a coarſer ſort than the plaſter of Paris, which is ſometimes uſed in this country for floors in gentlemen's houſes, and for corn-granaries: it is made of a blueiſh ſtone, taken out of quarries, which are generally at the ſide of a hill, much like the ſtone of which Dutch terras is made: the ſtone is burnt like lime, becomes white by burning, and when mixed with water, does not ferment like lime: when cold, it is beat into a fine powder; and when it is uſed, the quantity of about a buſhel is put into a tub, and water applied to it, till it becomes liquid: in this ſtate it is well ſtirred with a ſtick, and uſed immediately; for in leſs than a quarter of an hour it becomes hard and good for nothing, as it will not bear being mixed a ſecond time like lime. See GYPSUM, and PLASTERING.

PLASTER, in *Pharmacy*, an external application of a harder conſiſtence than our ointments: theſe are to be ſpread according to the different circumſtances of the wound, place, or patient, either upon linen or leather.

If the part upon which they are to be laid be naturally hairy, it muſt be ſhaved; but that they may ſtick the better, the natural ſhape of the part muſt be conſulted, and the plaſter ſpread and formed accordingly, either round, ſquare, triangular, elliptical, in a lunar form, or in ſhape of the letter T. Some alſo are divided at both ends, and others are perforated in the middle: theſe laſt are of frequent uſe in fractures attended with a wound; for by this contrivance the wound may be cleanſed and dreſſed without removing the plaſter.

Indeed there is almoſt no part of the body which a plaſter of one of thoſe forms may not be made to ſerve for, if it be notched about the edges with a pair of ſciſſars. See EMPLASTRUM.

The uſe of plaſters is various; they are ſerviceable in ſecuring the dreſſings, they alſo forward the maturation of the pus, agglutinate and heal wounds, unite broken bones, heal burns, aſſuage pain, and ſtrengthen weak parts. In many inſtances they contain acrid and ſtimulating ſubſtances, and operate as rubefacients, or bliſters.

The calces or oxyds of lead boiled with oils, unite with them into a plaſter of a proper conſiſtence, which makes the baſis of ſeveral other plaſters: but ſome of them owe their conſiſtence to wax and reſin; and others contain no oily or fatty matter whatever: in boiling theſe compoſitions, a quantity of hot water muſt be added from time to time, to prevent the plaſter from burning and growing black; but this ſhould be done with care, leſt it cauſe the matter to explode.

Plaſters ſhould not adhere to the hand when cold; they ſhould be eaſily ſpread when heated; and after they are ſpread they ſhould remain tenacious and pliant; but they ſhould not be ſo ſoft as to run when heated by the ſkin. All plaſters become too conſiſtent or brittle when long kept; but in this caſe, thoſe which are unctuous may be remelted by a gentle heat, and ſome oil added to them. They are uſually formed into rolls, each of which is wrapped in paper, and when uſed, they are melted, and ſpread on leather, calico, linen, or ſilk. Thoſe that contain metallic oxyds ought to be melted by boiling water, for in a greater degree of heat the fatty matter is apt to reduce the oxyd.

PLASTER, *Adheſive*. See EMPLASTRUM.

PLASTER, *Ammoniac*, is formed by diſſolving 5 oz. of purified ammoniac in half a pint of acetic acid (diſtilled vinegar), and evaporating the ſolution in an iron veſſel placed in a water bath; conſtantly ſtirring it till it acquire a proper conſiſtence. This plaſter, which is ſtimulant and reſolvent, is applied to ſcrophulous humours, and white ſwellings, and ſometimes over the ſcalp, in tinea capitis.

PLASTER, *Ammoniac, with Mercury*. See EMPLASTRUM.

PLASTER, *Anodyne*. See EMPLASTRUM, and PLASTER *of Opium*, infra.

PLASTER, *Aromatic*, is formed, according to the directions of the Dublin pharmacopeia, of frankincenſe, 3 oz.; yellow wax, ½ oz.; cinnamon bark in powder, 6 dr.; oil of pimenta and oil of lemons, of each 2 dr. Melt the frankincenſe and the wax together, and ſtrain the mixture; when it thickens by cooling, mix with it the powder of cinnamon previouſly rubbed with the oils, and form them into a plaſter. This plaſter is an elegant ſtimulant, and applied to the region of the ſtomach in dyſpepſia, and increaſed irritability of that viſcus, allays pain and vomiting, and expels flatus. As the oils are very volatile, it muſt be ſpread by the thumb without being melted. It requires to be frequently renewed, and is not very adheſive.

PLASTER, *Aſſafœtida*, conſiſts, by the Edinb. pharm., of plaſter of ſemi-vitreous oxyd of lead, and aſſafœtida, of each two parts, and galbanum and yellow wax, of each one part. This plaſter is ſometimes applied over the umbilical region, in flatulence and hyſteria.

PLASTER, *Bliſtering*, *Emplaſtrum Lyttæ* of the Lond. pharmac., is made by melting 1½ lb. of wax plaſter with a pound of prepared lard, and after removing them from the fire, when the mixture is beginning to be ſolid, ſprinkling in 1 lb. of bliſtering flies reduced to a very fine powder, and mixing the whole together. The *emplaſtrum Meloes veſicatorii*, olim, *emplaſtrum veſicatorium* of the Edinb. pharm., conſiſts of mutton ſuet, yellow wax, reſin, and bliſtering flies, of each equal weights. Reduce the inſects to a fine powder, and mix them with the other articles, previouſly melted together, and removed from the fire. The *emplaſtrum cantharidis* of the Dubl. pharmac. is formed by melting purified yellow wax and mutton ſuet, of each a pound, and 4 oz. of yellow reſin together, and a little before they concrete in becoming ſolid, ſprinkling in 1 lb. of bliſtering flies in fine powder, and forming the whole into a plaſter. (See EMPLASTRUM.) Bliſtering plaſters ſhould remain applied at leaſt for twelve hours to raiſe a perfect bliſter; they are then to be removed, the veſicle is to be cut at the moſt depending part, and without removing the cuticle, the veſicated part is to be dreſſed with ſimple cerate, or ſpermaceti ointment; and the old cuticle allowed to remain until a new one is formed under it; when it peels off, and the whole is healed in the courſe of a few days. The application of theſe plaſters is ſometimes attended with ſtrangury and bloody urine, from the abſorption of the active principles of the inſect, and the irritation of the kidnies and urethra; and this effect is much increaſed, if the bliſter be applied over an abraded ſurface, *e. g.* on the head after it has been immediately ſhaved, and alſo if the plaſter has remained too long applied. To prevent ſtrangury, it has been recommended to mix camphor with the bliſtering compoſition, but this has no good effect; it is better obviated by copious dilution with milk, or mucilaginous fluids, and fomentations of warm milk and water to the bliſtered part, after the removal of the plaſter. When the head is to be bliſtered, it ſhould be ſhaved at leaſt ten hours before the plaſter is applied; and in all caſes it is expedient to interpoſe a piece of thin gauze between the veſicatory and the ſkin, wetted with vinegar, and applied ſmooth and very cloſe over the plaſter. When the bliſtered part becomes a ſpreading ſore, which is ſometimes the caſe in irritable habits, the beſt local application is a warm emollient poultice, and bathing the denuded ſurface frequently with tepid milk and water; while at the ſame time cinchona bark is internally adminiſtered. See Bliſter.

Plaſter *of Spaniſh flies, compound*, of Edinb. pharm., is prepared of 18 parts of Venice turpentine; Burgundy pitch and bliſtering flies, of each 12 parts; yellow wax, 4 parts; ſubacetite of copper, 2 parts; white muſtard ſeeds and black pepper, of each 1 part. Melt the Burgundy pitch and the wax, and add to them the turpentine; while theſe remain ſtill warm, after being melted, ſprinkle in the other ingredients reduced to fine powder, and mix them, ſtirring conſtantly, ſo as to form a plaſter. This plaſter is intended to raiſe a bliſter more quickly than the former, and is therefore adapted to caſes of gout and cramps of the ſtomach, in which the effect of the bliſter muſt be almoſt inſtantly produced. Its operation is attended with much pain and pungent ſenſe of heat; and it is apt to produce very unpleaſant ulceration if allowed to remain too long applied.

Plaſter, *Cephalic*. See Emplaſtrum *Cephalicum*.

Plaſter, *Common*. See Emplaſtrum *Commune*.

Plaſter, *Cumin*. See Emplaſtrum *è Cymino*. This plaſter is ſtimulant and diſcutient; and is applied to the hypogaſtric region in flatulence and a cold feeling of the bowels, and to indolent tumours.

Plaſter, *Drawing*. See Emplaſtrum *Attrahens*.

Plaſter *of Galbanum, Compound*, of the Lond. pharm., is compoſed of purified galbanum, 8 ounces; plaſter of lead, 3 pounds; common turpentine, 10 drachms; and reſin of the ſpruce fir powdered, 3 ounces. Having melted the galbanum and the turpentine together, mix in firſt the reſin, and then the plaſter of lead previouſly melted by a ſlow fire, and mix the whole together. The *plaſter of galbanum* of the Dub. pharm. is prepared by adding to $\frac{1}{2}$ lb. of galbanum melted by heat, 2 lbs. of litharge plaſter, and 4 oz. of yellow wax ſliced; and then melting the whole together by a gentle heat.

Plaſter, *Gum*, of Edinb. ph., is compoſed of 8 parts of plaſter of ſemi-vitreous oxyd of lead, and ammoniac gum-reſin, galbanum, yellow wax, of each 1 part. See Emplaſtrum *Gummi*.

Theſe plaſters are ſtimulant and ſuppurative. They are applied with advantage to ſcrophulous tumours; to joints which have been long affected with arthritic pains; and to the loins in rickets. As a ſuppurative, they are applied to indolent tumours, and to reduce the induration which often remains round abſceſſes, after they are diſcharged.

Plaſter, *Mercurial*. (See Emplaſtrum *commune cum Mercurio*.) The Edinb. pharmac. directs it to be prepared of olive oil and reſin, of each 1 part; mercury, 3 parts; plaſter of ſemi-vitreous oxyd of lead, 6 parts; rub the mercury with the oil and the reſin, previouſly melted together and cooled, until the globules diſappear; then add gradually the plaſter of ſemi-vitreous oxyd of lead melted, and let the whole be carefully mixed together. Theſe plaſters are powerful diſcutients, and are applied to buboes, venereal tumours, nodes when they are not very painful to the touch, and indurations; they are alſo applied to joints affected with obſtinate ſyphilitic pains.

Plaſter *of Opium*, conſiſts of hard opium powdered, $\frac{1}{2}$ oz.; reſin of the ſpruce fir powdered, 3 oz.; lead plaſter, 1 lb.: melt the plaſter and the reſin together, then add the opium, and mix the whole. This plaſter is ſaid to be anodyne, and uſeful in relieving rheumatiſm and local pains.

Plaſter *of red oxyd of Iron* of Edin. pharm., formerly *ſtrengthening plaſter*, is compoſed of plaſter of ſemi-vitreous oxyd of lead, 24 parts; reſin, 6 parts; yellow wax and olive oil, of each 3 parts; and red oxyd of iron, 8 parts; rub the red oxyd of iron with the oil, and add the other ingredients melted.

Plaſter *of Frankincenſe* of Dubl. pharm. is formed of litharge plaſter, 2 lbs.; frankincenſe, $\frac{1}{2}$ lb.; and red oxyd of iron, 3 oz.; to the frankincenſe and plaſter melted together add the oxyd, ſtirring them together ſo as to form a plaſter. Theſe plaſters are ſuppoſed to be tonic; and are uſed in muſcular relaxations, and weakneſſes of the joints after ſprains; but they act chiefly in affording a mechanical ſupport to the parts. See Emplaſtrum *Roborans*.

Plaſter, *Compound pitch*, is compoſed of dried pitch, 2 lbs.; frankincenſe, 1 lb.; yellow reſin and yellow wax, of each 4 oz.; and expreſſed oil of nutmeg, 1 oz. To the pitch, reſin, and wax, melted together, add firſt the frankincenſe, then the oil of nutmeg, and mix the whole. This plaſter is ſtimulant and rubefacient. It is uſed in catarrh, and other pulmonary affections, applied to the thorax; and in head-ache, and chronic ophthalmia, applied to the temples. When a ſerous exudation takes place, the plaſter ſhould be frequently renewed.

Plaſter, *Head*, is prepared by boiling together over a ſlow fire, of ſemi-vitreous oxyd of lead, rubbed to a very fine powder, 5 lbs.; olive oil, a gallon; water, 2 pints, ſtirring conſtantly until the oil and oxyd of lead cohere into the conſiſtence of a plaſter. It is neceſſary, however, to add a little boiling water, if the whole of that which was employed at firſt ſhall be conſumed before the end of the proceſs.

Plaſter *of ſemi-vitreous oxyd of Lead*, formerly *common plaſter*, is prepared of the ſemi-vitreous oxyd of lead, 1 part; and olive oil, 2 parts; having added ſome water, boil them, ſtirring conſtantly, until the oil and the oxyd unite into a plaſter. See Emplaſtrum.

Plaſter, *Litharge*, of Dub. ph., is prepared by mixing 5 lbs. of litharge in fine powder; 9 lbs. of olive oil, and 2 pints of boiling water, at a high temperature, conſtantly ſtirring until the oil and the litharge unite ſo as to form a plaſter, ſupplying occaſionally any waſte of water that may take place. Theſe plaſters are intended chiefly to defend excoriated ſurfaces from the action of the air, and to form the baſis of ſome other plaſters.

Plaſter, *Reſin*, is formed of yellow reſin, $\frac{1}{2}$ lb., and lead plaſter, 3 lbs.; melt the lead plaſter by a gentle heat; then add the reſin in powder and mix.

Plaſter, *Reſinous*, formerly *adheſive plaſter*, is compoſed of plaſter of ſemi-vitreous oxyd of lead, 5 parts, and reſin, 1 part.

Plaſter *with Reſin, Litharge*, is formed by melting $3\frac{1}{2}$ lbs. of litharge plaſter by a moderate heat, and adding $\frac{1}{2}$ lb. of yellow reſin finely pulverized, that it may melt quickly, and form a plaſter. (See Emplaſtrum *Adheſivum*.) Theſe plaſters are defenſive, adheſive, and gently ſtimulant; they are uſed for retaining together the lips of recent wounds, when it is propoſed to heal them by the firſt intention; to give ſupport to ulcerated parts; and to aſſiſt their granulation and cicatrization.

Plaſter, *Soap*. (See Emplaſtrum *Saponis*.) The *ſoap plaſter* of the Edinb. pharm. is compoſed of 4 parts of ſemi-vitreous oxyd of lead; 2 parts of gum plaſter, and 1 part of ſoap ſliced. Mix the ſoap with the plaſters melted together; then boil them a little ſo as to form plaſter. Soap plaſter is diſcutient, and is applied to lymphatic tumours; but it is much leſs uſeful than the mercurial plaſter.

Plaſter, *Stomachic*. See Emplaſtrum *Stomachicum*.

PLASTER, *Warm*, is made by melting together, over a gentle fire, one ounce of gum plaſter, and two drachms of bliſtering plaſter; or one part of plaſter of cantharides, and ſeven parts of Burgundy pitch, according to the Dublin pharmacopeia. This is uſeful in catarrh, hooping-cough, the ſciatica, and other fixed pains of the rheumatic kind. It ought, however, to be worn for ſome time, and to be renewed, at leaſt, once a week.

PLASTER, *Wax*, is formed by melting together of yellow wax and of prepared ſuet, of each three pounds; and yellow reſin a pound; and then ſtraining. The *ſimple plaſter*, formerly *wax plaſter* of Edinburgh pharmacopeia, is formed of yellow wax, three parts; mutton ſuet and reſin, of each two parts. Theſe were generally uſed inſtead of the melilot plaſter, as a proper application after bliſters, and in other caſes where a gentle digeſtion is neceſſary; but on account of the pain and irritation they occaſion, they are now ſeldom employed.

PLASTER *of Paris*, is a foſſile ſtone, ſerving many purpoſes in building; and uſed likewiſe in ſculpture, to mould and make ſtatues, baſſo relievos, and other decorations in architecture.

It is dug out of quarries, in ſeveral parts of the neighbourhood of Paris; whence its name. The fineſt is that of Montmartre. See GYPSUM.

Plaſter of Paris, among our workmen, is of two kinds, *viz. crude*, or in the ſtone, and *burnt*, or beaten.

The *crude* is the native plaſter, as it comes out of the quarry; in which ſtate it is uſed as ſhards in the foundations of buildings.

The *burnt* plaſter is a preparation of the former, by calcining it like lime in a kiln or furnace, and then beating it into powder, and diluting and working it. In this ſtate it is uſed as mortar, or cement, in building.

This, when well ſifted, and reduced into an impalpable powder, is uſed alſo to make figures, and other works of ſculpture; and is, beſides, of ſome uſe in taking out ſpots of greaſe, &c. in ſtuffs and ſilks.

The method of repreſenting a face truly in plaſter of Paris is this: the perſon, whoſe figure is deſigned, is laid on his back, with any convenient thing to keep off the hair. Into each noſtril is conveyed a conical piece of ſtiff paper, open at both ends, to allow of reſpiration. Theſe tubes, being anointed with oil, are ſupported by the hand of an aſſiſtant; then the face is lightly oiled over, and the eyes being kept ſhut, alabaſter freſh calcined, and tempered to a thinniſh conſiſtence with water, is by ſpoonfuls nimbly thrown all over the face, till it lies near the thickneſs of an inch. This matter grows ſenſibly hot, and in about a quarter of an hour hardens into a kind of ſtony concretion; which being gently taken off, repreſents, on its concave ſurface, the minuteſt part of the original face. In this a head of good clay may be moulded, and therein the eyes are to be opened, and other neceſſary amendments made. This ſecond face being anointed with oil, a ſecond mould of calcined alabaſter is made, conſiſting of two parts joined lengthways along the ridge of the noſe; and herein may be caſt, with the ſame matter, a face extremely like the original.

If finely powdered alabaſter, or plaſter of Paris, be put into a baſon over a fire, it will, when hot, aſſume the appearance of a fluid, by rolling in waves, yielding to the touch, ſteaming, &c., all which properties it again loſes on the departure of the heat; and being thrown upon paper, will not at all wet it, but immediately diſcover itſelf to be as motionleſs as before it was ſet over the fire; whereby it appears, that a heap of ſuch little bodies as are neither ſpherical, nor otherwiſe regularly ſhaped, nor ſmall enough to be below the diſcernment of the eye, may, without fuſion, be made fluid, barely by a ſufficiently ſtrong and various agitation of the particles which compoſe it; and, moreover, loſe its fluidity immediately upon the ceſſation thereof.

Two or three ſpoonfuls of burnt alabaſter, mixed up thin with water, in a ſhort time coagulate, at the bottom of a veſſel full of water, into a hard lump, notwithſtanding the water that ſurrounded it. Artificers obſerve, that the coagulating property of burnt alabaſter will be very much impaired or loſt, if the powder be kept too long, eſpecially if in the open air, before it is made uſe of; and when it hath been once tempered with water, and ſuffered to grow hard, they cannot, by any burning or powdering of it again, make it ſerviceable for their purpoſe as before. Boyle's Works Abr. vol. i. p. 133. 313. 341.

This matter, when wrought into veſſels, &c. is ſtill of ſo looſe and ſpongy a texture, that the air has eaſy paſſage through it. Mr. Boyle gives an account, among his experiments with the air-pump, of his preparing a tube of this plaſter, cloſed at one end and open at the other, and on applying the open end to the cement, as is uſually done with the receivers, it was found utterly impoſſible to exhauſt all the air out of it; for freſh air from without preſſed in as faſt as the other, or internal air, was exhauſted, though the ſides of the tube were of a conſiderable thickneſs. A tube of iron was then put on the engine; ſo that being filled with water, the tube of plaſter of Paris was covered with it; and on uſing the pump, it was immediately ſeen, that the water paſſed through into it as eaſily as the air had done, when that was the ambient fluid. After this, trying it with Venice turpentine inſtead of water, the thing ſucceeded very well; and the tube might be perfectly exhauſted, and would remain in that ſtate ſeveral hours. After this, on pouring ſome hot oil upon the turpentine, the caſe was much altered; for the turpentine melting with this, that became a thinner fluid, and in this ſtate capable of paſſing like water into the pores of the plaſter. On taking away the tube after this, it was remarkable that the turpentine, which had pervaded and filled its pores, rendered it tranſparent, in the manner that water gives tranſparency to that ſingular ſtone called *oculus mundi*. In this manner, the weight of air, under proper management, will be capable of making ſeveral ſorts of glues penetrate plaſter of Paris; and not only this but baked earth, wood, and all other bodies porous enough to admit water on this occaſion. Phil. Tranſ. N° 122.

Plaſter of Paris, diluted with water into the conſiſtence of a ſoft or thin paſte, quickly ſets or grows firm, and at the inſtant of its ſetting, has its bulk increaſed; for Mr. Boyle has found, that a glaſs veſſel, filled with the fluid mixture, and cloſely ſtopped, burſts while the mixture ſets, and ſometimes a quantity of water iſſues through the cracks.

This expanſion of the plaſter, in paſſing from a ſoft to a firm ſtate, is one of its valuable properties; rendering it an excellent matter for filling cavities in ſundry works, where other earthy mixtures would ſhrink and leave vacuities, or entirely ſeparate from the adjoining parts.

It is probable alſo, that this expanſion of the plaſter might be made to contribute not a little to the elegance of the impreſſions which it receives from medals, &c. by properly confining the ſoft matter, that its expanſion may force it into the minuteſt traces of the figure; the expanſion of the matter doing the ſame office as the preſſure by which the wax is forced into the cavities of a ſeal.

Plaſter of Paris promotes the fuſion of forged iron.

This ſubſtance is commonly uſed for taking caſts and impreſſions from figures, buſts, medals, &c. as it is adapted to the double uſe of making both caſts and moulds for forming them. See *Impreſſions of* Medals.

Plaster *of Paris*, in *Agriculture*, a ſubſtance of the calcareous kind, in combination with the vitriolic acid, which has been ſometimes made uſe of as a manure. See Gypsum and *Sulphate of* Lime.

Plaster, in *Gunnery*, a piece of greaſed leather or rag, uſed by riflemen, &c. to make the ball fit the bore of the piece.

Plaster *Floors*, in *Rural Economy*, ſuch floors as are conſtituted of plaſter, prepared from ſuch lime as poſſeſſes a ſtrong binding property. They are highly uſeful in cottages and farm-houſes, as affording much ſecurity againſt fire. In conſtructing them, it is obſerved, in the firſt volume of Communications to the Board, that the joiſts are laid in the uſual manner; after which a ſort of ſtrong reed, which is found in Huntingdonſhire, is nailed on, upon which the plaſter is applied; but in order to ſave it, there is frequently a thin coat of common lime laid on firſt, to fill up the crevices and inequalities. On this the plaſter is then ſpread out, to the thickneſs of about two inches, being laid on with as much expedition as poſſible. The plaſter is ſold at the kilns in the midland diſtricts, at *6d.* the buſhel: and the expence of laying it on, if burnt and prepared, is *5d.* the ſquare yard; but if to be burnt and prepared by the workmen, about as much more. The floors are ſaid to be excellent and cheap. Where reeds cannot be procured, laths may be made uſe of, but they come much higher. Floors of this ſort are much in uſe in Nottinghamſhire, as well as in Rutlandſhire, at the earl of Winchelſea's, where the upper floors of his farm-houſes are made of it.

Theſe kinds of floors ſhould be more attended to, in conſtructing ſmall houſes both of the cottage and other kinds, as being cheap, readily laid, and at the ſame time ſecure.

PLASTERING, in *Architecture*, is that operation which conſiſts in laying on coats of mortar, variouſly prepared, on the ceilings and walls, &c. of different buildings. This belongs to a claſs of artificers called plaſterers. See Plaster.

Plaſterers' work is of two kinds: namely, ceiling, which is plaſtering upon laths; and rendering, which is plaſtering upon walls. Theſe are meaſured ſeparately. The contents are eſtimated either by the foot, or yard, or ſquare of 100 feet. Inriched mouldings, &c. are rated by running or lineal meaſure. Deductions are to be made for chimnies, doors, windows, &c. But the windows are ſeldom deducted, as the plaſtered returns at the top and ſides are allowed to compenſate for the window opening.

It were much to be wiſhed that this art of plaſtering could be again brought to its ancient perfection. In our beſt buildings the plaſtered walls and cielings crack and fly, and in a little time grow damp, or moulder to decay.

The Romans had an art of rendering their works of this kind much more firm and durable, and there is no reaſon to deſpair of reviving this art by proper trials.

The ancient plaſtering of theſe people preſerved to this time, where it has not met with violent blows or injuries from accidents, is ſtill found as firm and ſolid, as free from cracks or crevices, and as ſmooth and poliſhed on the ſurface, as if made of marble. The bottoms and ſides of the Roman aqueducts were made of this plaſtering, and endured many ages without hurt, unleſs by accidents: witneſs that whereof ſome yards are ſtill to be found on the top of the Pont de Gard, near Niſmes, for the ſupport of which that famous bridge was built to carry water to the ſaid town. The roofs of houſes, and the floors of rooms, at Venice are covered with a ſort of plaſter, made of later date, and yet ſtrong enough to endure the ſun and weather for ſeveral ages, without cracking or ſpoiling, and without much injury from people's feet.

The ſecret of preparing this Venetian plaſter is not among us; but it would be worth while to try whether ſuch a ſubſtance might not be made by boiling the powder of gypſum dry over the fire, for it will boil in the manner of water; and when this boiling or recalcining was over, the mixing with it reſin, or pitch, or both together, with common ſulphur, and the powder of ſea-ſhells. If theſe were all mixed together, and the water added to it hot, and the matter all kept hot upon the fire till the inſtant of its being uſed, ſo that it might be laid on hot, it is poſſible this ſecret might be hit upon.

Wax and oil of turpentine may be alſo tried as additions; theſe being the common ingredients in ſuch cements as we have accounts of as the firmeſt. Strong-ale-wort is by ſome directed to be uſed, inſtead of water, to make mortar of limeſtone of a more than ordinary ſtrength. It is poſſible, that the uſe of this tenacious liquor to the powdered ingredients of this propoſed plaſter, might greatly add to their ſolidity and firmneſs. Phil. Tranſ. N° 93. See Stucco.

PLASTIC, Πλαϛικος, from πλαϛης, of ϖλαϛὶς, or ϖλασσω, *fingo, I faſhion, form*, &c. imports as much as *formative*, or a thing endued with a faculty of forming or faſhioning a maſs of matter after the likeneſs of a living being.

Some of the ancient Epicureans, and perhaps the Peripatetics too, imagine a plaſtic virtue to reſide in the earth, or at leaſt to have anciently reſided therein; and that it was by means of this, and without any extraordinary intervention of a Creator, that it firſt put forth plants, &c. Nay, ſome of them, whether ſeriouſly or not we do not undertake to determine, taught that animals, and even man, were the effects of this plaſtic power.

Some learned modern writers have ſtrenuouſly contended for the doctrine of a plaſtic nature, which they have deſcribed to be an incorporeal created ſubſtance, endued with a vegetative life, but not with ſenſation or thought, penetrating the whole created univerſe, being co-extended with it, and, under God, moving matter ſo as to produce the phenomena, which cannot be ſolved by mechanical laws; active for ends unknown to itſelf, not being conſcious of its own actions, and yet having an obſcure idea of the action to be entered upon. Dr. Cudworth reaſons thus: ſince neither all things are produced fortuitouſly, or by the unguided mechaniſm of matter, nor God himſelf may reaſonably be thought to do all things immediately and miraculouſly, it may well be concluded, that there is a plaſtic nature under him, which, as an inferior and ſubordinate inſtrument, doth drudgingly execute that part of his providence, which conſiſts in the regular motion of matter; yet ſo as that there is alſo, beſides this, a higher providence to be acknowledged, which, preſiding over it, doth often ſupply the defects of it, and ſometimes over-rule it; for as much as this plaſtic nature cannot act electively, nor with diſcretion. This doctrine, he ſays, hath had the ſuffrage of the beſt philoſophers of all ages. Ariſtotle, Plato, Empedocles, Heraclitus, Hippocrates, Zeno, and the Stoics, and the latter Platoniſts and Peripatetics, as well as the chemiſts and Paracelſians, maintained this doctrine.

"If an unintelligent agent," ſays Dr. Price, "can act with ſuch uniformity, and yet ſo variouſly, as to produce the order of the world, and govern its motions; if, for inſtance, it can frame the bodies of plants and animals, or ſo direct its own action as to impel the particles of matter towards one another, in ſuch different directions, and with ſuch different forces in different ſituations, as to be the conſtant cauſe of thoſe laws and powers which obtain in the corporeal univerſe, and on which depend its form and being; if, I ſay, this is poſſible, there is an end of all our reaſonings about cauſes and effects, and of all arguments for deſign and intelligence in the author of nature, taken from its regularity and beauty. It avails nothing to ſay, that this agent acts in ſubordination to the deity, and only in virtue of powers given it by him. For it is not ſuppoſed to be merely an inſtrument in the hands of the deity, which never acts except in conſequence of being firſt acted upon; but what it does, it is ſuppoſed to do properly by a power inherent in itſelf, without wanting any *immediate* direction from the deity; and the very reaſons that have been aſſigned for ſuppoſing ſuch an agent, are, that it is abſurd to think that the deity ſhould be continually employed ſo much in vain, as is neceſſary to be ſuppoſed, if the general laws of the world are derived from his agency; and that it is diſhonouring him to conceive of him as acting himſelf continually on matter, and immediately concerned in framing the bodies of the meaneſt plants and inſects. To as little purpoſe is it to ſay, that omnipotence can give ſuch a power to an unintelligent agent: for what has not wiſdom, *cannot* act wiſely; and no power can make that to be, which *cannot* be. If the deity can make a cauſe that acts without knowledge or deſign to produce regular effects; then it is in the nature of things poſſible for *ſuch* a cauſe to produce *ſuch* effects; then deſign in the cauſe is not *neceſſary* to the greateſt conceivable order and regularity in the effect, nor can we *certainly* infer the one from the other: then, in ſhort, any thing may produce any thing, and no concluſion with reſpect to the cauſe can be drawn, in any caſe, from what we ſee in the effect.—The effects of habits have been very improperly alleged, as affording inſtances of regular action, without knowledge of deſign. For, what is done by habits, is, I think, always done in conſequence of ſome volition or direction of the mind; and our not being conſcious of it is in reality no more than not remembering it, the whole effect of a habit on the executive powers conſiſting in their more eaſy and ready compliance with the dictates of the mind. But not to inſiſt on this; let it be granted that regular actions are frequently performed in conſequence of habits, without thought or deſign: this, if true, muſt be owing to certain powers and laws of the animal economy, which muſt be accounted for in the ſame manner with other powers and laws which obtain in nature, and cannot be made an argument for ſuch a blind plaſtic force as has been contended for, without begging the queſtion. See the truly great and learned Dr. Cudworth's Intellectual Syſtem, book i. ch. 3, where the opinion on which I have made theſe remarks is particularly explained and defended. See alſo an account of a controverſy which it occaſioned between Mr. Bayle and Le Clerc. in the account of the life and writings of Dr. Cudworth, prefixed to the ſecond edition of the Intellectual Syſtem by Dr. Birch. Dr. Henry More and Dr. Grew have likewiſe maintained this opinion." Intell. Syſtem, vol. i. p. 147, &c. Birch's ed. More's Imm. of the Soul, lib. iii. cap. 12. Price's Diff.

PLASTICE, Πλαϛικη, the plaſtic art, a branch of ſculpture; being the art of forming figures of men, birds, beaſts, fiſhes, plants, &c. in plaſter, clay, ſtucco, or the like.

The workmen concerned in this art are alſo called *plaſtæ*, ϖλαϛαι.

Plaſtice differs from carving, becauſe here the figures are made by addition of ſomething that is wanting; but in carving, always by ſubtraction of what is ſuperfluous.

The plaſtic art is now chiefly uſed, among us, in fretwork ceilings; but the Italians apply it alſo to the mantlings of chimnies with great figures.

PLASTRON, in *Ancient Military Armour*, a breaſtplate of forged iron occaſionally put on, under or between the hauberk and gambeſon.

Plastron is alſo a piece of leather ſtuffed, uſed by fencing-maſters, on which to receive the puſhes made at them by their pupils.

PLASWIG, in *Geography*, a town of Pruſſia, in the province of Ermeland; 28 miles N.W. of Heilſberg.

PLAT, a popular term, among *Mariners*, &c. for a ſea-chart.

Plat, in *Rural Economy*, a term provincially applied to the mould-board of a plough.

Plat-*Veins*, in the *Manege*, called in French *ars*, are the veins in which we bleed horſes, one in the lower part of each ſhoulder, when we bleed a horſe in the ſhoulders; and in the flat part of the thighs.

Plats, in a *Ship*, flat ropes made of rope-yarn, and twiſted into *foxes*; they ſerve to ſave the cable from galling in the hawſe, or to wind about the flukes of the anchors, to ſave the pennant of the fore-ſheet from galling againſt them.

PLATA, Plate, in *Commerce*, a Spaniſh term, ſignifying ſilver; as vellon, which they pronounce vellion, ſignifies copper. Theſe two terms are not only uſed to expreſs the ſpecies of thoſe metals ſtruck in Spain, but alſo to diſtinguiſh between their ſeveral monies of account. Plate is reduced to vellon by ſaying, as 17 is to 32, ſo is the given plate to the vellon ſought; and *vice verſâ*. See Exchange; ſee alſo Maravedi and Real.

Plata, *La*, or *Buenos Ayres*, in *Geography*, a vice-royalty belonging to the Spaniſh dominions in South America, erected in 1778 (not in 1776, as ſtated under the article Buenos *Ayres*, from authorities to which we had then acceſs), is one of the moſt important diviſions, and that by which the chief opulence of the Spaniſh dominion in this part of the world paſſes to the parent country, and is interwoven with the commerce and intereſts of Europe. Including the ſavage Chiquitos and Mojos in the north, and extending to the ſouthern limits of Tuyu and the wide plains called the Pampas, its length from the chain of Vilcanota to the vicinity of the river Negro, may be aſſumed from 14° S. lat. to near 38°, that is 24°, or 1440 geographical miles. Eſtalla ſtates the boundary between La Plata and Peru to be now the cordillera of Vilcanota, dividing the province of Carabaya in La Plata from that of Canes and Canches in Peru.

The breadth of La Plata, which is generally pretty equal, may be computed at 12°, or 720 geographical miles. Eſtalla, cited by Pinkerton, computes the extent at 1000 Spaniſh or rather American leagues (ſeeming vaguely to include Chili), and the greateſt breadth at 350, forming a triangle of 1000 leagues in height, on a baſe of 350, equal to 175,000 ſquare leagues; which, as he adds, might ſupport 50,000,000 perſons, while in fact there is ſcarcely one million of civilized inhabitants, and ſome few ſavages. Before the eſtabliſhment of this vice-royalty, the greateſt part of the juriſdiction belonged to that of Peru; although the three provinces of Buenos Ayres, Paraguay, and Tucuman, were conſidered as "Capitanias Generales," that is, the governors had an authority independent of the viceroys of Peru, except in caſes of great importance and difficulty.

The part of Peru now annexed to La Plata was divided into well-known provinces or diſtricts ; and the miſſions of the Chiquitos, Mojos, and Guaranis, formed three diſtinct governments. The form of government in this new vice-royalty remained the ſame, though its title was changed. The ordinance of his Catholic majeſty for the ſub-diviſion of the vice-royalty was iſſued in 1782, and appointed nine intendancies. Eſtalla ſays that this vice-royalty is divided into nine intendancies, namely Buenos Ayres, compriſing the whole of that biſhopric ; the biſhopric of Tucuman embracing two intendancies, that of Salta, and that of Cordova, to which is joined the province of Cuyo-y Mendoza, which, with regard to ſpirituals, is ſubject to the biſhopric of Chili : in former Peru, there are five intendancies, Potoſi, Plata, Puno or Paucarcola, La Paz, and Cochabamba on the S.E. of La Paz ; and from the remaining deſcription, which is rather confuſed, it would appear that Santa Cruz de la Sierra forms the ninth intendancy ; but there is alſo an intendant of Paraguay.

Mr. Pinkerton, for the purpoſe of a geographical deſcription of this vice-royalty, enumerates the principal provinces, proceeding from the ſouth, which are as follow :

1. Pampas,
2. Tuyu,
3. Buenos Ayres,
4. Cordova,
5. Cuyo and Mendoza,
6. Charcas,
7. Guarania,
8. Paraguay,
9. Chaco,
10. Salta,
11. Jujuy,
12. Chichas and Tarija,
13. Lipes,
14. Atacama,
15. Potoſi or Porco,
16. Plata,
17. Santa Cruz de la Sierra,
18. Chayanta,
19. Oruro and Paria,
20. Carangas,
21. Pacajes,
22. La Paz,
23. Cochabamba,
24. Sicaſica,
25. Laricaja and Omaſuyos,
26. Chucuito,
27. Puno or Paucarcola,
28. Lampa,
29. Aſangaro,
30. Carabaya, which is the laſt province of La Plata on the N. of the great lake of Titicaca, ſeparated from the Peruvian province of Canes and Canches by the grand chain of the cordillera called Vilcanota.

Eſtalla has briefly deſcribed the upper and inferior parts of the vice-royalty, as he calls them. The former part is peculiarly rich in the precious metals, yielding only to Mexico in this reſpect, and he particularly mentions the cordillera of Lipes ; and to Porco belong the celebrated mines of Potoſi. The metals of Oruro and Paria are alſo celebrated. The provinces moſt rich in gold are Laricaja and Carabaya ; while thoſe that produce the greateſt quantity of ſilver are Lampa, Puno, Chucuito, Oruro, Chayanta, and Chicas, not to mention Potoſi. Carangas and Pacajes are famous for the breed of pacos, which are uſed as beaſts of burden. Lampa and Aſangaro are noted for the produce of wool, the ſheep in the former being eſtimated at near a million. Theſe diſtricts, together with Chucuito, alſo rear cattle and horſes. In the provinces of Salta and Jujuy mules form a prodigious article of trade, ſuppoſed to yield 200,000 dollars annually. Cochabamba produces abundance of wheat and maize, ſo as to ſupply Oruro, La Paz, and other upland provinces. Santa Cruz de la Sierra, which ranks among the warm regions beneath the chain of mountains, trades in honey, ſugar, and beer. In the lower part of the vice-royalty, Eſtalla obſerves that the province of Buenos Ayres comprehends three other cities beſides the capital, namely, Montevideo, Corrientes, and Santa Fé. The chief products of this province are beeves and mules. For an account of Buenos Ayres, we refer to that article ; here adding ſome particulars which have come to our knowledge ſince that article was written. In conſequence of the creation of the new vice-royalty, there has been a great increaſe of commerce and agriculture, and many other advantages have contributed to its progreſſive proſperity. Formerly its inhabitants had no country-houſes, nor any other fruits than a kind of peach ; but now every perſon in eaſy circumſtances has a country cottage and garden, with a variety of fruits, garden plants, and flowers. The houſes, though not elevated, are convenient and well furniſhed. The women are celebrated among the moſt beautiful in America ; and though their dreſs is leſs expenſive than that of thoſe of Lima, it is more agreeable and elegant. The cathedral has been lately rebuilt ; it has three naves, beſides ſeveral chapels ; and in 1798 it had coſt half a million of dollars, and the expence of completing it would be as much more. A college is opened, that of San Carlos, which is ſaid to contain 100 ſtudents. The eccleſiaſtical eſtabliſhment conſiſts of a biſhop and ſome dignitaries ; the pariſh churches are ſix, and the convents are numerous. Here are two hoſpitals for orphan children, one of which receives foundlings ; and here is alſo an aſylum for women of the town, and in the vicinity are ſeveral hermitages and little chapels. The population, which is daily on the increaſe, is ſuppoſed to be about 40,000 perſons, of whom the whites or Spaniards compoſe one half, the other half conſiſting of negroes, mulattoes, and ſome few Indians from other parts. Of the Spaniards, ſome are creoles, born in the country of white parents, and all are chiefly employed in commerce, the arts, and agriculture, while the people of colour are moſtly ſervants. The merchants form the chief part of the population, and of theſe the greater number is compoſed of ſuch as are not natives. The inhabitants of Buenos Ayres are, according to Eſtalla, of a ſedate turn, affable and polite. A theatre is eſtabliſhed. Bull fights, which were formerly held in the great ſquare, are aboliſhed. Both ſexes are handſome, having agreeable countenances, and wearing the Spaniſh dreſs. The ladies are fond of muſic, with which they amuſe themſelves and their company. Their ſtockings are fancifully embroidered with gold. The religious proceſſions of this city are numerous and ſplendid. From Spain, and chiefly from Cadiz, are imported moſt of the neceſſaries, as ſilks, woollens, cotton, linen, hats, &c. They are debarked at Montevideo, and carried in boats to Buenos Ayres, whence they may paſs to any part of the vice-royalty, paying 4 *per cent.* on the ſale if carried to the frontier provinces, and 6 *per cent.* in other caſes. The merchants are eſteemed men of character and good credit. If Buenos Ayres were not the capital of the province, and at preſent the great mart of Peruvian commerce, its trade would be inconſiderable, becauſe it has no great branch of native exportation. But the fertility of the neighbouring provinces may in time incline the balance in its favour ; and the leather, wool, wheat, tallow, may yield conſiderable revenues to the vice-royalty. The market of Buenos Ayres is abundantly ſupplied with all kinds of plants, fruits, meat, bread, fiſh, fowl, milk, &c. Eſtalla ſays, that nearly 1000 head of cattle are ſlain in the neighbourhood for the daily uſe of the city : fiſh is alſo abundant ; but clear water is wanting. The climate is leſs healthy than that of Montevideo, and the calentures or fevers are pernicious. The city is not deficient in coffee houſes, confectionary ſhops, and taverns ; but ice and ſnow are wanting. The viceroy is lodged in the fortreſs, in which are alſo the new royal audience, the royal treaſury, the chapel, guard-houſe, and various magazines. The guild-hall is a large building, raiſed on pillars of brick, where the judges hold the ſeſſions, and underneath is the gaol. The environs, eſpecially towards Cordova, are pleaſant, being full of gardens and groves, diverſified with fields of wheat and maize. Cattle are abundant. See BUENOS AYRES. For an account of Montevideo, Santa Fé, Corrientes, Potoſi, La Paz, Mendoza, Cordova, Tucuman, Salta, Cuyo, Rioja, the Guaranis, Paraguay, the Pampas, Chucuito, Puno, Oruro, Santa Cruz, Jujuy; ſee the ſeveral articles.

The government of La Plata is entruſted to a viceroy, who has alſo the title of captain-general, with an aſſeſſor, and a fiſcal, and alſo a ſecretary. The juriſdiction of the viceroy comprehends the whole political management, except the royal treaſury, to which his authority does not extend. In the military department he is commander-in-chief under the ſovereign. The aſſeſſor is alſo auditor, or ſupreme judge; and his military juriſdiction is that of captain-general of the veteran troops. The ſalary of the viceroy is 40,000 dollars; but after certain deductions the reſidue is about 30,000. He is nominated for three years. The ſalary of the aſſeſſor, fiſcal, and ſecretary, is between 2 and 3000 dollars each. The viceroy is ſupreme preſident of the royal audience of Charcas, and alſo of the new royal audience, erected in 1785, at Buenos Ayres. He exerciſes the royal vice-patronage, and as ſuch has a grand ſeat and canopy in the cathedral, where he is treated with the ſame ceremonies as are paid to the monarch. The royal treaſury acknowledges as its chief the intendant of the army; he has a ſalary of 10,000 dollars; and he audits all the accompts of the vice-royalty. The eſſential branches of the adminiſtration of the royal treaſury at Buenos Ayres are the cuſtoms, the depoſits of tobacco, the monopoly of which has ſometimes yielded 100,000 dollars a-year, playing cards and ſtamped paper, which are of little conſequence. Similar duties are exacted in the principal cities of the vice-royalty, and 4 *per cent.* ariſes from the ſale of merchandiſe. But the chief branch of the revenue is the duty called *fifths*, though in fact the *tenth* only of all metals. There is alſo a capitation tax from eight to ten dollars, paid by each perſon. However, the royal expences are great: the pay of the military, the charges of the ſales, and the ſalaries of the officers of the cuſtoms and of tobacco, are prodigious. The intendants of the provinces manage in their juriſdictions the adminiſtration of juſtice, of the police, of the revenues, and of war. In Paraguay, Tucuman, and Santa Cruz, they have joined the command of the troops. The governors intendants have a ſalary of 6000 dollars, and 600 for the expence of the ſecretariate and viſiting their province. The intendant of Potoſi, who is alſo director of the mint, and of the bank, has a ſalary of 10,000 dollars. The aſſeſſor, appointed by the king to aſſiſt theſe intendants in the adminiſtration of juſtice, has a ſalary of 1000 dollars, derived from the law-ſuits, and 500 from the treaſury, thoſe of the general intendancy excepted, who have 1000.

Beſides the nine intendancies there are four governments in the vice-royalty of La Plata, *viz.* that of Montevideo, political and military; and thoſe of the Guaranis, Chiquitos, and Mojos, who have great power military and civil. The eſtabliſhments on the Patagonian coaſt, and the Maluinas, or Falkland iſlands, are ſubject to particular inſtructions. Eſtalla computes the population of this extenſive vice-royalty at 1,000,000 Spaniards or creoles, and an inconſiderable number of ſavages. The population of the other two vice-royalties, *viz.* Peru and New Granada, probably does not exceed 2½ millions. That of Caracas, by the account of Depons, amounts to 728,000, including whites, negroes, and Indians; and Chili can ſcarcely exceed the number neceſſary to complete a million. Brazil, by the beſt accounts, contains 200,000 whites, and 600,000 negroes, while the natives are little more than ſufficient to complete another million. The whole number, therefore, will yield 5½ millions; nor can more, it is thought, than 6 millions be allowed for the general population of the whole of South America.

The internal commerce of this vice-royalty is conducted by means of covered carts or ſmall waggons drawn by oxen, and theſe form caravans for ſecurity againſt the attacks of the ſavages. The chief journies are from Buenos Ayres to Jujuy and Mendoza; beyond which ſtations it is neceſſary to have recourſe to mules, as the country becomes mountainous. This trade ſupports many individuals, and increaſes the circulation of money. The freedom of trade, granted in 1778, contributed very much to augment the general commerce of La Plata; and by a royal ordinance of the 10th of April, 1793, it was permitted, that ſalted meat and tallow might paſs to Spain, or the other colonies, free from duties; a privilege, which had before been granted to the trade in negroes, who were found neceſſary for the cultivation of the country.

The increaſe of commerce in this vice-royalty has had a beneficial effect on the agriculture of the country. A royal ſchedule, in 1791, granted to Spaniards and foreigners the right of introducing negroes, and inſtruments of agriculture; nor is it improbable, as our author (Eſtalla) conceives, that this wide and fertile vice-royalty may become, in a few years, not only the granary of the other Spaniſh colonies, but of the parent country, by the extreme fertility of its ſoil, and the excellent regulations that are adopted. The climate is ſingularly benignant, and the extent of fertile lands immenſe, watered by innumerable rivers and rivulets, which join the majeſtic waves of the Paraguay and the Parana. The farms, ſtations, and incloſures for breeding beeves, horſes, mules, ſheep, &c. are already ſo numerous that they may be counted by millions. Salt rivers and lakes, with numberleſs creeks, afford convenience for loading boats with ſalted meat, and the natives are diſtinguiſhed by their activity and induſtry. Some diſtricts of the miſſions produce cotton, lint, and flax; and there are mines of gold at Maldonado and San Luis, 200 leagues from the capital. Although agriculture, fiſhery, the chace, and the mines ſerve to enrich theſe provinces, yet no object is more uſeful than the breeding of cattle, and we may form ſome judgment of the number by that of the ſkins imported. In 1792, 825,609 hides of beeves were carried to Spain, beſides thoſe ſent to the coaſt of Brazil, and for the purchaſe of negroes, &c.

The botany of the provinces of this vice-royalty, which formerly belonged to Peru, may be found in the Flora Peruana; and that of the central, ſouthern, and eaſtern provinces, may be ſupplied from the work of the induſtrious Dobrizhoffer, who has, in his firſt volume, given a general natural hiſtory of Paraguay. For a ſketch of the botany and zoology, ſee PARAGUAY.

The mines form a grand object in the new vice-royalty, and are found chiefly in the provinces formerly conſidered as Peruvian; for, in fact, Charcas, Tucuman, and Buenos Ayres, were all regarded as dependencies of Peru, before the grand change in the year 1778. The upper part of the vice-royalty of La Plata very juſtly deſerves the appellation given to the vice-royalty, as it is the richeſt country in ſilver which has yet been diſcovered on the globe. The mines of gold and ſilver may be ſaid to be innumerable. All the northern provinces teem with mineral opulence: while Laricaja and Carabaya are diſtinguiſhed by virgin gold. (See Potosi.) Beſides gold and ſilver, copper is found at Articoya near Oruro, and in the diſtrict of Lipes. A rich mine of tin is wrought in the diſtrict of Paria; and mines of lead abound in the province of Chichas.

The following is the ſtate of the mines in the new viceroyalty of Buenos Ayres, as reported by Helms.

Provinces.	Gold.	Silver.	Copper Mines.	Tin.	Lead.
Tucuman - -	2	1	2		2
Mendoza - -		1			
Atacama - -	2	2	1		1
Lipes } prov. of Potoſi	2	1	1		1
Porco } prov. of Potoſi	1	2	1		
Carangas - -		2	1		
Pacajes, or Benenguela		1			
Chucuyto - -		2			
Paucarcolla, town Puno		1			
Lampa - -		2			
Montevideo - -	1				
Chichas and Tarija -	4	5			1
Cochabamba - -	1				
Sicaſica - -	2				
Laricaja - -	4				
Omaſuyos - -	4				
Aſangaro - -	3				
Carabaya - -	2	1			
Potoſi - -		1			
Chayanta - -	2	3	1	1	1
Mizque - -		1			
Paria - - -		1		1	1
Total	30	27	7	2	7

The ſame author has given the following ſtatement of the whole coinage in Spaniſh America, from January 1, to December 31, 1790, taken from the official regiſter.

	In Gold.	In Silver.	Total.
	Piaſtres.	Piaſtres.	Piaſtres.
At Mexico	628,044	17,435,644	18,063,688
At Lima	821,168	4,341,071	5,162,239
At Potoſi	299,846	3,983,176	4,283,022
At Santiago Chili	721,754	146,132	887,866
Total	2,470,812	25,906,023	28,376,855

Pinkerton's Geography, vol. iii. ed. 1807.

Plata, *La*, a province of the above deſcribed viceroyalty. Its capital of the ſame name was formerly a city of Peru and the ſee of an archbiſhop. It was built by captain Pedro Anzures in the year 1539, by order of Gonzalo Pizarro, on the ſcite of Chuquiſaca, and called Plata, in alluſion to the ſilver mines of the mountain of Porco in its neighbourhood, from which the Incas obtained great quantities of ſilver. Its ancient name long prevailed, and, as Ulloa ſays, is now commonly uſed. This city ſtands on a ſmall plain environed by eminences, which defend it from the winds. In ſummer the temperature of the air is very mild, nor is there any great difference throughout the year; but in winter, which here begins in September and continues till March, tempeſts of thunder and lightning are very common, and rain is of long continuance. The houſes are covered with tile, having one ſtory beſides the ground floor; they are roomy and convenient, and have delightful gardens planted with the fruits of Europe. Water is ſcarce. The inhabitants conſiſt of Indians and Spaniards, and are ſaid to amount to 14,000. The cathedral is large, of good architecture, and finely adorned with paintings and gildings. The pariſh is ſerved by two prieſts, one for the Spaniards, and one for the Indians. Another pariſh, ſituated at one end of the city, is appropriated to the Indians living within its precinct, and amounting to about 3000. The convents of the Franciſcans, Dominicans, Auguſtines, the fathers of Mercy, and the college of Jeſuits, are ſpacious buildings, with ſplendid churches. Here are alſo two nunneries, and an univerſity dedicated to St. Francis Xavier, the rector of which is always a Jeſuit: and alſo two other colleges, in which lectures of all kinds are read. The magiſtracy conſiſts of regidores, who are perſons of the firſt diſtinction, with a corregidor at their head; from theſe are annually choſen two ordinary alcaldes for ſuperintending the police. Plata was erected into a biſhopric in 1551, and in the year 1608 was raiſed to a metropolis. The juriſdiction of this city includes the imperial town of Potoſi, which ſee. Juan and Ulloa's Voyage, vol. ii. S. lat. 19° 40′. W. long. 66° 46′.

Plata, *Rio de la*, or river of Silver, a river of South America, which is the conjunct flood of the Paraguay, the Pilcomayo, the Parana, and the Uruguay. The main ſtreams are the Paraguay and the Parana, which ſee reſpectively. This river was firſt diſcovered by Juan Dias de Salis, in the year 1515, who ſailed up the ſtream as far as an iſland, which lies in S. lat. 34° 40′. The mouth, nearly 60 leagues broad, is ſuppoſed to have been called La Plata from the great quantity of ſilver found by thoſe who firſt viſited the countries adjacent to its banks; though it was originally called the river Salis, from its firſt diſcoverer, who, obſerving ſome Indian tents as he ſailed up the river, imprudently went on ſhore with ten men, who were all murdered by the ſavages. The river Plata, receiving conſiderable ſtreams, ſometimes ſwells to ſuch a degree, that the banks on each ſide are overflowed, like thoſe of Egypt by the inundation of the Nile, and thus rendered remarkably fertile. The current of the river, where it falls into the ſea, is ſo rapid, that the water is freſh ſome leagues diſtant from its mouth. Its water is alſo clear, ſweet, and wholeſome. It abounds with great plenty and variety of fiſh; and its banks are frequented by a number of very beautiful birds. The diſtance from the conflux of the Paraguay and Parana to the mouth of the river is near 600 miles, and this interval is interſperſed with delightful iſlands, and navigable by the largeſt ſhips. See Parana.

Plata, *La*, a ſmall iſland in the Pacific ocean, near the coaſt of Peru. S. lat. 1° 10′.

Plata, *La*, or *Sebaſtian del Oro*, a town of South America, in the province of Popayan; 60 miles E. of Popayan. N. lat. 2° 50′. E. long. 75°.

Plata *Keys*, a large ſand-bank among the Bahama iſlands, about 40 miles N. of Hiſpaniola.

PLATÆ, a word uſed by ſome anatomical writers to expreſs the ſcapulæ.

PLATÆA, in *Ancient Geography*, an iſland of the Mediterranean, on the coaſt of Lybia, whither, according to Herodotus, the Cyrenians ſent a colony. It was ſituated on the coaſt of the Giligames, in the midway between that coaſt and the iſle of Aphrodiſias. Scylax places it on the coaſt of Marmarica.

PLATÆÆ, a town of Greece, in Bœotia. Homer writes this name in the ſingular Πλάταια, Platæa; but the hiſtorians write it Πλαταιαί. It was ſituated on the river Aſopus,

Aſopus; and ſeems to have derived its name from Platea, the daughter of an ancient king of the country, who had given his own name to the river Aſopus.

The firſt military exploit of the Platæans, of which we have any knowledge, occurred at Marathon, where they effectually aided the Athenians; they afterwards diſtinguiſhed themſelves on many occaſions; but after having experienced the calamities of many wars, and having been frequently driven from their city and recovered it, their ruin was accelerated by Philip, after his victory in the battle of Cheronæa. Near the walls of this city was the tomb of thoſe Platæans who had fallen in combating againſt the Perſians. The other Greeks had alſo a common ſepulchre, whilſt the Athenians and Lacedæmonians had another apart for themſelves. Jupiter *Liberator* had an altar near the common burying place of the Greeks; both the robes and the ſtatue of the god were of white marble. The Platæans inſtituted games, which they celebrated every fifth year, on which occaſion they ran armed before the altar of Jupiter. The temple of Juno was very ſplendid and highly ornamented; her ſtatue was of an extraordinary ſize, and executed by Praxiteles of Pentelician marble. Minerva had alſo a temple at Platæa, which had been erected of the ſpoils gained from the Perſians in the battle of Marathon. Her ſtatue was the work of Phidias, and was not leſs in ſize, than that of bronze in the citadel at Athens. In this city was alſo the tomb of Leitus, who was the only Bœotian chief who returned from the ſiege of Troy.

PLATALEA, the *Spoon-bill*, in *Ornithology*, a genus of birds of the order Grallæ. The generic character is this: the bill is long and thin; the tip dilated, orbicular, flat; the noſtrils are ſmall, and at the baſe of the bill; tongue ſhort, pointed; the feet are four-toed and ſemi-palmate. There are three

Species.

* Leucorodia; White Spoon-bill. Body white; chin black; hind-head ſub-creſted. The bill is black, brown, or ſpotted; tongue heart-ſhaped; irids grey; lores, orbits, and naked dilatable chin black; quill-feathers ſometimes tipt with black; the legs are black. There are two varieties of this ſpecies, of which the *firſt* has the wings varied with black and white, the legs yellowiſh; in the *ſecond* the body is all white; legs fleſh-colour. The white or common ſpoon-bill weighs about three pounds and a half, and meaſures two feet eight inches in length. It inhabits from the Feroe iſlands to the Cape of Good Hope; it is rarely ſeen in England, but its appearance is ſufficiently frequent to juſtify us in placing before it the aſteriſk. It lives on graſs, carices, the roots of reeds, ſerpents, frogs, muſcles, and other ſhell fiſh; but eſpecially on fiſhes, which it often ſeizes from other birds. It makes its neſts in high trees, near to the ſea, and lays three or four white eggs, ſpeckled with pale red ſpots. The fleſh of the young ſpoon-bill is reckoned very good, little inferior to that of the gooſe.

Ajaja; Roſeate Spoon-bill. Body roſe coloured; tail-coverts ſcarlet. There is a variety blood-red; neck white; collar black; tail-feathers ſcarlet. It inhabits South America, and is twenty-ſeven inches long.

Pygmæa; Dwarf Spoon-bill. Body above brown, beneath white. It is only the ſize of a full-grown ſparrow, and is found in Guiana and Surinam.

PLATAMON, a word uſed to expreſs a low and ſmooth rock, juſt appearing above water.

PLATAMONE, in *Geography*, a town of European Turkey, in Macedonia, at the mouth of the river Jenicoro; 44 miles S.S.E. of Edeſſa.

PLATANAL, a ſmall iſland in the Spaniſh main, near the coaſt of Darien. N. lat. 9° 6′. W. long 80° 40′.

PLATANARIA, in *Botany*, a name by which ſome authors have called the *ſpargarium*, or burr-reed, from its round echinated fruit, which in ſhape and ſize much reſemble thoſe of the platanus.

PLATANI, in *Geography*, a river of Sicily, which riſes near Caſtro Nuovo, and runs into the ſea, 10 miles S. of Sacca.

PLATANUS, in *Ancient Geography*, a town of Aſia, in Syria; ſituated on the weſtern bank of the river Orontes, E. of mount Caſius, towards N. lat. 35° 50′.—Alſo, a town of Phœnicia, placed by M. d'Anville between Berytus and Sidon, in the vicinity of Libanus.

Platanus, in *Botany*, the claſſical name of the Plane-tree, adopted by the Romans from the Greeks, whoſe πλατανος was derived from πλατυς, *broad*, in alluſion to the wide ſpreading branches, and umbrageous foliage, of this noble and favourite tree.—Linn. Gen. 498. Schreb. 649. Willd. Sp. Pl. v. 4. 473. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 5. 304. Purſh North Amer. v. 2. 635. Juſſ. 410. Lamarck Illuſtr. t. 783. Gærtn. t. 90.—Claſs and order, *Monoecia Polyandria*. Nat. Ord. *Amentaceæ*, Linn. Juſſ.

Gen. Ch. Male flowers compound, diſpoſed in a globular catkin. *Cal.* A few ſlight minute ſegments. *Cor.* ſcarcely diſcernible. *Stam.* Filaments oblong, ſwelling upwards, coloured; anthers ſquare, ſurrounding the lower part of the filament.

Female flowers numerous, forming a globe, on the ſame tree. *Cal.* of ſeveral minute ſcales. *Cor.* Petals ſeveral, concave, oblong, club-ſhaped. *Piſt.* Germens ſeveral, awl-ſhaped, ending in awl-ſhaped ſtyles; ſtigma ſimple, recurved. *Peric.* none; ſeveral fruits are collected together into a globe. *Seed* roundiſh, tapering at the baſe, crowned with the awl-ſhaped permanent ſtyle, the bottom of the ſeed being ſurrounded with copious capillary down.

Obſ. Linnæus ſubmits his deſcription of the flowers to the more attentive ſcrutiny of "ſome lynx-eyed obſerver," but no one as yet has taken up the challenge. Mr. Bauer's fine drawing of *P. orientalis*, for the Flora Græca, has no male flowers.

Eſſ. Ch. Male, Catkin globoſe. Calyx and corolla obſolete. Anthers ſurrounding the filament.

Female, Catkin globoſe. Calyx of many leaves. Corolla none. Stigma recurved. Seed club-ſhaped, pointed by the ſtyle, briſtly at the baſe.

1. P. *orientalis*. Oriental Plane Tree. Linn. Sp. Pl. 1417. Willd. n. 1. Ait. n. 1. (Platanus; Ger. Em. 1489. Matth. Valgr. v. 1. 120. P. orientalis verus; Duham. Arb. v. 2. 172. t. 33.)—Leaves palmate, five-lobed; wedge-ſhaped at the baſe: ſegments lanceolate, ſinuated: ribs pedate. Stipulas nearly entire.—Native of the Levant.—A ſpecimen in the Linnæan herbarium was gathered by Haſſelquiſt, from a remarkably large tree, in the iſland of Cos, now Stanchio, the circumference of whoſe trunk was thirteen and a half Swediſh ells, about eight yards and a half. This beautiful ſpecies is among the earlieſt exotic trees recorded to have been cultivated in Britain, being mentioned by Turner in 1548; but the great lord Bacon appears to have been the firſt who planted it in any abundance. The Greeks and Romans eſteemed this tree very highly for its ſhade, as well as beauty. About the Roman villas it was always planted, and ſometimes honoured, rather than benefited perhaps, with libations of wine. Some ancient trees of this kind are reported to have attained a more ample ſize than the

above. The fineſt Oriental Plane, we believe, in England, ſtands at one corner of Chelſea garden, raiſing its round head far above all neighbouring objects. Miller ſpeaks of this as the Maple-leaved variety, now made a ſpecies, ſee n. 3; and he aſſerts, that young plants, which ſprung from its ſeeds, proved of the common ſort. We have no opportunity at preſent of inveſtigating this point. An elegant ſpecimen of the Oriental Plane, whoſe ſpreading branches are feathered down to the ground, ſtands near the temple in the arboretum at Kew. In Germany, this ſpecies is not hardy enough to attain the ſize of a tree. The *branches* of *P. orientalis* are round, ſmooth, ſlightly zigzag. *Leaves* deciduous, alternate, on longiſh, round, downy *ſtalks,* rather deeply palmate, about a ſpan wide, with five lanceolate, more or leſs deeply or copiouſly ſinuated, lobes, whoſe points are callous or glandular, and ſomewhat incurved: both ſides are ſmooth, with pedate ribs, and innumerable fine veins: in an early ſtate only, the leaves are clothed with mealy deciduous down. *Stipulas* tubular, ſurrounding the branch, with a ſpreading border, more entire in this ſpecies than the reſt. *Buds,* as in the whole genus, encloſed in the hollow baſe of each *footſtalk,* ovate, obtuſe, compreſſed, quite concealed till the leaves fall. By their ſwelling, the buds promote the ſeparation of the footſtalks. *Flowers* in three or four globular heads on each long drooping ſtalk, appearing in April and May. *Stigmas* crimſon. Each globe of ripe *fruit* is an inch or more in diameter.

2. P. *cuneata.* Wave-leaved Plane Tree. Willd. n. 2. Ait. n. 2. (P. orientalis undulata; Ait. Hort. Kew. ed. 1. v. 3. 364.)—Leaves three or five-lobed, toothed; wedge-ſhaped and elongated at the baſe; triple-ribbed, nearly ſmooth.—Gathered by Haſſelquiſt in the Levant. Miller is ſaid to have cultivated it in 1739. In ſome points this anſwers to his "Spaniſh, or Middle Plane Tree;" but we find great difficulty in applying with certainty the Engliſh names of this genus, which are in uſe amongſt nurſery-men. The *leaves* in our wild ſpecimen are remarkably wedge-ſhaped, and elongated at their baſe; in conſequence of which there are only three principal ribs, of which the lateral ones are ſeldom preciſely oppoſite: the lobes are three, ſtrongly ſinuated, but not ſeparated ſo far as the middle of the leaf. *Footſtalks* long. Miller deſcribes them ſhort, and covered with ſhort down, in his Spaniſh Plane, which character anſwers to another ſpecimen in the Linnæan herbarium from Burgundy, reſembling the true *orientalis,* except in its ſhort *footſtalks,* and ſtrongly toothed *ſtipulas.* This ſpecimen may be a nondeſcript ſpecies. The leaf in Duham. Arb. v. 2. t. 34. given for the following, repreſents our plant very well.

3. P. *acerifolia.* Maple-leaved Plane Tree. Willd. n. 3. Ait. n. 3. (P. orientalis aceris folio; Tourn. Cor. 41.)—Leaves heart-ſhaped, five-lobed, ſmooth, diſtantly toothed; abrupt and three-ribbed at the baſe.—Native of the Levant, where it was noticed by Tournefort. The Hort. Kew. mentions this ſpecies as cultivated here before 1724. Willdenow ſays it is hardy, forming a lofty tree, in Germany, and that it is known from all the reſt by the *leaves* being abrupt, not wedge-ſhaped at the baſe, and having their two lateral ribs ſpring from the top of the *footſtalk,* unaccompanied by any leafy expanſion beyond them. He adds, that they are extremely like thoſe of the Sugar Maple, *Acer ſaccharinum.* We have no ſpecimen that anſwers to this deſcription, nor does Duhamel's t. 34, given as Tournefort's plant, agree with Willdenow's account.

4. P. *occidentalis.* American Plane Tree. Linn. Sp. Pl. 1418. Willd. n. 4. Ait. n. 4. Cateſb. Carolin. v. 1. 56. t. 56. Duham. Arb. v. 2. 172. t. 35.—Leaves with five angles, ſlightly lobed, toothed; wedge-ſhaped at the baſe; downy beneath.—Native of the banks of rivers in North America, from Canada to Florida, as well as in Louiſiana. Mr. Purſh ſays this is perhaps the largeſt North American tree, ſome individuals, on the fertile banks of the Ohio and Miſſiſippi, meaſuring from ten to ſixteen feet in diameter. It is known by the names of Button-wood, Water Beech, Sycamore, and Plane Tree; in Canada by that of Cotton Tree. This Plane has been cultivated in England about 180 years, and is uſually hardy with us, as well as in Germany, flowering like the other ſpecies in April and May; but the winter of 1810, or ſpring of 1811, was fatal or injurious to moſt of the Occidental Planes in England, owing perhaps to tranſient cold, not generally obſerved, at ſome critical period of the growth of theſe trees in particular. The broad, ſlightly lobed foliage diſtinguiſhes this ſpecies readily from all the reſt. The three or five principal ribs have a conſiderable leafy, though ſcarcely wedge-ſhaped, expanſion below the point of their union. The *ſtipulas* are wavy, with blunt ſhallow teeth. *Footſtalks* rather ſhort, downy.

Platanus, in *Gardening,* contains plants of the exotic deciduous tree kind, of which the ſpecies cultivated are; the oriental plane tree (P. orientalis); and the American plane tree (P. occidentalis).

Of the firſt ſort there are two varieties, as the *maple-leaved,* which has not its leaves ſo deeply cut as thoſe of the eaſtern plane: they are divided into five ſegments, pretty deep, but are not lobed, like thoſe of the occidental plane. The petioles are much longer than in either of the ſpecies, and the upper ſurface of the leaves is rougher, ſo that they might be taken for different ſorts, if it was not known that they roſe from the ſame ſeeds.

The *Spaniſh* plane, which has larger leaves than either of the ſorts, and are more divided than thoſe of the occidental, but not ſo much as thoſe of the oriental. Some of the leaves are cut into five, and others into three lobes only; theſe are ſharply indented on the edges, and are of a light green; the footſtalks are ſhort, and covered with a ſhort down. This is by ſome called the middle plane tree, from the leaves being of a ſhape between the two ſpecies.

Method of Culture.—Theſe plants may be increaſed by ſeed, layers, and cuttings; but principally in the two laſt methods.

The beſt ſeaſon for ſowing the ſeed is autumn, if they can be procured, otherwiſe in the ſpring, upon a ſomewhat lightiſh mellow ſoil: the ground having been dug and raked, it ſhould be formed into four-feet wide beds, and the ſeeds then ſcattered evenly on the ſurface, and raked in, or with the back of a rake the earth be previouſly trimmed off the ſurface near half an inch deep into the alleys; then ſowing the ſeed, and directly with the rake turned the proper way, drawing the earth evenly over the ſeeds, and trimming the ſurface ſmooth, when many of the plants will riſe in ſpring, but probably not generally till the ſpring following. When they are one or two years old, they ſhould be planted out in nurſery-rows, two feet aſunder, and about half that diſtance in the lines; to remain till of a proper ſize for being finally ſet out.

In the layer method, ſome ſtout plants muſt be planted for ſtools, which in a year after muſt be headed down near the bottom, that they may throw out many ſhoots near the ground convenient for laying; which, in the autumn after they are produced, ſhould be laid down by ſlit-laying; and by the autumn after they will be well rooted, and form plants two or three feet high, which may be ſeparated, and planted in nurſery rows, as the ſeedlings. They ſucceed very readily in this way.

Moſt of the ſorts take tolerably by cuttings of the ſtrong young ſhoots; but the latter more freely than the former kinds. The moſt proper ſeaſon for planting them is the autumn, as ſoon as the leaf falls, or occaſionally in the ſpring; chooſing a moiſt ſoil for the purpoſe, when many of the cuttings will grow, and make tolerable plants by the autumn following.

Theſe laſt two methods are the only ones in order to continue the diſtinct varieties effectually.

Theſe trees have a very ornamental effect in all ſorts of plantations, from their large growth and the great ſize of their leaves.

PLAT-BAND, a border or bed of flowers, along a wall, or the ſide of a parterre; frequently edged with box, &c.

PLAT-BAND, in *Architecture*, is any flat ſquare moulding, whoſe height much exceeds its projecture.

Such are the faces, or faſciæ, of an architrave, and the plat-bands of the modillions of a cornich.

The plat-band is ſignified in Vitruvius, and others, by the words *faſcia*, *tænia*, and *corſa*.

PLAT-BAND of a door or window, is uſed for the lintel, where that is made ſquare, or not much arched.

Theſe plat-bands are uſually croſſed with bars of iron when they have a great bearing: but it is much better to eaſe them by arches of diſcharge built over them.

PLAT-BANDS of flutings, the liſts, or fillets, between the flutings of columns.

PLATE, in *Commerce*, denotes gold or ſilver wrought into veſſels for domeſtic uſes.

PLATE, in *Geography*, a town of Hinder Pomerania, on the Rega; 22 miles S. of Colberg. N. lat. 53° 49′. E. long. 15° 17′.

PLATE, in *Heraldry*, is a round flat piece of ſilver, without any impreſſion; but, as it were, formed ready to receive it.

The term is uſed only by the Engliſh heralds. In other nations they are known by the name of *beſants argent*.

PLATE-*Mail*, in *Ancient Armour*. See MAIL.

PLATE-*Armour*, formed of ſmall round plates of iron, like the ſcales of a fiſh, was known and uſed among the ancients. There are many ſpecimens of Roman plate armour in the muſeums of curious collectors. If the ſuit of armour, ſhewn in the Tower of London, be really what it is ſaid to have been, the armour of John de Courcy, earl of Ulſter, in Ireland, brought with him to the Tower; it will prove that plate-armour was in uſe as early as 1204, the date of his confinement. The general prevalence of it was checked by the large ſum which a complete ſuit of plate-armour coſt. It was, however, introduced both here and in France into more common uſe about the middle of the 14th century.

PLATE, a term uſed by our *Sportſmen*, to expreſs the reward given to the beſt horſe at our races.

The winning of a plate is not the work of a few days to the owner of the horſe, but great care and preparation are to be made for it, if there is any great dependence on the ſucceſs. A month is the leaſt time that can be allowed to draw the horſe's body clear, and to refine his wind to that degree of perfection that is attainable by art.

It is firſt neceſſary to take an exact view of his body, whether he be low or high in fleſh; and it is alſo neceſſary to conſider whether he be dull and heavy, or briſk and lively when abroad. If he appear dull and heavy, and there is reaſon to ſuppoſe it is owing to too hard riding; or, as the jockies expreſs it, to ſome greaſe that has been diſſolved in hunting, and has not been removed by ſcouring, then the proper remedy is half an ounce of diapente, given in a pint of good ſack; this will at once remove the cauſe, and revive the creature's ſpirits. After this, for the firſt week of the month, he is to be fed with oats, bread, and ſplit beans, giving him ſometimes the one, and ſometimes the other, as he likes beſt; and always leaving ſome in the locker, that he may feed at leiſure when he is left alone. When the groom returns at the feeding time, whatever is left of this muſt be removed, and freſh given; by this means the creature will ſoon become high ſpirited, wanton, and full of play. Every day he muſt be rode out an airing, and every day it will be proper to give him a little more exerciſe; but not in ſuch a degree as to make him ſweat too much.

The beans and oats in this caſe are to be put into a bag, and beaten till the hulls are all off, and then winnowed clean; and the bread, inſtead of being chipped in the common way, is to have the cruſt clean cut off.

If the horſe be in good fleſh and ſpirits when taken up for its month's preparation, the diapente muſt be omitted; and the chief buſineſs will be to give him good food, and ſo much exerciſe as will keep him in wind, without overſweating or tiring his ſpirits. When he takes larger exerciſe afterwards, towards the end of the month, it will be proper to have ſome horſes in the place to run againſt him. This will put him upon his mettle, and the beating them will give him ſpirits.

This, however, is to be cautiouſly obſerved, that he has not a bloody heat given him for ten days or a fortnight before the plate is to be run for; and that the laſt heat that is given him the day before the race, muſt be in his clothes: this will make him run with greatly more vigour when ſtripped for the race, and feeling the cold wind on every part. In the ſecond week, the horſe ſhould have the ſame food and more exerciſe: and in the laſt fortnight he muſt have dried oats, that have been hulled by beating; after this they are to be wetted in a quantity of whites of eggs, beaten up, and then laid out in the ſun to dry; and when as dry as before, the horſe is to have them. This ſort of food is very light of digeſtion, and very good for the creature's wind. The beans in this time ſhould be given more ſparingly, and the bread ſhould be made of three parts wheat, and one part beans. If he ſhould become coſtive under this courſe, he muſt then have ſome ale and whites of eggs beaten together: this will cool him, and keep his body moiſt.

In the laſt week the maſh is to be omitted, and barley-water given him in its place; and every day, till the day before the race, he ſhould have his fill of hay; then he muſt have it given him more ſparingly, that he may have time to digeſt it; and in the morning of the race day, he muſt have a toaſt or two of white bread, ſoaked in ſack, and the ſame juſt before he is led out of the field. This is an excellent method, becauſe the two extremes of fullneſs and faſting are at this time to be equally avoided; the one hurting his wind, and the other occaſioning a faintneſs that may make him looſe. After he has had his food, the litter is to be ſhook up, and the ſtable kept quiet, that he may be diſturbed by nothing till he is taken out to run. See RACING.

PLATES, in *Gunnery*. The *priſe*-plates, are two plates of iron on the cheeks of a gun-carriage, from the cap-ſquare to the centre, through which the priſe-bolts go, and on which the hand-ſpike reſts, when it poiſes up to the breech of the piece. *Breaſt*-plates are the two plates on the face of the carriage, one on each cheek. *Train*-plates are the two plates on the cheeks at the train of the carriage. *Dulidge*-plates are the fixed plates on the wheel of a gun-carriage, where the fellows are joined together, and ſerve to ſtrengthen the dulidges.

Plates, *Copper*, in *Engraving*. See Copper-*Plates*.

Plates, *Ground*, in *Building*. See Ground-*Plates*.

Plates, *Pintle*. See Pintle.

Plate-*Glaſs*. See Glass.

Plates, *Colours of Glaſs*. See Colours.

Plate-*Knees*, in *Ship Building*, are iron knees, made of flat bars of iron, about one inch thick, and four inches broad; the arms are bolted through the end of the beam, and a chock of oak under the beam, which is firſt bolted through the ſhip's ſide. This method of connecting the beams to the ſide is an excellent ſubſtitute for wood hanging-knees.

Plate-*Longe*, in the *Manege*, a woven ſtrap, four fathoms long, three fingers broad, and as thick as one. It is uſed for raiſing a horſe's legs, and ſometimes for taking him down, in order to facilitate ſeveral operations of the farrier. Some improperly give the name of plate-longe to the martingale.

PLATEA, in *Ornithology*, the name of a bird of the long-necked kind, approaching to the nature of the ſtork and heron, and called in Engliſh the ſpoon-bill. See Platalea.

PLATED Manufacture, in the *Arts*. From the valuable properties poſſeſſed by ſilver as a metal, it is much to be regretted that it is not ſufficiently plentiful, ſo as to be uſed for the fabrication of ſuch articles as are liable to corroſion; more eſpecially ſuch utenſils as are employed for culinary purpoſes. This deſirable object has given riſe to the deſideratum of covering ſome of the cheaper metals with ſilver, and this art has always been known by the name of plating.

The art of plating with ſilver appears to have been firſt applied to articles made of braſs, after they were in other reſpects finiſhed. It is known by the name of French plating, and was formerly much uſed for braſs candleſticks. After the goods were poliſhed, and perfectly free from greaſe, and indeed any other extraneous matter, the part to be plated was heated to a temperature ſomething ſhort of changing the colour of the metal. Leaf ſilver was now laid upon the part, and, while hot, was rubbed on with a hardened ſteel burniſher, perfectly dry and clean. By this means the ſilver adhered firmly to the braſs, which, from the action of the burniſher, aſſumed a fine poliſh. Theſe had much the appearance in colour and luſtre of thoſe of the preſent day. They poſſeſſed but little permanence, owing to the thinneſs of the covering. This art is ſcarcely now practiſed, from the introduction of the ſuperior plan of plating upon ingots of copper, and forming the utenſils out of the ſheets and wire made from the ingots. This latter is at preſent carried on to an immenſe extent in Sheffield, and alſo at Birmingham, but on a leſſer ſcale.

The inventor of this method of making plated articles was not aware of its great importance. He began by making it into ſnuff-boxes, and other trifling articles. It afterwards was extended to the manufactory of pints and tankards, and other articles, by a Mr. Hancock, who erected a mill near Sheffield for rolling the ingots. This mill is at preſent employed for this purpoſe by the ſon of the above gentleman.

The plated manufacture is divided into three departments, in each of which a diſtinct ſet of workmen is employed.

Thoſe workmen employed in making veſſels, ſuch as are required to be raiſed by the hammer, are called braziers, probably from braziers being firſt employed in it.

The next are called candleſtick makers, being excluſively employed in making all the varieties of theſe articles.

The next and laſt are called pierce-workers: theſe were originally employed in making articles with ornamental open work, ſuch as bread-baſkets, and trays of different kinds.

This open work was formed by piercing the ſubſtance with punches of different ſhapes, by means of a ſcrew-preſs called a fly.

This ſpecies of work is now become obſolete, ſince the invention of plated wire. The articles in which pierce-work had been made, are now formed by the varied interſections of wires, which give great lightneſs and elegance, with leſs waſte and more expedition. The workmen employed in this department are ſtill called pierce-workers.

Previouſly to deſcribing particularly the different branches of this art, we ſhall give the method of preparing the plated ſheets and wire of which all the different articles are made.

The ingots on which the ſilver is laid are not pure copper, but an alloy, conſiſting of copper and braſs; this gives it a degree of ſtiffneſs greater than that of copper, which renders it leſs liable to be deformed when in uſe.

Fig. 12. in *Pl. Plated Manufacture*, repreſents a ſection of the furnace uſed for melting the alloy for the purpoſe of caſting. The crucibles are thoſe made at Chelſea with black-lead. The ingot-moulds are of caſt-iron, conſiſting of two pieces, faſtened together by two rings, with wedges, the interior being of the ſhape of a parallelepipedon, about three inches broad, 1½ in thickneſs, and about eighteen or twenty long. The mouth-piece, into which the metal is poured, makes an angle with the length of the cavity; ſo that when the mould is placed on the ground, with the narrow ſide uppermoſt, and makes an angle with the horizon of about ten degrees, the mouth-piece points directly upwards. The inclination of the mould and the length of the mouth-piece are to give a certain head of liquid metal, which determines the impurities of leſs ſpecific gravity than the metal to riſe into the cavity of the mouth-piece, in order to inſure the ſoundneſs of the ingot. If this were not attended to, the ſheets rolled from ſuch ingots would abound with ſeams and looſe places. It is eaſy to ſee that a ſmall hole in the ingot would be the ſource of a ſeam by extenſion, and a larger cavity would have the effect of making hollow places in the ſubſtance of the ſheet, which frequently peel off with the ſilver after plating.

The proper heat of the metals, and the temperature of the mould when the metal is poured, are of great importance, as far as regards the ſoundneſs of the ingot. When the metal is too cold, and its liquidity of courſe imperfect, the impurities cannot freely aſcend, which cauſes imperfection in its ſubſtance. The ſame effect may take place from the moulds being cold: this, with the great conducting power of the metal mould, rapidly robs the metal of its caloric, and leſſens its liquidity. The proper heat for the moulds is ſomething ſhort of burning the fat with which they are greaſed on the interior ſurface. The preſence of fat which contains hydrogen has a happy effect in preventing the ſurface being rough. Its preſence is therefore eſſential, and hence the moulds ſhould never be ſo hot as to deſtroy it. On the other hand, the metal ſhould not be too hot, as in this caſe it remains longer in the liquid ſtate than is proper: this has the effect of allowing the metal to aſſume a more complete cryſtalline arrangement than under ordinary circumſtances. When an ingot under ſuch circumſtances is broken, the cryſtals are very diſtinct. The ſheet rolled from an ingot ſo caſt, will be found to exhibit on its ſurface very thin looſe pieces, which peel off. This is frequently a ſource of great miſchief to the manufacturer. After the pieces are plated and rolled, this laſt inconvenience is frequently ſo great, as to render the whole ſheet uſeleſs, except to work over again.

It will be remembered, from what we obſerved reſpecting the temperature of the ingot moulds, that the proper heat for the metal can only be acquired by practice. Men of ſome talent and obſervation ſhould have the management of caſting and plating. It is notorious, however, throughout the trade, that the men employed in this eſſential department are generally taken from the claſs of common labourers.

The beſt teſt for the proper degree of heat of the metal is its colour, and the appearance of liquidity. When it firſt fuſes it appears ſtiff, and of the colour of the red cokes of the furnace: with a greater heat it becomes more liquid, and aſſumes a blueiſh colour. This latter is the proper ſtate for pouring it into the mould. If the heat be greater, the zinc of the braſs, and perhaps the copper itſelf, begins to burn. This ariſes from the metal's aſſuming the form of vapour, which combines with the oxygen of the atmoſphere. When the metal has become ſolid in the mould, the wedges which keep the two halves of the mould together are ſlackened, to prevent the ingot from breaking, by its contraction, during cooling. When it is taken from the mould its ſurface ought to be ſmooth and metallic. Its fracture ſhould exhibit a rough uniform cryſtallization, in which the cryſtals preſent ſmall ſurfaces. If the cryſtals appear diſtinct, with large faces, the metal will be ſhelly when rolled.

For the ordinary kind of work theſe ingots are generally cut in two in the middle, being more convenient for plating than longer pieces.

The next proceſs is to dreſs the face of the ingot for the purpoſe of receiving the ſilver, on one or both ſides, as it may be intended to be ſingle or double plated. This is effected by filing, which is continued till the ſurface becomes entirely free from the leaſt blemiſh. This is ſo important, that the naked eye ſhould not be depended upon. A very ſmall hole in the ingot would become a ſurface on rolling, and the ſilver would come off in that part. The ſurface of the copper ſhould, therefore, be minutely examined by a magnifier before the ſilver is laid on. The thickneſs of the ſilver to be laid on the copper will be beſt known, when it is underſtood, that the ſilver, in ſingle plated metal, or that plated on one ſide only, is from 8 to 10 pennyweights to the pound troy of copper; and, of courſe, double that quantity when plated on both ſides. If the ingot of copper be $1\frac{1}{4}$ thick, the ſilver plate to be laid upon it, at eight pennyweights to the pound, will be $\frac{1}{32}$ of an inch, and a ſquare inch of it will weigh about 90 grains. When the plate of ſilver is cut to a little leſs than the ſize of the copper ſurface, made flat, and ſcraped perfectly clean, the copper ſurface being equally clean, they are laid together, and the ſilver plate is tied down with wire. A little of a ſaturated ſolution of borax is now inſinuated under the edge of the ſilver plate on every ſide: this fuſes at a low red heat, and prevents the oxygen of the atmoſphere from affecting the ſurface of the copper, which would prevent the adherence of the ſilver. In this ſtate the ingot is brought to the plating furnace.

In *fig.* 12. B is an iron door, with a ſmall hole to look through. This furnace has a grate on a level with the bottom of the door. The fuel conſiſts of cokes. The ingot is laid upon the bare cokes, and the door ſhut. When it has acquired nearly a proper degree of heat, the plater applies to the hole in the door to obſerve the proper point, when the proceſs is finiſhed. When the ſilver and copper are uniting, the ſurface of the former begins to be rivetted, and this is the ſign to remove the ingot from the fire as quick as poſſible. If it were allowed to ſtop longer, the ſilver would become alloyed with the copper, and completely ſpoiled.

In this proceſs, the ſilver is, in fact, ſoldered to the copper, although no ſolder is expreſsly employed. It is well known to chemiſts, that an alloy of ſilver and copper, as well as many other alloys, is more fuſible than either of the ſimple metals. From what takes place in the above proceſs, it will be eaſily inferred, that a portion of ſilver and copper unite at contiguous ſurfaces, which fuſing before the ſilver or the copper, unite the ſilver with the copper. The ingot, being now plated, is made perfectly clean, and is ready to be rolled. The firſt rollers employed for plated metal are of caſt-iron, ſimilar in ſize and conſtruction to thoſe employed for ſheet iron and ſheet copper. (See Rolling Mill.) The metal is rolled cold, and annealed from time to time. When it has gone through the rollers a certain number of times, it acquires a certain degree of hardneſs, ſo that the rollers have not much effect upon it; and if the rolling were continued, the metal would crack. To remedy this evil, the metal is taken to a reverberatory furnace. It is laid upon a hearth of brick or fire-ſtone, and the flame of coal made to paſs over it. The heat, however, is not intenſe, ſince the metal is required to be ſlowly heated to a dull red. It may now be cooled in the quickeſt way poſſible to ſave time, as quenching in water does not affect it, as is the caſe with ſteel. It now paſſes through the rollers, as before, till it becomes hard, and then annealed and rolled again, till it is reduced ſomething ſhort of the ſize required. This being done, it is again annealed and paſſed through a pair of rollers faced with caſt ſteel, and finely poliſhed. This gives the ſurface great ſmoothneſs and truth. It is now annealed for the laſt time: after this, the ſheets are immerſed in hot dilute ſulphuric acid, then ſcowered with fine Calais ſand, which fits them for the workmen to ſhape into different articles.

Having deſcribed the method of preparing the ſheet plated metal, we ſhall next give an account of the method employed for manufacturing plated wire. This is generally a diſtinct buſineſs, being unconnected with the buſineſs of making the plated goods.

The pieces of metal to be plated for the purpoſe of making wire, are forged out of bar copper unalloyed. Theſe pieces are of a cylindrical ſhape, and about 18 or 20 inches long, and about $1\frac{1}{4}$ inch in diameter. The true cylindrical ſhape is given to the copper by wire-drawing: it is then made perfectly clean and metallic by ſcraping. The ſilver to be laid upon it is much thinner in proportion to the copper than was ſtated in the ſheet metal. The ſilver is firſt formed into a tube, one edge projecting a little over the other. A copper cylinder, a little leſs in diameter than the tube, and ſo much longer as to admit one end of it being faſtened into a hole, is now heated red-hot, and faſtened by one end in the hole. The tube is now ſlipped upon it, with the ſeam upwards. A flat ſteel burniſher, with rounded poliſhed edges, and a handle at each end, is now rubbed briſkly backward and forward upon the overlapped edges of ſilver, at the ſame time uſing conſiderable preſſure. By this means the two ſurfaces are completely welded together, ſo that it would be difficult to find where the union had taken place.

The cylinder of copper intended to be plated, is now made perfectly clean, the inſide of the ſilver tube being the ſame. It is now put upon the cylinder, which is about two inches longer than the tube; a ſmall groove is made round the cylinder coinciding with the ends of the ſilver tube. Into this groove the ends of the tube are cloſely worked, ſo as to render the ſpace between the tube and the cylinder perfectly air-tight. The neceſſity of this will be obvious, ſince the whole is required to be heated red-hot, which would cauſe the oxydation of the copper, and prevent the ſilver from adhering to it. When the cylinder and tube are together heated ſlightly red-hot, the ſame burniſher that was uſed to unite the tube is now rubbed briſkly over the tube in a longitudinal direction. This unites the ſilver firmly to the copper, and makes it fit for drawing into wire of various forms and ſizes. The machinery employed for drawing this wire is preciſely ſimilar to that employed for braſs and copper wire. The great variety of figure and form given to it depends upon the plate through which it is drawn. Some are flat, others half round, ſome fluted, or with mouldings. It is chiefly uſed for making bread-baſkets, toaſt-racks, ſnuffers, and many other articles, affording much neatneſs and elegance, with little manual labour. The wire after drawing, like ſheets after rolling, is annealed, and afterwards cleaned with hot dilute ſulphuric acid.

We ſhall firſt deſcribe the manufacture of ſheet metal into various articles. It may be eaſily conceived, that the nature of this metal is ſo ſimilar to copper, that the working of it with the hammer into various forms will be very ſimilar to that uſed by copperſmiths, with the difference of more exact and complete tools, and greater care on account of the value of the metal. Formerly all the different ſhaped veſſels were made with the hammer, which made the price of labour very great. Now, all veſſels of ſimple form, and not of large ſize, are formed in dies by means of the ſtamping hammer. This operation is now ſo general, that ſome manufacturers employ as many as ſix or eight of theſe engines.

Figs. 1 and 2 are two views of the ſtamp. A is a large ſtone, the larger the better; *b*, the anvil on which the die, *e*, is ſecured by four ſcrews. See ground plan.

In *fig.* 1. *a*, *a*, are two upright ſquare pillars, with the angles oppoſed to each other, which work in angular receſſes in the hammer *d*. This admits the hammer to ſlide freely and truly from top to bottom, by pulling at the rope *f*, which paſſes over the pulley *c*. This hammer is let fall from different heights, according to the effect to be produced.

All veſſels may be raiſed by the ſtamp, with the exception of ſuch as are immoderately large, or thoſe of inordinate depth, compared with the diameter. Veſſels which are of leſs diameter at the top and bottom than in the middle, muſt either be ſtamped on two pieces, or raiſed with the hammer by hand.

The dies are, or ought to be, made of caſt ſteel, but it ſhould be as hard as to weld to iron, ſo that the iron ſhould not be much below the ſurface of the die. This precaution is neceſſary only when the die requires to be hardened. In other reſpects the whole may be caſt ſteel. Thoſe unhardened ſhould be of harder caſt ſteel. No other ſteel can anſwer, as it would be liable to abound with flaws, and would not be uniformly hard.

When the die is placed upon the anvil, and the metal cut into pieces of proper ſize, the next thing is to ſurround the top of the die with a paſte made with oil and clay, an inch or two above the ſurface. This cavity is now filled with melted lead. The under ſide of the ſtamping hammer has a flat face of iron fitted into it, about the breadth and length of the die: this is called the *lickerup*. When the lead becomes ſolid, the hammer is raiſed to a certain height and let fall upon it. The underſide of the *lickerup*, from being cut on the ſurface into teeth in ſhape like thoſe of a raſp, firmly adheres to the lead, which afterwards riſes with the hammer. The metal is now placed over the die, and the hammer with its lead made to fall upon it, till the impreſſion on the metal is complete. If the veſſel to be ſtamped be of any conſiderable depth, two or three dies are often uſed, one bigger than another, the laſt being of the proper ſize and ſhape. It ſometimes happens, that when the veſſel has a long conical neck, they are obliged to have recourſe to an auxiliary operation called drafting. Theſe in the plate are called emboſſing punches.

In *fig.* 11. the punches are made of caſt ſteel, and the cavities turned out in a lathe. The pieces *a*, *b*, are of lead. This operation is performed by a ſeries of theſe punches of different ſizes, beginning with the largeſt firſt, and gradually going on to the ſmalleſt. By this means a hollow cone may be raiſed out of a flat plate, three or four inches in length, and not more than an inch in diameter at the wideſt part. Theſe punches are alſo employed for ſmall articles of too great delicacy for the ſtamp.

It frequently happens, that one part of an article is made by the ſtamp, and the reſt by the hammer. Sometimes they are rudely formed by the hammer and finiſhed by the die.

Cylindrical and conical veſſels are moſtly formed by bending and ſoldering. The bending is performed on blocks of wood with wooden hammers, to avoid injuring the plated ſurface. We ſhall here recommend a method of turning rings, or any thing in a cylindrical or conical ſhape. It is already uſed to great advantage by tin-plate workers. This is done by a machine conſiſting of three rollers, a ſection of which is ſhewn in *figs.* 5 and 6. A, B, C, are the three rollers, and *a b e d* the piece of metal paſſed through them to receive the cylindrical or conical ſhape.

The upper roller, A, can be raiſed or lowered at pleaſure, which has the effect of determining the diameter of the cylinder. When one end of the upper roller is higher than the other, it gives the conical ſhape. In order to ſolder the cylinder or cone, the two edges are made very true, and are kept in contact by binding with ſmall iron wire. The part where the ſolder is intended to be run muſt be made perfectly clean by ſcraping. The ſolder employed is that called ſilver ſolder. It is an alloy of braſs and ſilver, or rather an alloy of ſilver, zinc, and copper. The alloy of copper and ſilver is more fuſible than either of theſe metals, and may be employed as a ſolder for ſilver, copper, or plated metal, when the plated metal has no zinc in its compoſition. It is, however, neceſſary to employ an alloy of braſs and ſilver as a ſolder for plated metal. The braſs ſhould be the leaſt poſſible, being no more than what is neceſſary to give the requiſite fuſibility to the ſolder, ſince too much braſs would not only injure the colour, but its malleability is impaired, and the ſeam would break when it came to be hammered.

The ſolder is firſt caſt into an ingot, and then rolled thin enough to cut with ſhears into ſmall ſhreds. Beſides the ſolder they alſo employ borax, and a ſubſtance which floats on the top of melted glaſs, and is taken off as refuſe. It is called *ſandiver*, and probably conſiſts of ſulphat of potaſh and flint. The borax is firſt calcined, which conſiſts in driving off the water of cryſtallization. The white powder is then mixed with a little water, a ſmall quantity of the powdered *ſandiver* being at the ſame time added. After the ſeam to be ſoldered has been ſmeared with this pulpy maſs, and the bits of ſolder laid on, the whole is expoſed to the heat of a lamp with a blowpipe; or if the ſubſtance be large, to a charcoal fire, urged with bellows. The borax firſt fuſes, and defends the parts to be united from the action of the air. The heat is then increaſed rapidly till the ſolder melts. The uſe of the ſandiver is to prevent the iron wire from being ſoldered to the other metal. It appears that the ſalt in this ſubſtance is decompoſed by the iron, by which the ſurface of the lathe becomes oxydated, and prevented from uniting with the ſilver or the copper. The ſandiver has no action upon the other metals, and therefore does not prevent their union. When the united part is made clean, and hammered with poliſhed tools, the ſeam cannot be ſeen on the ſilvered ſide. If a yellow line appear, the ſolder contains too much braſs.

Veſſels intended to have other forms are generally ſoldered up in a conical or a cylindrical form, according as the width at the top and bottom of the veſſel varies. The metal is ſo malleable, even in the ſoldered part, that a ſkilful workman can give almoſt any form to a veſſel with the hammer.

Mouldings are ſometimes formed upon the edges of veſſels, which ſerve to give much ſtrength and ſtiffneſs, as well as being ornamental. This operation is performed by an inſtrument called a ſwage, ſee *figs.* 3 and 4. The part A lifts up by a joint, and the metal to be ſwaged is placed between the dies, as ſhewn in the figures: the part *b* is held in a vice, while the other reſts upon it. By ſtriking on the part A, at the ſame time ſhifting the metal forward, the bead is formed. In *fig.* 3, the part *a* is a guide to regulate the diſtance of the bead from the edge. The ſame effect is produced in a neater and more expeditious manner by the rollers, *figs.* 8, 9. *Fig.* 10. is a ſection, ſhewing the form of the bead. The two wheels *a*, *a*, (*fig.* 8.) are placed upon an axis, which have pinions for the purpoſe, the lower one giving motion to the upper one. The groove in the upper wheel correſponds with the bead in the lower one, and the metal paſſed between aſſumes the ſame figure. This machine, a little varied, may be uſed as ſhears to cut the metal into pieces of uniform breadth. A part of the upper wheel *a*, for this purpoſe muſt be a little larger, and the edges ſquare and ſharp. The lower wheel being put on firſt, the other muſt be put on to the other axis, till the face of the enlarged part comes up to that of the other wheel, and in this ſituation ſecured by nuts. It will be evident, that if a piece of metal be now placed between them, that the metal will be cut by the projecting part of the upper wheel, in a ſimilar manner to that employed for ſlitting iron.

The beading and moulding, however, is not at preſent much uſed. When prominent parts like theſe are merely plated metal, they, from being more expoſed, ſoon become bare, and the copper ſurface is preſented.

The greateſt improvement ever made in this branch of manufacture, is the introduction of ſilver edges, beads, and mouldings. Without this means of defending the prominent parts which become ſo ſoon bare in the old method, the trade muſt long ſince have gone into diſgrace, and ultimately to decay. The ſilver intended to form the prominent and ornamental parts is rolled extremely thin, a ſuperficial inch ſometimes not weighing more than 10 or 12 grains.

This is too delicate to have the ornamental form given to it by the ſwage above deſcribed. The two oppoſite dies being ſteel, if not very accurately made, would tear ſilver ſo delicate as that uſed for ornaments. It is neceſſary, therefore, that the ſunk part of the die ſhould be ſteel, and the oppoſite ſide lead, as was obſerved in the ſtamping, and this is the method generally employed to form theſe ſilver ornaments. It ſeems wonderful, that manufacturers have not thought of doing this by ſmall rollers. It would only require to have the part in which the die is ſunk a wire ring of caſt ſteel, the concave part being a little conical, and made to exactly correſpond with a convex cone on one of a pair of rollers, ſo that by a little force it may be as firm as a ſolid roller. A ring of lead, or even a ſtraight piece, might act oppoſite to the die. A much greater variety of dies might be made in this way, than by making dies flat. The dies would coſt leſs, and be better executed. The ſilver would alſo run leſs riſk of tearing, than by the ſtamp or the ſwage.

When theſe ſilver mouldings are formed, and the refuſe metal poured off, they are laid upon a level plate, with the hollow ſide upwards. Small bits of reſin are put into the hollow parts, and ſoft ſolder melted in with a ſoldering iron, the point of the ſame being applied into the groove to keep it in a ſtate of fuſion. This is continued till the cavity is quite full. To prevent the ſolder from accidentally adhering to the convex part, it is previouſly covered with a paint-like compound of ſize and whitening. The ſame expedient is reſorted to in all caſes where ſoft ſolder is employed, or when it is applied to great heat. The ſoft ſolder is formed of equal parts of lead and tin. The former metal has ſo great an affinity for lead, as to require the greateſt care to keep theſe metals ſeparate when one of them is in a ſtate of fuſion.

The ſilver ſhells, thus filled with ſoft ſolder, will now admit of being bent into almoſt any form. After they are fitted accurately to the place they are to occupy, the part being firſt made clean and partially tinned, they only require to be ſecured by temporary faſtenings, till the parts can be expoſed to a degree of heat capable of melting the ſolder. This unites the ornament, without leaving any appearance of ſolder on the outſide.

In forming ſubſtances which have a maſſive appearance, ſuch as the feet of tea urns, the handles of veſſels, and plated table-ſpoons, no other metal is employed but the ſheet. The maſs is formed of two ſhells, which, when put together, form an apparent ſolid. Each of the concave parts is firſt filled with ſoft ſolder, they are then fitted accurately together, and heat applied till the maſs fuſes, ſo that the apparently maſſive article conſiſts of a ſhell of plated metal filled with ſoft ſolder. Bulky ornaments, in the form of ſhells and flowers, are frequently put on in this way; ſome in ſilver. Theſe have a ſimilar maſſive appearance to, and ſtrongly imitate, real plate.

All goods formed by hand with the hammer, require great labour in finiſhing. After hammering the veſſel into the proper ſhape, the marks of the hammer appear like ſo many flat places. Theſe are removed from the outſide of the veſſel to the inſide, when the inſide is concealed, as in tea urns. This is effected by covering either the anvil or the hammer with a piece of the ſtuff called everlaſting. The roughneſs is transferred to that ſurface in contact with the everlaſting. In hammering plated metal from time to time, it requires to be annealed by heating it red-hot: this diſcolours both the ſilver and the copper. Theſe are cleaned by boiling in dilute ſulphuric acid, and ſcowering with Calais ſand. The ſulphuric acid to the water is in very ſmall proportion. If the ſilver begins to appear black by boiling, the acid is too much, and muſt be watered. When the veſſels are finiſhed in every reſpect by the maker, and the ſurface free from oxyd, it frequently happens that bits of roſin, uſed with ſoft ſolder, adhere to it. This is removed by boiling in a weak ſolution of pearl aſhes. The ſame is alſo uſed for cleaning the ſurface of tinned copper.

The veſſels are now ready for burniſhing, a proceſs which we ſhall ſoon deſcribe.

Our inſtructions hitherto have particularly applied to braziers' work; we ſhall next deſcribe the candleſtick-making.

In this branch of the buſineſs there is great variety. In the commencement of this trade the object was chiefly to imitate thoſe made of ſilver, and it began with the prevailing taſte of imitating the different orders of architecture. The numerous points and prominences thus introduced, were ill fitted for plated metal, as in a very little time their ſilver diſappeared, which gave them the moſt ſhabby appearance poſſible. This obliged the manufacturers to make them more plain and ſimple, and it was not till the diſcovery of the ſilver edges, that candleſticks of plated metal began to gain reſpect in the world of luxury and faſhion. The ſtems of candleſticks have been made ſquare; ſome with ſharp, others with rounded corners; others oval, but the greateſt number with round ſtems, which appear to be the moſt conſiſtent and the moſt permanent. Of theſe, the patent teleſcope candleſtick has had the greateſt run. This conſiſts in the cylindrical part lengthening and ſhortening at pleaſure, by one tube ſliding into the other. In this caſe the tubes are drawn by machinery, ſimilar to that uſed for drawing the tubes of teleſcopes. The feet of candleſticks, or the baſe, are generally made in a die by the ſtamp. The neck, which is ſometimes ſmall in one part, is alſo ſtamped. The diſh part of the nozzle or ſocket is made in a die, and the tube part in the ſame way as the cylindrical pillar. Theſe, for the ſake of neatneſs and expedition, are generally drawn in the wire drawing machine, whether for ſliding or not. Some of theſe tubes are fluted. The prominent moulding and beads are generally of ſilver. The different parts are ſoldered together, ſome parts with hard and others with ſoft ſolder. The branches of candleſticks are formed in two halves, like the tea urn feet, &c. In forming ſuch articles as are made of wire, ſuch as bread baſkets, toaſt racks, and caſters, the wire is bent into the given form with a wooden block and a mallet. When pieces require to be ſoldered together, the joinings muſt be accurately fitted, in order to prevent the copper from appearing. In theſe caſes hard ſolder is employed. This branch of plated manufacture admits of extenſive application. Wires are capable of great variety of poſitions. The work lately publiſhed by ſir James Hall, ſeems to prove that Gothic architecture has originated in the fanciful forms of bended twigs. The peruſal of this work could not fail to give important hints to an ingenious manufacturer of plated wire work.

Plated goods, particularly tea urns, and globular veſſels for the ſame purpoſe, frequently require to be engraved; but it is obvious that, from the extreme thinneſs of the plate, the graver would lay bare the copper; and if the plate was ſo thick all over as to admit of engraving, the articles would be very expenſive. Both theſe evils are obviated, by working an extra plate of ſilver on to the part to be engraved. This is done while the plate, of which the veſſel is made, is in its flat form. The part where the engraving will fall is firſt ſcraped clean, and a plate of ſilver, of ſimilar thickneſs to that employed for ſilver edges, is cut to the ſame ſize, and alſo ſcraped clean. The plated ſheet is then laid upon a hot anvil, and the plate of ſilver laid upon the place prepared. It is firſt rubbed ſlowly, but with great preſſure, with a poliſhed hammer previouſly heated, but not ſo as to affect the poliſh. The plate will begin to adhere, and it may then be ſlightly hammered; ultimately it will adhere all over, and may now be hammered on a poliſhed ſtake, till the whole ſurface becomes plane, and the piece of ſilver cannot be diſtinguiſhed from the reſt. This proceſs is on the ſame principle as the plating of wire, and is ſimilar to welding two pieces of iron together. It appears practicable that the ſurfaces of any malleable metals, when clean and heated to acquire a certain degree of ſoftneſs, are capable of uniting. Moſt people are familiar with the union of two pieces of lead by preſſure, even at the common temperature.

When the different plated goods come out of the hands of the workmen, the metal, although clean, is of a dull white colour, poſſeſſing no poliſh whatever.

This laſt finiſh is called burniſhing, and is generally performed by females in a diſtinct ſet of apartments. The burniſhing tools are generally made of blood-ſtone, and ſome of hardened ſteel finely poliſhed. The latter are to burniſh the minute parts which cannot be touched by the blood-ſtone, which are employed chiefly for the greater and uninterrupted parts.

The bits of blood-ſtone are let into little caſes, made of ſheet iron, and then finely poliſhed.

The burniſhers, if uſed dry, would adhere to the ſilver in ſome places, and would ſcratch inſtead of giving the fine poliſh intended. This is obviated by frequently dipping the burniſhing tool into a ſolution of white ſoap. After being burniſhed they are raiſed, and laſtly wiped with clean ſheep's leather.

It is a circumſtance much to be regretted, that ſilver, although it is ſuſceptible of ſo fine a poliſh, does not keep its luſtre. This is occaſioned by the ſulphur which comes from ſulphurated hydrogen, a gas always exiſting in the atmoſphere. The thinneſt coating of any ſubſtance will prevent this change. If the ſurface of ſilver were coated with a ſolution of gum arabic or iſinglaſs, the defence will not be perceived, and the ſilver will never change colour.

We ſhall conclude this article with a few remarks upon the preſent mode of plating the ingots intended for ſheets. It will be evident, that ſince the heat in plating muſt be equal to forming a portion of an alloy of ſilver and copper, which by its early fuſion unites the two ſurfaces together, the ſilver will not be uniform in its quality, and by wearing will preſent an alloy having more than its proper quantity of copper; and will, in conſequence, exhibit a baſe colour. It will be remembered, that the method uſed for plating the wire ingots does not admit of this inconvenience. The ſilver will keep its colour to the laſt. We ſhall no doubt hear, at ſome period when the plated manufacturers employ men of talent as platers, that the ingots for rolling will be plated by the method employed for the wire.

PLATER, Felix, in *Biography*, an eminent phyſician of the 16th century, was born at Baſle in 1536, of the college of which place his father was principal. Here Felix received his early education under his father's eye; and afterwards went to complete his medical ſtudies at Montpellier, where he diſtinguiſhed himſelf at an early age, and obtained the degree of doctor in 1556. He then returned to Baſle, where he is ſaid to have taken another degree in the following year, and ſettled in the practice of his profeſſion. His reputation and ſucceſs were ſoon equal to the promiſe of his education; for he was appointed to the chair of medicine in 1560, and became the confidential phyſician of the princes and nobles of the Upper Rhine. In addition to his medical ſkill, he poſſeſſed an extenſive knowledge of anatomy, botany, natural hiſtory, and other branches of ſcience; and contributed much by his talents and character to the celebrity of his native univerſity, in which he was a teacher upwards of fifty years. He died in July, 1614, in the 78th year of his age, extremely regretted by his countrymen and his brother-profeſſors. He left the following works: "De Corporis humani ſtructura et uſu Libri tres," Baſle, 1583 and 1603, folio; "De

Febribus Liber," Francfort, 1597; "Praxeos Medicæ Tomi tres," Baſle, 1602; "Obſervationum Medicinalium Libri tres," ibid. 1614, &c.; "Conſilia Medica," Francf. 1615, in the collection of Brendelius; "De Gangrænâ Epiſtola," in the firſt century of the letters of Hildanus. After his death were publiſhed "Quæſtionum Medicarum paradoxarum et eudoxarum Centuria poſthuma," Baſle, 1625, edited by his brother, Thomas Plater; and "Quæſtiones Phyſiologicæ de partium in utero conformatione," Leyden, 1650.

Thomas Plater, the brother of Felix, alſo was a profeſſor of medicine at Baſle, and had two ſons, Felix and Francis, the former of whom occupied ſucceſſively the chairs of logic and natural philoſophy. Eloy Dict. Hiſt. de la Medecine.

PLATERNETZA, in *Geography*, a town of Sclavonia, on the Save; 10 miles from Poſzega.

PLATES, a cluſter of ſmall iſlands among the Bahamas. N. lat. 22° 30′.

PLATESSA, in *Ichthyology*, a name by which Auſonius and ſome other authors have called the paſſer-fiſh, or common plaiſe. See PLEURONECTES *Plateſſa*.

PLAT-FOND, in *Architecture*, the ſame as ſoffit.

PLAT-FORM, in the *Military Art*, an elevation of earth, a floor of wood or ſtone, on which cannon is placed to fire on the enemy.

Such are the mounts in the middle of the curtains. On the rampart there is always a platform, where the cannon are mounted.

It is made by the heaping up of earth on the rampart, or by an arrangement of madriers, riſing inſenſibly for the cannon to roll on, either in a caſemate, or an attack in the outworks.

Plat-forms are generally laid ſloping towards the parapet, nine or ten inches; this declivity carries off the rain, prevents the gun from recoiling ſo much when fired as it would do if laid level; and, when loaded, it is more eaſily brought to the embraſure.

In temporary batteries, the plat-forms are made of planks laid acroſs ground-timbers or ſleepers, uſually five in number, and kept ſteady by ſtakes at each end; there is uſually a plat-form made to each gun; it is commonly about eighteen feet long, eight feet broad next the parapet, and about fourteen feet broad at the tail, the intermediate ſpaces between the plat-forms ſerving for the ſhot and other neceſſaries. When a plat-form is to be laid on marſhy ground, firſt lay a floor or two of faſcines; cover theſe with hurdles, twelve or fifteen feet long, and ſix or ſeven broad; on theſe lay a floor of three or four inches of earth, and therein lay the ſleepers, and over them the planks. When a battery is built of ſtone or brick, the plat-form is generally a flat ſtone pavement ranging the whole length of the battery: this, on account of its reſiſting the injuries of the weather for a long time, is to be preferred to planks; but in caſe of bombardment ſuch a plat-form is to be avoided, becauſe the ſhells will not only break the pavement, but alſo, by driving about the broken ſtones, do much miſchief to the troops.

All practitioners are agreed, that no ſhot can be depended on, unleſs the piece be placed on a ſolid plat-form; for if the plat-form ſhakes with the firſt impulſe of the powder, it is impoſſible but the piece muſt likewiſe ſhake; which will alter its direction, and render its ſhot uncertain. To prevent this accident, the plat-form is uſually made extremely firm to a conſiderable depth backwards, ſo that the piece is not only well ſupported in the beginning of its motion, but likewiſe through a great part of its recoil. However, it is ſufficiently obvious, that when the bullet is ſeparated from the piece, it can be no longer affected by the trembling of the piece or plat-form; and by a very eaſy computation it will be found, that in a piece ten feet in length, carrying a bullet of twenty-four pounds, and charged with ſixteen pounds of powder, the bullet will be out of the piece before it has recoiled half an inch; whence, if the plat-form be ſufficiently ſolid at the beginning of the recoil, the remaining part of it may be much ſlighter, ſince its unſteadineſs beyond the firſt half inch will have no influence on the direction of the ſhot: and hence a more compendious method of conſtructing plat-forms may be found out. New Princip. of Gunnery, p. 42.

PLAT-FORM, in *Architecture*, is a row of beams, which ſupport the timber-work of a roof, and lie at the top of the wall where the entablature ought to be raiſed.

PLAT-FORM is alſo uſed for a kind of terrace, or broad, ſmooth, open walk, at the top of a building, from whence we may take a fair proſpect of the adjacent country.

Hence an edifice is ſaid to be covered with a plat-form, when it is flat at top, and has no ridge.

Moſt of the oriental buildings are thus covered, as were all thoſe of the ancients. Cæſar was the firſt among the Romans who procured leave to build his houſe with a ridge or pinnacle.

PLAT-FORM, in a *Man of War*. See ORLOP.

PLATIA, in *Geography*, a ſmall iſland in the gulf of Engia; 18 miles N.W. of Engia.

PLATIASMOS, of πλατιαζω, *I dilate*, formed from πλατυς, *wide*, a word uſed by many authors to expreſs a fault in pronunciation, owing to a perſon's opening his mouth too wide, and thence ſpeaking indiſtinctly.

PLATICORIA, formed of πλατυς, *wide*, and κορη, *pupil*, a word uſed by medical writers to expreſs a preternatural dilatation of the pupil of the eye, uſually owing to a paralytic diſorder.

PLATILLA, LA, in *Geography*, a mountain of Spain, N.W. of Molina; celebrated for its mines of copper.

PLATINA, BARTOLOMMEO, in *Biography*, an hiſtorian who flouriſhed in the 15th century, was born in 1421, at Piadena, in the Cremoneſe, from which place he choſe to take his ſurname, rather than from that of the family to which he belonged, which was De Sacchi. He was brought up to the military profeſſion, and bore arms ſome time before he engaged in literary ſtudies, which he probably firſt purſued at Mantua. He accompanied cardinal Franceſco Gonzaga to Rome, where Pius II. aggregated him to his new college of abbreviators. He was deprived of his poſt by Paul II., who diſſolved the college, and turned on the world, without any means of ſupport, ſeventy learned men, who had been employed in it. Platina, who had more ſpirit than the others, wrote to the pope, threatening him with an appeal to a council. This menace enraged Paul to ſuch a degree, that he threw Platina into priſon, where he was kept four months, till he obtained his liberty by the interceſſion of cardinal Gonzaga. Three years after this he underwent a more ſevere treatment, on occaſion of a conteſt between the ſame pope and the Roman academy of Pomponio Leto, of which Platina was a member. It appears from Platina's own account of this tranſaction, that he himſelf was apprehended while at ſupper with cardinal Gonzaga, brought before the pope, and urged with threats to confeſs a ſuppoſed conſpiracy againſt him; and that he was committed to priſon, becauſe he avowed his perfect innocence of the crime laid to his charge. He and ſeveral of his friends were put to the torture twice, but when nothing could be found to criminate them, they were gradually liberated. Platina obtained from Sixtus IV. a recompence for his ſufferings, in the honourable poſt of keeper of the Vatican library, which he held till his death in 1481. In the following year there was a ſolemn commemoration of the anniverſary of his death. He was conſidered as one of the ableſt ſcholars of his time. His moſt celebrated work was the "Lives of the Roman Pontiffs," compoſed in Latin with great elegance and energy. "It was," ſays the hiſtorian, "one of the firſt pieces of biographical hiſtory which gave an example of good criticiſm. He frequently examines, doubts, conjectures, cites ancient documents, refutes errors, and ſometimes, as might be expected, commits them himſelf. His greateſt fault is the acrimony with which he ſpeaks of ſome contemporary popes, among whom it may well be ſuppoſed that he does not ſpare Paul II." He was likewiſe author of the "Hiſtory of Mantua," from its origin to the year 1464. His other writings are chiefly dialogues on points of moral philoſophy, and ſhort treatiſes on miſcellaneous topics: among the latter is one on the culinary ſcience; and what renders this ſtill more curious is, that it is dedicated to cardinal della Rovere. Moreri. Gen. Biog.

Platina, or *little ſilver*, from the Spaniſh word *plata*, ſilver; called alſo *platinum* by ſome late Engliſh chemical writers; in French *le platine*.

Platina, not being liable to oxydation by the agencies of heat, air, or moiſture, is uſually claſſed with gold and ſilver, which poſſeſs the ſame property; and theſe three metals were formerly, and are ſtill ſometimes called the *noble* metals, in oppoſition to the *baſe* metals, or thoſe which are oxydable by air and moiſture.

It is only about ſixty years ſince platina was introduced into Europe. The firſt ſpecimens which reached this country were brought from America by Mr. Wood in the year 1749; in the following year ſome others were preſented to the Royal Society by Dr. Brownrig, ſoon after which Mr. Wood, Dr. Lewis, Bergman, and other chemiſts, began to examine the properties of this metal. Of late years, Morveau, Jeannetty, Vauquelin, Deſcotils, and more eſpecially Wollaſton and Tennant, have greatly contributed to our knowledge of this ſubſtance. The free importation of platina into Europe was for a long time jealouſly prevented by the Spaniſh government, from an apprehenſion that advantage might be taken of its ſpecific weight, and other general properties, to adulterate gold with it, an objection which the preſent improved ſtate of chemiſtry has entirely removed.

Natural Hiſtory.—Platina was for a long time ſuppoſed to be the excluſive produce of South America, where it is found in various places, particularly on the banks of the Rio del Pinto, in the diſtrict of Choco in Peru; in the mines of Taddo, near the Rio de la Plata in the ſame diſtrict; in the mine of Santa Fé near Carthagena, in New Granada, (Klaproth's Dictionary of Chemiſtry, iii. 363.); and alſo, as Dr. Wollaſton has lately ſhewn, in a new mineral from the gold mines in Brazil. (Philoſ. Tranſ. 1809, part ii.) Of late years, however, Vauquelin has alſo diſcovered platina in Europe, in a grey ſilver ore from the mines of Guadalcanal, in the province of Eſtramadura in Spain. Ann. de Chimie, vol. lx.

The natural hiſtory of this metal is but imperfectly known. But it is well aſcertained that platina is found in its native ſtate in ſmall fragments or grains, looſely mixed with the ſand of certain ſtreams, always accompanying gold, and generally interſperſed with a variety of other metallic and heavy earthy bodies. The greater part of theſe impurities is ſeparated from the ore in America; ſo that when it reaches Europe, it appears in the form of pretty uniform metallic grains, which are neither round nor angular, but are ſomewhat flattened and ſmooth; their colour is a greyiſh-white; they appear to be partly attracted by the magnet, which is no doubt owing to the iron always mixed with them. Their ſize varies from that of fine ſand to that of a pea. No veins or conſiderable maſſes of pure platina have ever been diſcovered. Some fragments, however, weighing from 10 to 40 grains, have occaſionally been found, and are preſerved as mineralogical curioſities. An extraordinary large ſpecimen of this kind, exceeding the ſize of a pigeon's egg, is ſaid to have been given by Humboldt to the National Muſeum of France; it weighs 1088 grains, and its ſpecific gravity is 15.6. It was found in 1800, in the mines of Taddo, in the diſtrict of Choco. Klaproth's Dictionary of Chemiſtry.

Platina, in the granular form juſt deſcribed, which is properly that of an ore, ſtill containing a variety of impurities, fluctuates in its ſpecific gravity between 15 and 17. In one inſtance Dr. Wollaſton ſaw it reach 17.7; but this is the heavieſt ſpecimen he ever met with. (Phil. Tranſ. 1805.) This ore ſcarcely contains 80 *per cent.* of the pure metal, and ſometimes much leſs; the remainder being a mixture of a great variety of other minerals, ſuch as gold, ſilver, mercury, iron, copper, lead, chrome, titanium, (Fourcroy and Vauquelin, Annales du Muſée, tom. iii.); and, what is very remarkable, no leſs than four new metals, iridium, oſmium, rhodium, and palladium, the exiſtence of which was not even ſuſpected till a few years ago, and which have never been found elſewhere. Various earthy minerals, and eſpecially quartz and hyacinth, are alſo occaſionally found mixed with this ore in different proportions. Wollaſton, Phil. Tranſ. 1805.

Purification of the Ore.—Before we deſcribe the properties of platina as a metal *ſui generis*, it will be proper to relate the manner in which it is obtained, in a pure and malleable ſtate, from the granular mixture juſt deſcribed.

Various difficulties occur, not only in ſeparating the platina from the other bodies with which it is mixed in the ore, but alſo, and principally, in bringing the metal to the ſtate of a conſolidated malleable maſs.

With regard to the ſeparation and purification of platina, this might be effected in an imperfect manner, by ſelecting and picking out the grains of platina, which are diſcernible from the other ingredients by their external characters. This, however, would be a moſt tedious proceſs, and the grains of platina would ſtill be found to contain various impurities, and particularly iron, which would prevent their ſubſequent conſolidation into a malleable maſs. Beſides, the great infuſibility of platina would render ſuch a mode of conſolidation, if not impracticable, at leaſt extremely difficult. After trying a variety of methods, more or leſs imperfect, for the purification of platina, chemiſts have generally adopted the following proceſs.

The firſt ſtep conſiſts in ſeparating from the platina ore ſmall globules of quickſilver, which are generally found mixed with it, in conſequence of a proceſs of amalgamation, which it undergoes in America, in order to ſeparate the gold from it, when it is firſt collected. Theſe are eaſily driven off by a moderate heat. A conſiderable portion of the other impurities may be eaſily ſeparated, in conſequence of their greater levity: thus, by blowing upon a quantity of theſe grains, ſpread over an inclined plane, with a common pair of bellows, the lighter particles, ſuch as thoſe of quartz and iron ore, are readily driven off from thoſe of platina.

The gold, ſome portions of which always eſcape the proceſs of amalgamation juſt mentioned, may be next ſeparated by pouring a ſmall quantity of dilute nitro-muriatic acid upon the grains of crude platina. The quantity of gold thus taken up commonly amounts to about a quarter of a grain from each ounce of the ore ; but as much as 7, or in one inſtance as much as 13, parts of gold are ſaid to have been obtained from 100 parts of the ore. (Prouſt, Ann. de Chim. vol. xxxviii.) In this firſt operation, a ſmall quantity of platina and other ingredients will alſo be diſſolved ; but the gold may be eaſily precipitated from this ſolution by ſulphate of iron, and the platina by muriate of ammonia.

After the ſeparation of the gold, nitro-muriatic acid, being poured on the remaining maſs, will diſſolve it, with the exception of a ſmall quantity of black matter (about 3 *per cent.*), which was formerly miſtaken for plumbago, but is now proved to be a compound of oſmium and iridium, two of the four new metallic bodies before mentioned, which were diſcovered a few years ago by Mr. Tennant. See Iridium and Osmium ; and Phil. Tranſ. for 1804.

Theſe two metals Dr. Wollaſton has ſince ſhewn to exiſt alſo in the crude platina ore, united together in the form of diſtinct minute cryſtals, and diſperſed through the other grains, from which they can be diſtinguiſhed and picked out without difficulty. (Phil. Tranſ. for 1805.) Muriate of ammonia being now added to the ſolution, the platina is precipitated in the form of a yellowiſh powder, which is a compound of muriatic acid, ammonia, and platina, or an ammoniaco-muriate of platina.

The remaining ſolution, after the platina has been ſeparated from it, ſtill contains, beſides iron, minute quantities of various other ſubſtances, amongſt which the two other metallic bodies, palladium and rhodium, were diſcovered by Dr. Wollaſton. Phil. Tranſ. for 1804 and 1805. See alſo Palladium and Rhodium.

Conſolidation.—Having now brought the platina to the ſtate of a ſalt, the next object is to reſtore the platina, thus purified, to its metallic ſtate, and to conſolidate it into a malleable maſs. This, from the great infuſibility of platina, has long been a matter of conſiderable difficulty and labour ; and although the proceſs has been, of late years, conſiderably improved and ſimplified, it ſtill requires from the operator a certain degree of dexterity and experience.

Before we deſcribe the improved proceſs in queſtion, it may be proper to notice the earlier and leſs ſucceſsful attempts, which were made for the conſolidation of platina.

It had been long diſcovered that arſenic readily united with platina, and formed with it an alloy of great fuſibility. An alloy, therefore, was made of crude platina and arſenic ; and the latter metal, being eaſily volatilized, was driven off by heat ; whilſt the iron, being oxydated during the proceſs, was alſo ſeparated from the maſs ; ſo that the platina was left in an impure, but malleable ſtate. This mode of conſolidation of the crude ore by means of arſenic, firſt propoſed by Achard and others, was brought to a great degree of improvement by Jeannetty, a working ſilverſmith of Paris (Ann. de Chim. vol. xiv.) ; and utenſils of platina were procured by his method at a reaſonable price. But the platina ſo prepared was far from being pure ; for it had a lower ſpecific gravity, and ſtill contained ſmall portions of arſenic, iron, lead, copper, beſides the four new metals above mentioned ; and it did not, therefore, poſſeſs in a ſufficient degree thoſe qualities which render platina ſo uſeful for its various purpoſes.

The late improvements in the proceſs conſiſt principally in obtaining the platina, not immediately from the crude ore, but from the ammoniaco-muriate above mentioned. By applying heat to this ſalt, the muriated ammonia is gradually expelled, and the metal paſſes to the ſtate of a ſpongy maſs, which, by patient and repeated heating and hammering in a ſtrong mould, is at laſt brought to a malleable ſtate. Count Mouſſin Pouſchkin was, we believe, the firſt perſon who propoſed to prepare platina from the ammoniaco-muriate (Nicholſon's Journal, vol. ix.) ; but he uſed mercury in the proceſs. An amalgam was formed with the ſpongy maſs above deſcribed ; and by ſucceſſively heating and hammering this amalgam, the mercury was driven off, and the metal was conſolidated into a malleable maſs. This method was afterwards farther ſimplified by other chemiſts, the intervention of mercury being altogether diſpenſed with. One of the earlieſt accounts of this laſt improvement was publiſhed by Mr. Knight. (Phil. Mag. vol. vi.) But the moſt perfect deſcription of this mode of working platina, that has yet been publiſhed, is that given by Mr. Cock, in Aikin's Dictionary, vol. ii. p. 233, which, being ſcarcely ſuſceptible of abridgment, we ſhall tranſcribe *verbatim.* "The platina being diſſolved in nitro-muriatic acid, the liquor is to be filtered through clean white ſand, in order to ſeparate the black powder which floats among it. The clear ſolution being then decompoſed by ſal-ammoniac, the yellow precipitate is to be collected, moderately well waſhed in warm water, and dried. It is then to be diſtributed into ſaucers, which are placed in a ſmall oven conſtructed for the purpoſe, where they are expoſed for a ſhort time to a low red heat, in order to bring the platina to the metallic ſtate, and drive off by ſublimation the greater part of the muriated ammonia. When withdrawn, it is a ſpongy maſs of a grey colour. About half an ounce of the platina in this ſtate is to be put into a ſtrong iron mould, about 2½ inches long, by 1½ wide, and is to be compreſſed as forcibly as poſſible, by ſtriking with a mallet upon a wooden peſtle, cut ſo as accurately to fit the mould : another half ounce is then added, and treated in the ſame manner ; and ſo on, till ſix ounces have been forced into the mould. A looſe iron cover, juſt capable of ſliding down the mould, is then laid upon the platina, and, by means of a ſtrong ſcrew preſs, almoſt every particle of air is forced out from the platina. This is a part of the proceſs that requires eſpecial care ; for if any material quantity of air is left in the maſs, the bar into which it is formed is very apt, in the ſubſequent operations, to ſcale and be full of flaws. The preſſure being duly made, the mould is to be taken to pieces, and the platina will be found in the form of a denſe compact parallelopiped. It is now to be placed in a charcoal forge fire, and heated to the moſt intenſe white heat, in order completely to drive off the remaining ammoniacal muriate. This being done, it is to be quickly placed on a clear bright anvil, and gently hammered in every direction by a clean hammer. This is to be repeated ſeveral times, at the end of which the maſs will be perfectly compact, and fit to be laminated or wrought in any other manner that the artiſt chooſes. It is to be obſerved, that while the platina is heating, it muſt lie looſe in the fire ; for if it were held by the tongs, they would infallibly become welded to the platina, and thus greatly damage it. By the time that the platina is thus drawn down to a compact bar, it will be covered by a ſomewhat reddiſh ſemi-vitreous cruſt, proceeding chiefly from particles of the aſhes melted down upon it, and extended over its ſurface by the hammer. To remove this, the bar, being made red-hot, is to be ſprinkled over with pulverized glaſs of borax, and then kept for a few minutes at a white heat. When moderately cool, it is to be plunged into dilute muriatic acid, by which the borax and other vitreous matter will be diſſolved, leaving the platina with a perfectly clean white ſurface."

It is by methods of this kind that utenſils of platina, though ſtill expenſive, have gradually become leſs ſcarce, and are now much uſed in chemical manipulations. This metal may now (1814) be purchaſed in bars at the rate of 15*s.* an ounce; whilſt a few years ago, its price was between two and three times as great. The price of platina, in grains, fluctuates between 3*s.* and 4*s.* an ounce.

Phyſical and Chemical Properties of Platina.—The colour of pure platina is between ſilver-white and ſteel-grey; its ductility and malleability are very great; it can be brought to the ſtate of laminæ of almoſt any thinneſs by being preſſed between rollers; and it can alſo be drawn into wire of extreme minuteneſs. In hardneſs, platina is ſcarcely inferior to iron, and it is ſuſceptible of a fine poliſh; ſo that coin or medals made of pure platina would admit of very fine impreſſions, and, like gold, would not be liable to alteration.

The ſpecific gravity of malleable platina is generally found to be about 21.3, never riſing to 22 or 23, as ſome French chemiſts have erroneouſly ſtated; but being ſubject to ſlight variations according to the different degrees of denſity it has received during the proceſs of hammering. Gold, the next heavieſt metal, is 19.3; and therefore the denſity of platina is much more conſiderable than that of any other known ſubſtance. In its native ſtate, however, the ſpecific gravity of the platina ore does not, as was obſerved before, exceed 17.7; whilſt that of the grains of iridium and oſmium above mentioned is 19.15, which is a higher degree of ſpecific gravity than that of any other known *native* ſubſtance.

The great ductility of platina has been put in a very ſtriking light by ſome recent experiments of Dr. Wollaſton. (Philoſ. Tranſ. for 1813.) This philoſopher, whoſe dexterity in mechanical operations is no leſs conſpicuous, than his views in natural ſcience are acute and refined, ſucceeded, by a new and ingenious proceſs, in drawing platina wire ſo ſmall as the $\frac{1}{10000}$dth, or even $\frac{1}{18000}$dth part of an inch in diameter; and the tenacity of the latter was ſtill ſuch as to ſupport $1\frac{1}{3}$d grain without breaking. The method by which Dr. Wollaſton ſucceeded in obtaining ſuch very fine wire was ſhortly this: a piece of platina wire, previouſly drawn, by the uſual means, to the $\frac{1}{100}$dth of an inch, was fixed longitudinally in the centre of a ſhort cylindrical mould of $\frac{1}{3}$d of an inch in diameter; the mould being afterwards filled with melted ſilver, a cylinder of this metal was obtained, having the platina wire in its centre. Now it is evident, that by drawing the ſilver rod to $\frac{1}{30}$th, the platina wire was reduced to $\frac{1}{1000}$dth of an inch; and this was repeated, till, by a ſucceſſion of ſimilar reductions, the extremely ſmall wires above-mentioned were obtained. The ſilver coating was then removed by dilute nitrous acid, which left the platina wire untouched. Very fine wires of this kind have been employed by Dr. Wollaſton to meaſure the intenſity of very ſmall Voltaic batteries, and have alſo been applied to ſome optical purpoſes.

But the moſt characteriſtic property of platina, from which it derives its great value, is that of being neither oxydable by the combined influence of heat, air, and moiſture, nor capable of being fuſed by the moſt powerful furnaces: on this account crucibles and other utenſils are made of this metal, which are ſingularly uſeful in chemical experiments. In the ſtate of wire, however, it can be fuſed and reduced to the ſtate of globules by a very powerful Voltaic battery; and Dr. Marcet has ſhewn that the ſame may be effected with great eaſe by the flame of a ſpirit lamp impelled by a current of oxygen gas. (Thomſon's Annals of Chemiſtry, vol. ii.) Platina which has been thus melted, appears to be ſomewhat more ductile and tenacious; and it was from globules melted by the latter method, that the extremely fine wire above-mentioned was obtained. Platina wire, provided it be exceedingly fine, is alſo capable, as Tennant and Berzelius have lately obſerved, of being melted by the common blowpipe; but the globule thus obtained is ſo minute as to be ſcarcely ponderable.

Although platina can only be ſuſed in very ſmall quantities, whatever method be employed, it poſſeſſes, at a white heat, the valuable property of welding like iron; ſo that two pieces, when heated to the proper point, may be forged together and united into one uniform maſs. This, however, is not very eaſily effected, on account of the impurities which ariſe from the fuel and impede the operation.

Platina is not acted upon by any of the acids, except by the nitro-muriatic or oxymuriatic. If two parts by weight of aquafortis of 35°, Beaumé, be mixed with ſix parts of muriatic acid of 15°, and digeſted with thin laminæ of platina, nitrous gas is given out, and about one part of the metal is diſſolved. (Prouſt, Ann. de Chim. vol. xxxviii.) This ſolution is of a reddiſh-orange colour, and gives an indelible ſtain to the ſkin. The muriate of platina is capable of being cryſtallized by careful evaporation; and by the application of heat alone, it may be reduced firſt to the ſtate of oxyd, and afterwards to the pure metallic ſtate.

Platina, thus diſſolved in nitro-muriatic acid, has the property, (firſt diſcovered by Lewis, and already alluded to in deſcribing the purification of platina,) of being precipitated by muriate of ammonia, in the form of a triple ſalt, or ammoniaco-muriate of platina. This ſalt, if pure and unmixed with other metals, is of a yellow colour; but it is ſaid to aſſume a brick-red colour if combined with the oxyd of iron, or the other metals which are mixed with crude platina. The ammoniaco-muriate of platina is but very ſparingly ſoluble in water. It is decompoſed by heat alone, leaving behind about 42 *per cent.* of its weight of platina; ſo that, in this inſtance, the metal paſſes from the ſtate of ſalt to the reguline ſtate, without appearing in the intermediate form of oxyd.

Both ſoda and potaſh, in precipitating platina from its ſolution, alſo form triple ſalts, the general properties of which are analogous to thoſe of the former. There is, however, this remarkable difference between the action of the two fixed alkalies on muriate of platina, that ſolutions of this ſalt, however dilute, are inſtantly precipitated by potaſh or its compounds; whilſt ſoda does not produce any precipitates from them, the ſoda-muriate being much more ſoluble than the two others, both in water and alcohol, and requiring conſiderable concentration for its cryſtallization. A ſolution of platina, therefore, affords an eaſy teſt of diſcrimination between the two fixed alkalies, which are not always eaſily diſtinguiſhable by their other properties.

Solutions of muriate of platina are decompoſed by ſeveral metallic ſalts, particularly by ſolution of muriate of tin, a very minute quantity of which will impart to ſolutions of platina a bright red colour. Platina, however, is not precipitated by the gallic and pruſſic acids, or by their compounds. Sulphuretted hydrogen ſeparates platina from its ſolution in the form of a brown precipitate.

The action of the cauſtic fixed alkalies on platina, at high temperatures, is conſiderable. The metal is corroded and partly diſſolved, a circumſtance which, of courſe, limits the uſe of platina crucibles in the analyſis of earthy minerals. Nitre, likewiſe, as Mr. Tennant has ſhewn, is capable of acting upon, and partly diſſolving platina, at high temperatures.

Platina is capable of combining, by fuſion, with moſt of the metals. It forms alloys with gold, with ſilver, with lead, &c., many of which have been examined by Mr. Hatchett. (Philoſ. Tranſact. 1803.) The alloy of platina and gold, in particular, poſſeſſes properties, eſpecially in regard to its hardneſs and malleability, which may ſome day be found uſeful. The alloy of platina and ſilver is moderately fuſible and very malleable ; but when heated to redneſs, its ſurface becomes uneven, and incapable to be wrought. Lead combines readily with platina at a full red heat, forming a malleable and eaſily fuſible alloy. Mercury acts but ſlowly upon platina in its malleable ſtate ; but the triple ſalt, or ammoniaco-muriate, readily combines with mercury by trituration, forming ſolid and brilliant amalgams.

Platina does not appear to be capable of combining with ſulphur ; but it unites readily with phoſphorus, forming a phoſphuret of much greater hardneſs and fuſibility than the metal itſelf. When expoſed to a ſtrong fire, the phoſphorus is melted and volatilized ; a circumſtance which has ſuggeſted the idea of purifying platina by the intervention of phoſphorus. Pelletier, Ann. de Chim. xiii. 105.

Platina has not hitherto been extenſively uſed in the arts on account of its high price ; but its utility is becoming every day more generally acknowledged. From its great infuſibility and unalterability in particular, crucibles, and other utenſils made of this metal, are of incalculable value in analytical reſearches. Many facts are daily brought to light by means of platina inſtruments, which, without it, might perhaps ever have eſcaped notice. The remarkable ſlowneſs with which platina conducts caloric, increaſes its utility in many chemical manipulations. Thus ſmall tongs or ſpoons, or thin ſlips of laminated platina (which often anſwer the purpoſe better than ſpoons) may be held with the hand by one end, whilſt the other extremity is expoſed to an intenſe heat, without the heat reaching the fingers. The touch-holes of guns are now generally made of this metal, inſtead of gold, which was formerly uſed for this purpoſe. From the circumſtance of platina not being tarniſhed by air or moiſture, nor ſcarcely by any chemical agent, mirrors for reflecting teleſcopes have been made of this metal ; and inſtruments of various kinds might, no doubt, be covered over or plated with it with great advantage.

Guyton Morveau has recommended platina as a ſubſtance likely to afford a new and uſeful means of aſcertaining high temperatures, by its dilatations and contractions, which he believes to bear an exact proportion to the changes of temperature. Platina being nearly infuſible and unalterable by heat and air, would ſeem, on theſe accounts, likely to be a valuable pyrometrical ſubſtance. Morveau's contrivance conſiſted in connecting a bar of platina with a very ſimple machinery, by which the elongations or contractions of the portion of the apparatus which was expoſed to the heat, were rendered conſpicuous, and could be accurately meaſured. Ann. de Chim. tom. xlvi.

Platina veſſels have, in a few inſtances, been uſed upon a large ſcale in manufactories, eſpecially in the concentration of vitriolic acid, which is uſually carried on in large glaſs retorts, containing as much as 50 or 60 pounds of acid. The burſting of theſe veſſels, an accident both dangerous and expenſive, and by no means uncommon, may be totally avoided by ſubſtituting veſſels of platina. A veſſel of this metal, containing 300 pounds of vitriolic acid, has, for many years, been uſed for this purpoſe in the manufactory of Mr. Sandman in the Borough. Still larger veſſels have ſince been uſed for the ſame purpoſe by other manufacturers. The diſtillation is alſo more eaſy, becauſe the veſſel is ſet upon a naked fire, inſtead of being placed in a ſand bath.

The metallic glazing, with which ſome kinds of earthen ware and porcelain utenſils have, for a few years paſt, been coated, is obtained from oxyd of platina. (Klaproth's Dictionary, iii. 380.) This glazing has a brilliant ſilvery, or rather ſteel-grey luſtre. The ammoniaco-muriate of platina is ſaid to be commonly employed in Britiſh potteries for this purpoſe.

PLATISMA, in *Botany*, from πλατυς, *broad*, the name of the nineteenth ſection of Lichens, in the Prodromus of Acharius. See LICHENES.

PLATNER, JOHN ZACHARIAH, in *Biography*, an able phyſician, was born at Chemnitz, in Miſnia, in Auguſt 1694. His father, who was one of the principal merchants of the place, intended to make him his ſucceſſor in the ſame line ; but reſolved to enlarge his mind by a liberal education, and to give him a knowledge of ancient languages and philoſophy, before he led him into commercial purſuits. But young Platner poſſeſſed a delicate conſtitution ; and, partly on this account, and partly in conſideration of the rapid progreſs which he made in his ſtudies, his parents relinquiſhed their original deſign, and conſented that he ſhould direct his attention to medicine, for which he had manifeſted a ſtrong inclination. He repaired, therefore, to Leipſic in 1712, where he purſued his ſtudies for the ſpace of three years, when the reputation of the univerſity of Halle induced him to viſit its ſchools. During the following winter, he ſtudied mineralogy and metallurgy in the celebrated mines of Chemnitz ; after which he returned to Halle, and received the degree of doctor in September 1716. The purſuit of profeſſional knowledge became his paſſion, and he ſpent four years in viſiting the moſt celebrated ſeats of learning in Europe. At Paris he particularly attended to anatomy and ſurgical operations, eſpecially to thoſe relative to diſeaſes of the eye, in which he is ſaid by Haller to have acquired ſuch dexterity, as to have ſucceeded in the cure of ſome, which the celebrated St. Ives had failed to relieve.

He now determined to ſettle at Leipſic, and accordingly fixed himſelf in that city in 1720 ; and his great profeſſional acquirements were ſpeedily rewarded by public acknowledgements of their value. In 1721 he was appointed profeſſor extraordinary of anatomy and ſurgery. In 1724 he obtained the chair of phyſiology, which had become vacant by the death of Rivinus; in 1737 he was promoted to the profeſſorſhip of pathology ; and in 1747 to that of therapeutics. He was alſo nominated perpetual dean of the faculty, and conſulting phyſician to the court of Saxony. He did not live long, however, to enjoy theſe flattering diſtinctions ; for he was carried off ſuddenly, on the 19th of December 1747, in the fifty-fourth year of his age, by a paroxyſm of aſthma. He had viſited his patients on the morning of that day, and given his lecture after dinner ; and upon returning home, about ſix in the evening, was ſeized with the fatal fit.

He left only three different works, the firſt of which, entitled "Inſtitutiones Chirurgiæ Rationalis, tum medicæ, tum manualis," Leipſic 1745, was publiſhed by himſelf. It paſſed through ſeveral editions. The ſecond, entitled "Opuſculorum Chirurgicorum et Anatomicorum Tomi duo : Diſſertationes et Proluſiones," ibid. 1749, was edited by his ſon, Frederic Platner, a profeſſor of law. And the third, entitled "Ars medendi ſingulis morbis accommodata," ibid. 1765, which had been bequeathed by the author to his pupil J. B. Boehmer, upon condition that it ſhould not be publiſhed, was printed by a bookſeller, Fritſch, into whoſe hands a copy of it fell eighteen years after the author's death. Eloy Dict. Hiſt. de la Med.

PLATO, a Greek comic poet, who flouriſhed about the cloſe of the fifth century B.C., was contemporary with Ariſtophanes and Euripides. He is ſaid to have left twenty-eight comedies, of which the titles of many are to be found in Athenæus, Pollux, and other writers. Of his works, only a few fragments remain, ſome of which are of the epigrammatic kind.

Plato. See Platoniſm.

We ſhall here obſerve, that Plato, Ariſtotle, Ariſtoxenus, and Plutarch, were for ever complaining of the corruption and degeneracy of muſic. The pious Plato, indeed, regarded it as fit only for the gods, and their celebration in religious ceremonies, or as a vehicle for religious and moral lectures in the education of youth; and with a methodiſtical ſpirit cenſured all ſuch as was uſed in theatres, ſocial feſtivity, or domeſtic amuſement: but modern divines might, with equal propriety, declaim againſt the profane uſe of bread as an aliment, becauſe it is adminiſtered in the moſt ſolemn rite of our religion. A line ſhould certainly be drawn between the muſic of the church and of the theatre; but totally to ſilence all muſical ſound, except upon ſolemn occaſions, ſeems to border upon downright fanaticiſm.

With reſpect to perfection and depravity, there is nothing ſo common among muſical diſputants, as for the favourers of one ſect to call that *degeneracy*, which thoſe of another call *refinement*. But Plato ſeems to have been always too fond of ideal excellence in every thing, to be ſatisfied with any other. His complaints of the degeneracy of muſic, may be ſeen in his third Book of Laws. The poets, indeed, never fail to charge the corruption of muſic upon its profeſſors, yet Plato throws the blame upon the poets themſelves. "The muſic of our forefathers," ſays he, "was divided into certain ſpecies and figures. Prayers to the gods were one ſpecies of ſong, to which they gave the name of hymns: oppoſed to this was another ſpecies, which, in particular, might be called threni; another, pæones; and another, the birth of Dionyſius, which I hold to be the dithyrambus: there were alſo citharœdic nomi, ſo called, as being ſtill another ſong. Theſe, and ſome others, being preſcribed, it was not allowable to uſe one ſpecies of melos for another. But, in proceſs of time, the poets firſt introduced an unlearned licence, being poetic by nature, but unſkilled in the rules of the ſcience, trampling upon its laws, over attentive to pleaſe, mixing the threni with the hymns, and the pæones with the dithyrambi, imitating the muſic of the flute upon the cithara, and confounding all things with all." Plat. de Legibus, as tranſlated by ſir F. H. E. Stiles. Though it was Plato's opinion, that the government of a ſtate, and the morals of a people, would be affected by a change in the national muſic, yet this was not the opinion of Cicero, who in many other particulars is a rigid Platoniſt: "Change," ſays this orator, "the government or cuſtoms of a city, and it will certainly change the muſic." De Legib. lib. iii.

It has been ſaid by many writers, both ancient and modern, that Plato was deeply ſkilled in the muſic of his time; but it does not appear that his claims to ſkill in this art extend further than to mere theory, or a very little more. Plutarch, indeed, in his dialogue, proves his profound muſical ſcience; but how? By a long paſſage from his Timæus, in which he applies muſical ratios to the ſoul.

However this may have been, it is difficult to refrain from numbering this philoſopher, together with Ariſtotle, Ariſtoxenus, and Plutarch, though ſuch illuſtrious characters, and, in other particulars, ſuch excellent writers, among the muſical grumblers and croakers of antiquity. They all equally lament the loſs of good muſic, without conſidering that every age had, probably, done the ſame, whether right or wrong, from the beginning of the world; always throwing muſical perfection into times remote from their own, as a thing never to be known but by tradition. The golden age had not its name from thoſe who lived in it.

Ariſtotle, indeed, complains of degeneracy in a more liberal way: "every kind of muſic," ſays he, "is good for ſome purpoſe or other; that of the theatres is neceſſary for the amuſement of the mob; the theatrical tranſitions, and the tawdry and glaring melodies in uſe there, are ſuited to the perverſion of their minds and manners, and let them enjoy them."

The complaints of Ariſtoxenus are more natural than thoſe of Plato and Ariſtotle; for he was not only leſs a philoſopher, but more a muſician; and, as a profeſſor, and an author on the ſubject of muſic, he muſt have had rivals to write down. Heſiod ſays that bards hate bards, and beggars beggars. And it has been the practice for writers on muſic, in all ages, to treat their contemporaries with ſeverity and ſcorn. Gaſpar Printz inſerts in his book a canzonet in four parts, in which every rule of compoſition is violated, and calls it modern; as if error was always new. But beſides a natural tendency in human nature, or at leaſt in the nature of authors, towards envy and malignity, Ariſtoxenus had a ſyſtem to ſupport, which is uſually done at the expence of moderation, truth, and every thing that ſtands in its way; for, like the tyrant Procruſtes, the builder of a ſyſtem, or the defender of an hypotheſis, cuts ſhorter what is too long, and ſtretches to his purpoſe whatever is too ſhort.

The muſic of the Greeks, in the time of Ariſtoxenus, was too remote from perfection to be much injured by innovation and refinement; and yet Athenæus gives a paſſage from a work of this writer, now loſt, in which he makes the following complaints: "I, and a few others, recollecting what muſic once was, and conſidering what it now is, as corrupted by the theatre, imitate the people of Poſſidonium, who annually celebrate a feſtival after the Greek manner, in order to keep up the memory of what they once were; and before they depart, with tears deplore the barbarous ſtate into which they are brought by the Tuſcans and Romans."

Though Ariſtoxenus lived with Alexander the Great, with Plato, and with Ariſtotle, when all other arts and ſciences had arrived at their greateſt degree of force and refinement; yet muſic, from whatever cauſe, does not ſeem, at that, or at any time, to have kept pace with other arts in its improvements: at leaſt, it did not in Italy; nor, indeed, in England or France, if we compare the poetry of Milton with the muſic of Henry Lawes, or the writings of Racine and Boileau, with the compoſitions of Lully.

PLATOBERG, in *Geography*, a mountain of France, in the department of Mont Tonnerre; four miles N. of Landau.

PLATONIA, in *Natural Hiſtory*, a name given by the modern Greeks to the *prox* of Ariſtotle, and of other ancient writers in that language. This is the *cervus platyceros*, or broad-horned ſtag. Some have tranſlated this *dama;* but they are to be underſtood in this as meaning the *dama* of their own times, not that of the ancients; that being the *iſarus*, or chamois-goat, not any animal of the ſtag kind, or by any means meriting that title.

PLATONIC, ſomething that relates to Plato, his ſchool, philoſophy, opinions, or the like.

Platonic *Bodies*, are the ſame with what we otherwiſe call regular bodies.

Platonic *Love* denotes a pure ſpiritual affection, ſubſiſting between the different ſexes, abſtracted from all carnal appetites, and regarding no other object but the mind, and its beauties; or it is even a ſincere diſintereſted friendſhip ſubſiſting between perſons of the ſame ſex, abſtracted from any ſelfiſh views, and regarding no other object but the perſon.

The term took its riſe from the philoſopher Plato, a ſtrenuous advocate for each kind.

The world has a long time laughed at Plato's notions of love and friendſhip. In effect, they appear arrant chimeras, contrary to the intentions of nature, and inconſiſtent with the great law of ſelf-preſervation; into which love and friendſhip are both ultimately reſolvable.

PLATONIC *Year*, or the *great year*, is a period of time determined by the revolution of the equinoxes, or the ſpace in which the ſtars and conſtellations return to their former places, in reſpect of the equinoxes.

The Platonic year, according to Tycho Brahe, is 25816; according to Ricciolus, 25920; and according to Caſſini, 24800 years. See PRECESSION *of the Equinoxes*.

This period, which is more than five times the age of the world, once accompliſhed, it was an opinion among the ancients, that the world was to begin anew, and the ſame ſeries of things to return again.

PLATONISM, the doctrine and ſentiments of Plato and his followers, with regard to philoſophy, &c.

The founder of this ſyſtem of philoſophy, Plato, the ſon of Ariſto, was an Athenian, related by his father to Codrus, and by his mother to Solon; born in the iſland of Ægina, where his father reſided after it became ſubject to Athens, on the ſeventh of Thargelion, in the firſt year of the 88th olympiad, B.C. 428, or, as it may be more accurately fixed, in the third year of the 87th olympiad, B.C. 430.

He gave early indications of a diſtinguiſhed genius; and whilſt he was young he was inſtructed in the rudiments of letters by the grammarian Dionyſius, and trained in athletic exerciſes by Ariſto of Argos. He applied with induſtry to the ſtudy and practice of painting and poetry. In the latter he made ſuch proficiency as to produce an epic poem, which, however, upon comparing it with Homer, he committed to the flames; and at the age of 20 years he compoſed a dramatic piece, which he delivered to the performers in order to its being exhibited on the theatre; but in the mean while he became acquainted with Socrates, and ſo much enamoured of his philoſophy, that on the day before it was to have been repreſented to the public he withdrew it, and gave up all ideas of poetical diſtinction. After having ſpent his youth in exerciſes of the body, painting, poetry, and muſic, he became, at the age of twenty years, a diſciple of Socrates, and applied himſelf wholly to the ſtudy of wiſdom. It is ſuppoſed, that he received the firſt tincture of philoſophy from Cratylus and Hermogenes, who taught the ſyſtems of Heraclitus and Parmenides. But having become a ſtated diſciple of Socrates, he remained with him eight years. Blending, however, foreign tenets with thoſe of his maſter, and grafting upon the Socratic ſyſtem opinions which he had taken from ſome other ſtock, he occaſionally diſpleaſed the followers of Socrates, and ſometimes gave Socrates himſelf occaſion for complaint. Nevertheleſs, he retained a zealous attachment to this maſter, and when he was ſummoned before the ſenate, Plato undertook to plead his cauſe, and began a ſpeech in his defence, which the partiality and violence of his judges would not allow him to proſecute. After the condemnation of Socrates, he preſented him with money ſufficient for redeeming his life, which, however, this eminent teacher of wiſdom refuſed to accept. During his impriſonment, Plato attended him, and was preſent at a converſation which he held with his friends concerning the immortality of the ſoul, the ſubſtance of which he afterwards committed to writing, in the beautiful dialogue entitled "Phædo," intermixing occaſionally his own opinions and language. Upon the death of his maſter he withdrew, with ſeveral other friends of Socrates, to Megara, where they were hoſpitably entertained by Euclid, and remained till the ferment at Athens ſubſided. Under Euclid he ſtudied the art of reaſoning, and probably increaſed his fondneſs for diſputation. With a view of furniſhing himſelf with all the knowledge which the age in which he lived could ſupply, he travelled into every country which was likely to anſwer any uſeful purpoſe to him in this reſpect. In that part of Italy called Magna Græcia, there was a celebrated ſchool eſtabliſhed by Pythagoras, and here he was inſtructed in the myſteries of the Pythagorean ſyſtem, the ſubtleties of which he afterwards too freely blended with the ſimple doctrine of Socrates. He next viſited Theodorus of Cyrene, in order to be inſtructed in mathematical ſcience; and he then determined to ſtudy aſtronomy, and other ſciences, in Egypt. Under the diſguiſe of a merchant, and ſeller of oil, he traverſed the whole kingdom of Artaxerxes Mnemon, deriving information from the Egyptian prieſts concerning their aſtronomical obſervations and calculations. In Egypt, it is ſaid, he acquired his opinions concerning the origin of the world, and learned the doctrines of the tranſmigration and immortality of the ſoul; but it is more probable, that he learned the latter doctrine from Socrates, and the former from Pythagoras. All things conſidered, it is not very likely that Plato derived his ſyſtem of philoſophy from the Egyptians; nor is it more probable, that during his reſidence in Egypt, Plato became acquainted with the doctrine of the Hebrews, and enriched his ſyſtem with ſpoils from their ſacred books.

The Platonic philoſophy appears, in many reſpects, very conſiſtent with the Moſaic; and a great party of the primitive fathers follow the opinions of that philoſopher, as being favourable to Chriſtianity. Juſtin is of opinion, that Plato could not learn many things which he has ſaid in his works, from mere natural reaſon; but thinks he might have learnt them from the books of Moſes, which he might have read when in Egypt.

Hence Numenius the Pythagorean expreſsly calls Plato the *Attic Moſes*, and upbraids him with plagiariſm; becauſe he ſtole his doctrine about the world and God from the books of Moſes.

Theodoret ſays expreſsly that he has nothing good and commendable about the Deity and his worſhip, but what he ſtole from the Hebrew theology; and Clemens Alexandrinus calls him the *Hebrew philoſopher*.

Gale is very particular in his proof of the point, that Plato borrowed his philoſophy from the ſcriptures, either immediately, or by means of tradition; and, beſide the authority of the ancient writers, he brings ſome arguments from the thing itſelf. As, *e. gr.* Plato's confeſſion, that the Greeks borrowed their knowledge of the one infinite God from an ancient people, better and nearer to God than they; by which people, our author makes no doubt, he meant the Jews, from his account of the ſtate of innocence; as, that man was born of the earth, that he was naked, that he enjoyed a truly happy ſtate, that he converſed with brutes, &c. In effect, from an examen of all the parts of Plato's philoſophy, phyſical, metaphyſical, and ethical, this author finds, in every one, evident characters of its ſacred original.

St. Auguſtine commends the Platonic philoſophy; and even ſays, that the Platoniſts were not far from Chriſtianity. He adds, that the generality of the new Platoniſts of his time embraced the faith; and he expreſsly acknowledges, that it was by means of the Platonic ſyſtem he was able to underſtand the doctrine of the Trinity.

Juſtin Martyr profeſſes, that Plato's doctrine was of the utmoſt advantage to him, in helping him to believe the myſteries of the Chriſtian faith. To which it may be added, that it was, in good meaſure, by Plato's help, that Origen confuted Celſus.

Indeed, the late author of "Platoniſme Devoilé" carries things to an extravagant length, when he contends, that the dogmata of our religion are only the opinions of Plato; that the fathers give us nothing of the myſteries thereof, but what they learnt from him; and that Chriſtianity is only Platoniſm veiled, or covered over. To which opinion, however, M. le Clerc ſeems alſo a little inclined.

The opinion, that Plato borrowed the dogmata of his philoſophy from the ſcriptures, which has been ſtrenuouſly maintained by ſeveral Jewiſh and Chriſtian writers, has, however, as others maintain, little foundation beſides mere conjecture; and it is ſuppoſed to have originated in that injudicious zeal for the honour of revelation, which led theſe writers to make the Hebrew ſcriptures, or traditions, the ſource of all gentile wiſdom.

The chief grounds upon which the above-mentioned opinion reſts are the following: 1. The authority of the Jewiſh writers, Joſephus and Ariſtobulus, and of the Chriſtian fathers, Juſtin Martyr, Clemens Alexandrinus, Euſebius, Cyril of Alexandria, Theodoret, Ambroſe, and others. 2. The opinion that a Greek verſion of the Hebrew ſcriptures appeared in Egypt before the time of Plato, which he might have ſeen and read, as Clemens Alexandrinus and Euſebius, on the teſtimony of Ariſtobulus, aſſert. 3. The preſumption, that the Egyptians borrowed many of their tenets from the Iſraelites, and communicated them to Plato. And, 4. The agreement of the doctrines of Plato with thoſe of the Hebrews. But to theſe arguments it has been replied, 1. That the teſtimony of the Chriſtian fathers is, with regard to the preſent queſtion, of little value; as they had recourſe to no authentic memorials or impartial witneſſes, but credited the aſſertions of certain Jewiſh writers, who, ſeveral centuries after the time of Plato, with a view of gratifying their own vanity, and that of their countrymen, pretended that all gentile wiſdom had been originally derived from Moſes; and particularly, that Plato, during his reſidence in Egypt, had been inſtructed in the Hebrew ſchool. This notion was eagerly adopted by ſeveral learned Platoniſts, who in the ſecond century were converted to Chriſtianity, but ſtill retained an attachment to their former maſter; and from this time it became a common practice among thoſe who affected the credit of Greek erudition, to maintain, that whatever opinions Plato and his followers held, ſimilar to the doctrines of revelation, had been borrowed either from the Hebrews or Chriſtians. 2. A Greek verſion of the Hebrew ſcriptures, prior to the time of Alexander, never exiſted but in the brain of Ariſtobulus. 3. Equally unſupported is the aſſertion, that the Egyptians, and even Plato himſelf, converſed with the Jews on theological ſubjects. Laſtly, no proof of the point in queſtion can ariſe from the ſuppoſed agreement between the Moſaic and Platonic doctrines; for the agreement is either imaginary, or it conſiſts of ſuch particulars as might be eaſily diſcovered by the light of reaſon. Beſides, the true doctrine of Plato was ſo far adulterated and blended with other ſyſtems in the Alexandrian ſchool, that thoſe Chriſtian fathers who had ſtudied Platoniſm in this ſchool, might eaſily conceive that there was a greater harmony between the Platonic doctrine and their own creed than in reality exiſted.

Plato, after having availed himſelf of all the information which he could receive in diſtant countries, returned to the Pythagorean ſchool at Tarentum, in Italy, and here he attempted to improve his own ſyſtem by incorporating with it the doctrine of Pythagoras. In recounting the ſources of Plato's philoſophy, we may obſerve, that he borrowed his dialectics from Euclid of Megara; the principles of natural philoſophy he learned in the Eleatic ſchool, from Hermogenes and Cratylus; and combining theſe with the Pythagorean doctrine of natural cauſes, he framed from both his ſyſtem of metaphyſics. In mathematics and aſtronomy he was inſtructed in the Cyrenaic ſchool, and by the Egyptian prieſts. From Socrates he imbibed the pure principles of moral and political wiſdom, the ſimplicity of which he afterwards obſcured by Pythagorean ſpeculations. At length Plato, with his mind thus richly furniſhed, ſettled at Athens, and accompliſhed the deſign which he had long meditated, of forming a new ſchool for the inſtruction of youth in the principles of philoſophy. The place he choſe for this purpoſe was a public grove, called the *Academy*; which ſee. Here he eſtabliſhed his ſchool, and over the door of it, in order to indicate his reſpect for mathematical ſtudies, and how neceſſary a preparation he thought them for higher ſpeculations, he placed this inſcription, Ὀυδεὶς ἀγεωμέτρητος ἐσίτω: "Let no one, who is unacquainted with geometry, enter here." This ſchool became famous, and was crowded not only by young men from every quarter and of every diſtinction, but by females diſguiſed in men's clothes. Among the moſt illuſtrious of his followers we may reckon Dion, the Syracuſan prince, and the orators Hyperides, Lycurgus, Demoſthenes, and Iſocrates.

Such diſtinguiſhed reputation excited among the companions of Plato, formerly the diſciples of Socrates, a ſpirit of emulation, which degenerated into envy, and which terminated in detraction and obloquy. To this natural jealouſy it was owing, that Xenophon and Plato, though they relate the diſcourſes of their common maſter, ſtudiouſly avoid to mention one another. Diogenes the Cynic ridiculed Plato's doctrine of ideas, and other abſtract ſpeculations. Nevertheleſs, the fame of Plato increaſed, and his political wiſdom was held in ſuch high eſtimation, that ſeveral ſtates ſolicited his aſſiſtance in new-modelling their reſpective forms of government. The Arcadians and the Thebans applied to him for this purpoſe, but he rejected their applications, becauſe they refuſed to adopt the plan of his republic, which required an equal diſtribution of property. He gave his advice to ſeveral Grecian ſtates, and furniſhed a code of laws for Syracuſe. At three different periods he viſited the court of Dionyſius, tyrant of Sicily, and made ſeveral attempts to ſubdue his haughty and tyrannical ſpirit. The object of his firſt viſit to Sicily, in the fortieth year of his age, was to ſurvey the iſland, and to obſerve the wonderful phenomena of mount Ætna. During his reſidence at Syracuſe, he was employed in the inſtruction of Dion, the king's brother-in-law; and in his efforts to reſcue his pupil from the baneful influence of the general depravity, he was not diſappointed. Dion, inſpired with the love of wiſdom, was deſirous of introducing his preceptor to Dionyſius, the tyrant; but his diſcourſe with him being levelled againſt the vices and cruelties of his reign, the tyrant conceived a prejudice againſt Plato, and formed a deſign againſt his life, which by the aſſiſtance of Dion he eſcaped. Having engaged Pollis, a delegate from Sparta, to take charge of the philoſopher, and to land him ſafely in his own country, Dionyſius attempted to defeat his friendly purpoſe, and engaged Pollis either to put him to death, or to ſell him as a ſlave, in his paſſage. Accordingly, Pollis ſold him in the iſland of Ægina, the inhabitants of which were at war with the Athenians. Here he became acquainted with Anicerris, a Cyrenaic philoſopher, who teſtified his reſpect for Plato, by purchaſing his freedom for thirty minæ, and ſending him home to Athens; and when Plato's relations afterwards wiſhed to repay the money which Anicerris had advanced, he declined accepting it, alleging, with the genuine ſpirit which true philoſophy always inſpires, that he ſaw no reaſon why Plato's relations ſhould engroſs to themſelves the honour of ſerving him.

After much ſolicitation and deluſive promiſes on the part of Dionyſius, Plato took a ſecond journey to Syracuſe, where he was received by the king with ſingular reſpect, and ſacrifices were offered in congratulation of his arrival. It was not long, however, before Dion was baniſhed into Italy, and Plato was ſent back into his own country. Dionyſius again renewed his intreaties for the return of Plato to his court, who arrived a third time at Syracuſe, and for ſome time poſſeſſed the chief influence and authority there. But finding it impoſſible to prevail upon Dionyſius to adopt his ſyſtem of policy, or to recall Dion from his exile, a mutual diſtruſt aroſe between the tyrant and the philoſopher, and Plato, diſſatisfied with his ſituation, earneſtly requeſted permiſſion to return to Greece. After ſome delay permiſſion was granted, and a veſſel of convoy was provided; but the tyrant again changed his mind, and detained Plato in Syracuſe againſt his inclination. The tyrant's ſeeming reſpect was converted into rage, and the philoſopher was diſmiſſed from court, and committed to the cuſtody of ſoldiers. When his Pythagorean friends at Tarentum heard of his dangerous ſituation, they diſpatched an embaſſy to Dionyſius, demanding a fulfilment of his promiſes; and the tyrant, dreading the conſequences of a refuſal, and the diſgrace of having baniſhed from his court the firſt philoſopher of the age, gave Plato a magnificent entertainment, and ſent him away loaded with rich preſents.

Plato, reſtored to his country and his ſchool, devoted himſelf to ſcience, and ſpent the laſt years of a long life in the inſtruction of youth. Having enjoyed the advantage of an athletic conſtitution, and lived all his days temperately, he arrived at the 81ſt, or, according to ſome writers, the 79th year of his age, and died, through the mere decay of nature, in the firſt year of the 108th olympiad, B.C. 348.

He paſſed his whole life in a ſtate of celibacy, and as he had no natural heirs, he bequeathed all his effects by will to his friend Adiamantus. The grove and garden, which had been the ſcene of his philoſophical labours, at laſt afforded him a ſepulchre. Statues and altars were erected to his memory: the day of his death long continued to be celebrated as a feſtival by his followers; and his portrait is to this day preſerved in gems: but the moſt permanent monuments of his genius are his writings, which have been tranſmitted, without material injury, to the preſent times.

The character of Plato has been differently appreciated. Whilſt ſome have extolled him with the language of mere panegyric, as if he had been free even from human frailties, others have loaded his memory with unjuſt obloquy and reproach. Several anecdotes are preſerved which reflect honour on his moral principles and character. Such was his command of temper, that whilſt he was lifting up his hand to correct his ſervant for an offence, and perceiving himſelf angry, he kept his arm in that elevated poſture, and ſaid to a friend, who aſked him what he was about to do, "I am puniſhing a paſſionate man." At another time, he ſaid to one of his ſlaves, "I would chaſtiſe you if I were not angry." At the Olympic games he paſſed a day with ſome ſtrangers, who were delighted with his affable converſation, and who merely knew that his name was Plato. When they parted, he invited them, if they ſhould viſit Athens, to take up their reſidence at his houſe: they accepted his invitation, and were courteouſly entertained. During their ſtay, they expreſſed a wiſh to be introduced to his nameſake, the famous philoſopher, and to be ſhewn his academy. Plato, ſmiling, ſaid, "I am the perſon you wiſh to ſee." The diſcovery ſurprized them, nor could they eaſily perſuade themſelves, that a philoſopher, ſo eminent, would condeſcend to converſe ſo familiarly with ſtrangers. When he was informed that his enemies were induſtriouſly circulating reports to his diſadvantage, he ſaid, "I will live ſo, that none ſhall believe them." One of his friends remarking that he ſeemed no leſs deſirous to learn himſelf, than to teach others, aſked him, how long he intended to be a ſcholar? "As long," ſays he, "as I am not aſhamed to grow wiſer and better."

Of his merit as a philoſopher, we may form the moſt ſatisfactory judgment from his writings. As to his ſtyle, it retained that ſtrong tincture of a poetical ſpirit, which he diſcovered in his firſt productions. Hence have proceeded thoſe encomiums which ancient and modern critics have paſſed upon his language; and on this account it was held in high eſtimation by Cicero, who ſays, that "if Jupiter were to ſpeak in the Greek tongue, he would borrow the ſtyle of Plato." Ariſtotle deſcribes it as "a middle ſpecies of diction, between verſe and proſe." Moſt of his dialogues, independently of the copious and ſplendid diction that enriches them, are juſtly admired for their literary merit: the introductions are pertinent and amuſing; the courſe of the debate, or converſation, is clearly marked; the characters are accurately ſupported; every ſpeaker has his proper place, language, and manner; the ſcenery of the conference is painted in lively colours; and the whole is, with admirable art, adorned and enlivened by thoſe minute embelliſhments which render the colloquial mode of writing ſo peculiarly pleaſing. Even upon abſtract ſubjects, moral, metaphyſical or mathematical, the language of Plato is often clear as the running ſtream, and in ſimplicity and ſweetneſs vies with the humble violet which perfumes the vale. In theſe beautiful parts of his works, it has been conjectured, and not improbably, that Socrates and Lyſias were his models. At other times, his ſtyle is turgid and bombaſt, puerile or frigid, and his metaphors are harſh, and he is too fond of introducing new terms, with a bold and unwarrantable innovation. Faults of this kind have been noticed and cenſured by ſeveral ancient critics. His conceptions alſo have been charged with an inequality, ſimilar to that of his ſtyle. Whilſt he adheres to the ſchool of Socrates, and diſcourſes upon moral topics, he is much more pleaſing, than when he loſes himſelf with Pythagoras, in abſtruſe ſpeculations.

The Dialogues of Plato are claſſed by the ancients under the two heads of "didactic" and "inquiſitive." The former are divided into "ſpeculative," including *phyſical* and *logical*; and "practical," comprehending *ethical* and *political*. The latter, or "inquiſitive," are characteriſed by terms taken from the athletic art, and divided into the "gymnaſtic," and the "agoniſtic:" thoſe termed "gymnaſtic," ſuppoſed to be ſimilar to the *exerciſe*, were ſubdivided into the *majeutic*, as reſembling the teaching of the rudiments of the art, and the *picraſtic*, as repreſented by a ſkirmiſh, or trial of proficiency. The "agoniſtic" dialogues, ſuppoſed to reſemble the *combat*, were either *endeictic*, as exhibiting a ſpecimen of ſkill, or *anatreptic*, preſenting the ſpectacle of a perfect defeat. Inſtead of this whimſical claſſification, Plato's dialogues may not improperly be divided into *phyſical*, *logical*, *ethical*, and *political*.

The writings of Plato were originally collected by Hermodorus, one of his pupils: they conſiſt of 35 dialogues, and 13 epiſtles. They were firſt publiſhed, after the invention of printing, by Aldus Manutius, at Venice, in 1513. The editions of Ficinus and Serranus are the moſt valuable; but the notes and interpretations ſhould be read with caution; for Ficinus, having formed his conceptions of the doctrine of Plato after the model of the Alexandrian ſchool, frequently, in his "Arguments," miſrepreſents the deſign of the author, and in his verſion obſcures the ſenſe of the original; and Serranus, for want of an accurate acquaintance with the doctrine of his author, and under the influence of a ſtrong predilection for the ſcholaſtic ſyſtem of theology, ſometimes gives an incorrect and injudicious explanation of the text.

Availing ourſelves of the excellent work, which has furniſhed the materials of this article, we ſhall now proceed to detail the philoſophical ſyſtem of Plato, in order to which ſome general obſervations ſhould be premiſed. Plato, diſdaining the ſober method of reaſoning introduced by Socrates, left his firſt maſter in ſearch of other preceptors. Inclined to ſpeculative refinement, and miſled by the celebrity of the Italian ſchool, which abounded in ſubtleties, he attached himſelf to the Pythagorean philoſophy; and purſuing his ſtudies under the Egyptian prieſts, he deviated ſtill farther from the plain path of common ſenſe, which had been purſued in the Socratic ſchool. Among other errors which he adopted from foreign philoſophy, it was not the leaſt that he borrowed the art of concealing his real opinions: and hence his writings became not only incidentally, but perhaps deſignedly, obſcure. After the example of Pythagoras, he threw a veil of obſcurity over his public inſtructions, which was removed only for the benefit of thoſe who were admitted to his more private and confidential lectures. This concealed method of philoſophiſing he adopted partly from a regard to his perſonal ſafety, and partly, if not principally, from motives of vanity. For this purpoſe the colloquial form of inſtruction, introduced by Socrates in his conteſts with the Sophiſts, and adopted in the Dialectic ſchools, was found by Plato to be peculiarly convenient. Accordingly Cicero, though an enthuſiaſtic admirer of Plato, obſerves, that "Plato affirms nothing, but after producing many arguments, and examining a queſtion on every ſide, leaves it undetermined." His language likewiſe, occaſionally ſplendid, and at other times ambiguous and equivocal, renders his meaning often doubtful and unintelligible: to which we may add, that the obſcurity of his writings is greatly increaſed by the intermixture of mathematical ideas or language with thoſe of metaphyſics. After all, the principal cauſe of the want of perſpicuity that characterizes the writings of Plato is the extreme ſubtlety of his ſpeculations upon abſtract and ſublime topics. Raiſing man above his condition and nature, Plato unites him to certain imaginary divine principles, leads him through various orders of emanation and forms of intelligence to the Supreme Being, and repreſents theſe fictions of fancy as the firſt principles of wiſdom. In ſuch a wondrous maze of words does Plato involve his notions, that none of his diſciples, not even the ſagacious Stagirite, could unfold them; and yet we receive them as ſacred myſteries, and if we do not perfectly comprehend them, imagine that our intellects are too feeble to penetrate the conceptions of this divine philoſopher, and that our eyes are blinded, as Burnet in his "Archæologia" expreſſes it, by that reſplendent blaze of truth, upon which his eagle ſight could gaze without injury. Plato, indeed, ambitious of the honour of forming a new ſect, and endued by nature with more brilliancy of fancy than ſtrength of judgment, collected the tenets of other philoſophers, which were, in many particulars, contradictory, and could by no exertion of ingenuity be brought to coaleſce; and that, out of this heterogeneous maſs, he formed a confuſed ſyſtem, deſtitute of form or conſiſtency. This, it is ſaid, will be acknowledged by every one, who, in peruſing the philoſophical writings of Plato, is capable of diveſting himſelf of that blind reſpect for antiquity, by which the learned ſo frequently ſuffer themſelves to be miſled. In confirmation of this judgment, we need only refer to the dialogue entitled "Timæus;" a chaotic maſs of opinions, which no commentators have yet been able to reconcile, or to explain. The followers of Plato, inſtead of ariſing to diſperſe the clouds that envelope his ſyſtem, ſeem to have combined in increaſing its obſcurity. By ſucceſſive changes in the academy, after the death of its founder, new opinions were introduced, and theſe increaſed the difficulty of exploring the true ſenſe of Plato; and when, in a ſubſequent period, the Platonic philoſophy was profeſſed in Alexandria, it was further adulterated by an injudicious and abſurd attempt to mould into one ſyſtem the doctrines of Plato, the traditionary tenets of Egypt and the eaſtern nations, and the ſacred records of the Jews and Chriſtians; a coalition which will appear, in the ſequel of this article, to have proved exceedingly injurious both to philoſophy and religion.

All the preceding circumſtances conſidered, it will appear to be no eaſy taſk to delineate an accurate ſketch of the Platonic philoſophy. This philoſophy, as he ſuggeſts, and his interpreters allow, may be divided into three branches: the firſt treating of the art of reaſoning, or dialectics; the ſecond, of theoretical queſtions concerning nature, or phyſics; and the third, of practical ſubjects reſpecting life and manners, or ethics.

Wiſdom, in the ſtrict Platonic ſenſe of the term, is the knowledge of thoſe things which truly exiſt, and are comprehended by the intellect, particularly thoſe which reſpect God, and the human ſoul as diſtinct from the body. Philoſophy is the deſire of divine ſcience, or the liberation of the mind from the body, and its direction towards thoſe real eſſences, which are perceptible only by the underſtanding: accordingly, a philoſopher muſt poſſeſs a mind naturally turned towards contemplation, an ardent love of truth, a penetrating judgment, and a retentive memory; and he muſt alſo be inured to the exerciſe of temperance and fortitude, that nothing corporeal may divert him from the purſuit of wiſdom. Philoſophy, as employed in the contemplation of truth, is termed theoretical; and as converſant in the regulation of actions, it is practical. The former produces a contemplative life, in which the mind, occupied in meditations purely intellectual, acquires a reſemblance to the divinity; the latter leads to an active life, and applies the principles of wiſdom to the benefit of ſociety. Beſides the contemplation of truth and virtue, the philoſopher will inquire into the right conduct of the underſtanding, and the powers of ſpeech in the purſuits of knowledge, or will ſtudy the art of reaſoning or diſputation. The office of philoſophy then is threefold, *dialectic*, *theoretical*, and *practical*.

For the ſum of Plato's doctrine on *dialectics*, as collected from his dialogues, ſee DIALECTICA. The *theoretical* philoſophy is divided by Plato into three branches, *viz. theological*, *phyſical*, and *mathematical*.

On *theology*, the fundamental doctrine of Plato, as well as that of other ancient philoſophers, is, that from nothing nothing can proceed. This univerſal axiom, applied not only to the infinite efficient, but to the material cauſe, Plato, in his "Timæus," lays down as the ground of his reaſoning concerning the origin of the world. In this dialogue, which comprehends his whole doctrine on the formation of the univerſe, matter is ſo manifeſtly ſpoken of as eternally co-exiſting with God, that this part of his doctrine could not have been miſtaken by ſo many learned and able writers, if they had not been deſirous of eſtabliſhing a coincidence of doctrine between the writings of Plato and of Moſes. On the other hand, it is obſerved by the learned Dr. Cudworth, that though ſome of the ancient fathers impute to Plato the opinion, that matter was an unmade ſelf-exiſtent being, there ſeems to be no ſufficient ground for their ſo doing; and Porphyry, Iamblichus, Proclus, and other Platoniſts, do not only profeſſedly oppoſe the ſame as falſe, but alſo as that which was diſſonant from Plato's principles. However, he acknowledges, that Plato did aſſert a plurality of gods, meaning animated or intellectual beings, or dæmons, ſuperior to men, to whom honour and worſhip are due, and applying the appellation to the ſun, moon, and ſtars, and alſo to the earth. Nevertheleſs he aſſerts, at the ſame time, that there was one ſupreme God, the ſelf-originated being, the maker of the heaven and earth, and of all thoſe other gods. He alſo maintains, that the Pſyche, or univerſal mundane ſoul, which is a ſelf-moving principle, and the immediate cauſe of all the motion which is in the world, was neither eternal nor ſelf-exiſtent, but made or produced by God in time; and above this ſelf-moving Pſyche, but ſubordinate to the Supreme Being, and derived by emanation from him, which he calls τὸ ἓν, and τ' αγαθον, *the good*, he ſuppoſes an immoveable Nous or intellect, which was properly the Demiurgus, or former of the world.

The firſt matter of which this body of the univerſe was formed, he obſerves, was a rude undigeſted heap, or chaos: now, adds he, the creation was a mixed production; and the world is the reſult of a combination of neceſſity and underſtanding, *i. e.* of matter, which he calls neceſſity, and the divine wiſdom; yet ſo that mind doth rule over neceſſity: and to this neceſſity he aſcribes the introduction and prevalence both of moral and natural evil; maintaining, however, that the evils reſulting from the neceſſity of imperfect beings are over-ruled by Mind or God for good.

The principles, or elements which Plato lays down are fire, air, water, and earth.

He ſuppoſes two heavens, the *empyrean*, which he takes to be of a fiery nature, and to be inhabited by angels, &c.; and the *ſtarry* heaven, which he teaches is not adamantine, or ſolid, but liquid and ſpirable.

Although Plato, in his "Timæus," as other writers argue, calls God "the parent of the univerſe;" and in his "Sophiſta," ſpeaks of him as "creating animate and inanimate beings, which did not before exiſt;" yet theſe expreſſions do not neceſſarily imply that no prior matter exiſted, from which theſe new beings were formed. Through the whole "Timæus," Plato ſuppoſes two eternal and independent cauſes of all things: one, that by which all things are made, which is God; the other, that from which all things are made, which is matter. He diſtinguiſhes between God, matter, and the univerſe; and ſuppoſes the architect of the world to have formed it out of a maſs of pre-exiſtent matter. According to Plato, matter is an eternal and infinite principle, originally of no form, yet capable of receiving any, and infinitely diviſible; but his notion of it is eſſentially different from that which ſuppoſes it to conſiſt of ſmall indiviſible particles; and, therefore, Plato is not to be ranked among the Atomic philoſophers. Plato alſo maintains, that there is in matter a neceſſary, but blind and refractory force; and that hence ariſes a propenſity in matter to diſorder and deformity, which is the cauſe of all the imperfection which appears in the works of God, and the origin of evil. See Evil.

The principle oppoſite to matter, in the ſyſtem of Plato, is God, an intelligent cauſe, the origin of all ſpiritual being, and the former of the material world; whoſe nature he thought it difficult to diſcover, and, when diſcovered, impoſſible to divulge. The exiſtence of God he inferred from the marks of intelligence, which appear in the form and arrangement of bodies in the viſible world; and from the unity of the material ſyſtem he concluded, that the mind by which it was formed muſt be one. God, according to Plato, is the ſupreme intelligence, incorporeal, without beginning, end, or change, and capable of being perceived only by the mind. Plato aſcribes to the Deity all thoſe qualities which modern philoſophers attribute to immaterial ſubſtance, and conceives him to be in his nature ſimple, uncircumſcribed in ſpace, the author of all regulated motion, and, in fine, poſſeſſed of intelligence in the higheſt perfection. Whatever were Plato's notions of the eſſence of Deity, he aſcribed to him wiſdom and power ſufficient for the formation and preſervation of the world, and ſuppoſed him poſſeſſed of goodneſs, which inclined him to deſire, and, as far as the refractory nature of matter would permit, to produce, the happineſs of the univerſe. This great being is diſtinguiſhed by the appellation Το Αγαθον, *the Good*. "God, that he might form a perfect world," ſays Plato, followed that eternal pattern, which remains immutable, and which can only be comprehended by reaſon." But this pattern, or archetype, he has explained ſo obſcurely, that his interpreters and followers have been led to adopt very different opinions concerning it. Some have inferred from various paſſages that occur in his writings, that the whole of Plato's doctrine, with reſpect to the formation of the world, amounts to nothing more than that the Deity employed his underſtanding or reaſon in planning and executing the ſyſtem of the univerſe; and, conſequently, that by ideas exiſting in the reaſon of God are only meant conceptions formed in the divine mind. But by ideas Plato appears to have meant ſomething much more myſterious; namely, patterns, or archetypes, ſubſiſting by themſelves, as real beings, οντως οντα, in the divine reaſon, as in their original and eternal region, and iſſuing thence to give form to ſenſible things, and to become objects of contemplation and ſcience to rational beings. It is the doctrine of the "Timæus," that ὁ λογισμος τȣ θεȣ, the reaſon of God, comprehends examples of all things, and that this reaſon is one of the primary cauſes of things. Plutarch ſays, that Plato ſuppoſes theſe principles God, matter, and idea. Juſtin Martyr, Pſeudo-Origen, and others, aſſert the ſame. Theſe ideas Plato defines to be the peculiar natures of things, or eſſences as ſuch; and aſſerts, that they always remain the ſame, without beginning or end. Plato, having been from his youth converſant with Cratylus, a diſciple of Heraclitus, and inſtructed in the doctrine of that ſchool, that all ſenſible things are variable, and cannot be proper objects of ſcience, reaſonably concluded, that if there be any ſuch thing as ſcience, there muſt exiſt, beſides ſenſible objects, certain permanent natures, perceptible only by the intellect. Such natures, divine in their origin, and eternal and immutable in their exiſtence, he admitted into his ſyſtem, and called them ideas. Theſe objects of contemplation and ſcience Plato ſeems to have found in the ſchool of Pythagoras, whoſe numbers agreed in many leading characters with the ideas of Plato, and were employed for the ſame purpoſes, namely, to furniſh objects of true ſcience, and to elevate the human mind to a reſemblance to the divine. Plato compares the ſtate of the human mind, with reſpect to the material and the intellectual world, to that of a man, who, in a cave into which no light can enter but by a ſingle paſſage, views, upon a wall oppoſite to the entrance, the ſhadows of external objects, and miſtakes them for realities. See the article PERCEPTION.

It was another doctrine in the Platonic ſyſtem, that the deity formed the material world after a perfect archetype, which had eternally ſubſiſted in his reaſon, and endued it with a ſoul. This Plato ſuppoſed to be the animating principle in the univerſe, pervading and adorning all things. This third principle in nature is, in the Platonic ſyſtem, inferior to the Deity, being derived from that divine reaſon, which is the ſeat of the ideal world; thus eſſentially differing from the Stoical doctrine of the ſoul of the world, which ſuppoſed the eſſence of the divine nature diffuſed through the univerſe. The doctrine of a twofold ſoul of the world, the one υπερκοσμιον, preſiding over it, the other εγκοσμιον, reſiding in it, is an appendage to the ancient Platonic ſyſtem, introduced by the later Platoniſts, to accommodate this ſyſtem to the notions adopted by many of the Chriſtian fathers concerning the divine nature. But Plato's doctrine concerning God and the ſoul of the world differs materially from the doctrine of the Trinity, afterwards received in the Chriſtian church. Plato did not ſuppoſe three ſubſtances in one divine eſſence, ſeparate from the viſible world; but he taught, that the λογος, or reaſon of God, is the ſeat of the intelligible world, or of ideas, and that the ſoul of the world is a third ſubordinate nature, compounded of intelligence and matter. In the language of Plato, the univerſe, being animated by a ſoul which proceeds from God, is the ſon of God; and ſeveral parts of nature, particularly the heavenly bodies, are Gods. He probably conceived many ſubordinate divinities to have been produced at the ſame time with the ſoul of the world, and imagined that the Supreme Being appointed them to the charge of forming animal bodies, and ſuperintending the viſible world; a doctrine which he ſeems to have borrowed from the Pythagoreans, and particularly from Timæus the Locrian, who ſays, "the ruler of all aſſigned the inſpection of human affairs to dæmons, and committed to them the government of the world."

On the foundation of the doctrine, above explained, concerning God, matter, ideas, the ſoul of the world, and dæmons, Plato raiſed the ſtructure of his phyſics: thinking, that the ſupreme Architect, by uniting eternal and immutable ideas or forms to variable matter, produced the viſible world; and believing, that the world had a beginning in time, and not to have exiſted from eternity.

Other tenets included in the Platonic doctrine of nature were, that the univerſe is one animated being, including within its limits all animated natures; that fire and earth were firſt formed, and afterwards united by means of air and water; that from perfect parts one perfect whole was produced, of a ſpherical figure, as in itſelf moſt beautiful, and beſt adapted to contain all other figures; that the elementary parts of the world are of regular geometrical forms, the particles of earth being cubical, thoſe of fire pyramidical, thoſe of air in the form of an octahedron, and thoſe of water in that of an icoſahedron; that theſe are adjuſted, in number, meaſure, and power, in perfect conformity to the geometrical laws of proportion; that the ſoul which pervades this ſphere is the cauſe of its revolution round its centre; and, laſtly, that the world will remain for ever, but that, by the action of its animating principle, it accompliſhes certain periods, within which every thing returns to its ancient place and ſtate. This periodical revolution of nature is called the PLATONIC, or *Great*, *year*.

Plato's doctrine concerning the human ſoul, as an emanation from God, is treated obſcurely. This emanation was not immediate, but through the intervention of the ſoul of the world, debaſed by ſome material admixture; and conſequently the human ſoul, receding farther from the firſt intelligence, is inferior in perfection to the ſoul of the world. The human ſoul, in the material part of its nature, is formed for converſing with ſenſible objects, and, in its intellectual part, capable of ſpiritual contemplation; but what he meant by οχημα, the material vehicle of the ſoul, is uncertain. The relation which the human ſoul, in its original conſtitution, bears to matter, Plato appears to have conſidered as the ſource of moral evil. As to the manner in which the ſoul acts on the body, Plato ſpeaks obſcurely and inconſiſtently; but it is probable, that, as he conceived the ſoul of the world to produce the motion of the earth, and the heavenly bodies, by means of that part of its nature which is material; ſo he ſuppoſed the power of moving bodies, which belongs to the human ſoul, to be the effect of its material principles. With regard to the origin and preſent ſtate of human ſouls, Plato ſuppoſes, that when God formed the univerſe, he ſeparated from the ſoul of the world inferior ſouls, equal in number to the ſtars, and aſſigned to each its proper celeſtial abode; but that theſe ſouls, by ſome means, or for ſome reaſon or other not explained, were ſent down to the earth into human bodies, as into a ſepulchre or priſon; and to this cauſe he aſcribes the depravity and miſery to which human nature is liable; maintaining, at the ſame time, that by diſengaging itſelf from all animal paſſions, and riſing above ſenſible objects to the contemplation of the world of intelligence, the ſoul of man can be prepared to return to its original habitation. According to Plato, the ſoul conſiſts of three parts, *viz.* the ſeat of intelligence, that of paſſion, and that of appetite; and he aſſigns to each its proper place in the human body. The firſt of theſe portions or faculties of the ſoul, under both which denominations he ſpeaks of them, he conceived to have been derived from God; the ſecond and third from matter. Plato teaches, in expreſs terms, the doctrine of the immortality of the rational ſoul, reſting the proof of this doctrine, however, upon arguments drawn from the mere fanciful parts of his ſyſtem.

Plato was a zealous advocate for the importance of that kind of ſcience, which is purely ſpeculative, and though he has left no direct treatiſe on mathematics, he requires from his diſciples an acquaintance with the elements of this branch of knowledge, preparatory to the ſtudy of theoretical philoſophy. On the ſubjects of policy and morals he preſcribes rules, which are intended for the direction of ſocieties and individuals in the offices of life, but they are too much tinctured with his theoretical doctrines. The main object of his political inſtitutions, appears to have been the ſubjugation of the appetites and paſſions, by means of the abſtract contemplation of ideas. The chief heads of his moral doctrine are as follow: Our higheſt good conſiſts in the knowledge and contemplation of the firſt good, which is mind, or God. All thoſe things which are called good by men, are really ſuch only ſo far as they are derived from the firſt and higheſt good. The only power in human nature, which can acquire a reſemblance to the Supreme good, is reaſon. The minds of philoſophers are fraught with valuable treaſures; and, after the death of the body, they ſhall be admitted to divine entertainments; ſo that whilſt with the gods they are employed in ſurveying the fields of truth, they will look down with contempt on the folly of thoſe, who are contented with earthly ſhadows. Goodneſs and beauty conſiſt in the knowledge of the firſt good, and the firſt fair. That only which is becoming is good; therefore virtue is to be preferred for its own ſake; and, becauſe it is a divine attainment, it cannot be taught, but it is the gift of God. He alone, who has attained the knowledge of the firſt good, is happy; the end of this knowledge is, to render man as like to God as the condition of human nature will permit. This likeneſs conſiſts in prudence, juſtice, ſanctity, temperance. In order to attain this ſtate, it is neceſſary to be convinced, that the body is a priſon, from which the ſoul muſt be releaſed, before it can arrive at the knowledge of thoſe things which are real and immutable. Virtue is the moſt perfect habit of mind which adorns the man, and renders him firm, reſolute, and conſiſtent, in action and ſpeech, in ſolitude and ſociety. The virtues are ſo nearly allied, that they cannot be ſeparated: they are perfect, and therefore neither capable of increaſe, nor of diminution. The paſſions are motions of the ſoul, excited by ſome apparent good or evil: they originate in the irrational parts of the ſoul, and muſt be regulated and ſubdued by reaſon. Friendſhip is, ſtrictly ſpeaking, reciprocal benevolence, which inclines each party to be as ſolicitous for the welfare of the other, as for his own. This equality of affection is created and preſerved by a ſimilarity of diſpoſition and manners. Upon the whole it may be obſerved, that whilſt the writings of Plato contain many juſt and ſublime ſentiments on moral ſubjects, his ethical doctrine, duly examined, will appear to be, in ſome particulars, defective, and in others extravagant and abſurd. The fanciful notions which he entertained concerning the divine nature, the world of ideas, and matter, ſeem to have given a romantic and enthuſiaſtic turn to his conceptions on morals; a defect, which may be in part aſcribed to his connection with the Pythagorean ſchool, but which was, perhaps, chiefly owing to the peculiar propenſity of his genius towards metaphyſical fiction.

After the death of Plato, two of his principal diſciples, Ariſtotle and Xenocrates, continuing his office, and teaching, the one in the Academy, and the other in the Lycæum, founded two ſects, under different names, though in other reſpects the ſame; the one retaining the denomination of Academics, the other aſſuming that of Peripatetics. The Academic ſect fell into general neglect under the Roman emperors; partly becauſe it was treated with contempt by the dogmatiſts, and partly on account of the reviving credit of the Sceptic ſect, in which the peculiar tenets of the Middle Academy were embraced. Nevertheleſs, the true doctrine of Plato, which had formerly obtained ſuch high eſteem among philoſophers, and which had been lately reſtored at Athens by Antiochus, reſumed its honours. Among the genuine followers of Plato, we find, at this period, ſeveral illuſtrious names. Under the emperors Auguſtus and Tiberius, flouriſhed Thraſybulus, a Mendeſian, who, though an eminent Platoniſt, ſo far conformed to the practice of the Pythagoreans, as to become an adept in the art of aſtrology. Not long after his time lived Theon of Smyrna; to whoſe aſtronomical obſervations, Ptolemy the aſtronomer, who flouriſhed under Antoninus Pius, has referred, and whoſe mathematical treatiſes, elucidating the writings of Plato, prove that he belonged to the Platonic ſchool. At the ſame time, his diſcourſes in geometry, arithmetic, muſic, aſtronomy, and the harmony of the univerſe, ſerve to caſt ſome light upon the Pythagorean ſyſtem. Alcinous, whoſe age is uncertain, but commonly placed about the beginning of the ſecond century, wrote an introduction to Plato, containing a ſummary of his doctrine, which ſhews him to have been well acquainted with his philoſophy. Favorinus, a native of Arles, lived in the reigns of Trajan and Adrian, and was well inſtructed in the precepts of philoſophy by Epictetus, the illuſtrious ornament of the Stoical ſchool; but none of his writings are extant. Under the reign of Antoninus Pius flouriſhed Calviſius Taurus of Beryta, and he is mentioned as a Platoniſt of ſome note. He wrote ſeveral pieces, chiefly to illuſtrate the Platonic philoſophy; he lived at Athens, and taught, not in the ſchools, but at his table. Aulus Gellius was frequently one of his gueſts, and in his "Noctes Atticæ" has given an account of the manner in which theſe philoſophical entertainments were conducted. The ſame period produced Lucius Apuleius; ſee his article. Another Platoniſt, who flouriſhed under M. Aurelius Antoninus, was Atticus; chiefly memorable for the laudable pains with which he endeavoured to aſcertain the exact points of difference between the doctrines of Plato and Ariſtotle. (See Atticus.) Numenius of Apamea in Syria belonged to the ſame claſs of writers with Atticus; and Maximus Tyrius, though chiefly diſtinguiſhed by his eloquence, obtained ſome degree of celebrity as a philoſopher; and his elegant Diſſertations are for the moſt part written upon Platonic principles, though they ſometimes incline towards ſcepticiſm. Plutarch and Galen are alſo commonly ranked among the Platoniſts. See their reſpective articles.

In later times, about the firſt ages of the Chriſtian church, the followers of Plato abandoned the title of "Academics" or "Academiſts," and aſſumed that of "Platoniſts." It is ſuppoſed to have been at Alexandria, in Egypt, that they firſt aſſumed their new title, after having reſtored the ancient Academy, and re-eſtabliſhed Plato's ſentiments; many of which, in proceſs of time, had been laid aſide. Among the Greek Platoniſts, thoſe who acquired the greateſt reputation were Porphyry, Plotin, Iamblichus, Proclus, and Plutarch; and among the Latins, Apuleius and Chalcidius. Among the Hebrews, Philo Judæus occupied the chief rank. The modern Platoniſts were Plotin, the founder, at leaſt the reformer of their ſect.

It is certain, that moſt of the celebrated fathers were Platoniſts, and borrowed many of their explanations of ſcripture from the Platonic ſyſtem. In order to account for this fact, we may obſerve, that, towards the concluſion of the ſecond century, a new ſect of philoſophers, called the modern, or later Platonics, aroſe of a ſudden, ſpread with amazing rapidity through the greateſt part of the Roman empire, ſwallowed up almoſt all the other ſects, and proved extremely detrimental to Chriſtianity. The ſchool of Alexandria in Egypt, inſtituted by Ptolemy Philadelphus, renewed and reformed the Platonic philoſophy. The votaries of this ſyſtem diſtinguiſhed themſelves by the title of Platonics, becauſe they thought that the ſentiments of Plato, concerning that moſt noble part of philoſophy, which has the Deity and things inviſible for its objects, were much more rational and ſublime than thoſe of the other philoſophers. This new ſpecies of Platoniſm was embraced by ſuch of the Alexandrian Chriſtians as were deſirous to retain, with the profeſſion of the Goſpel, the title, the dignity, and the habit of philoſophers.

Thoſe Alexandrian philoſophers, who became converts to the Chriſtian faith, retained a ſtrong predilection for Platonic tenets, and the higheſt reverence for the name of Plato; and therefore they eaſily credited the report, that the doctrine of Plato concerning the divine nature had been derived from revelation; and hence they thought themſelves juſtified in attempting a coalition between Plato and Jeſus Chriſt. An union of Platonic and Chriſtian doctrines was unqueſtionably attempted in the ſecond century by Juſtin Martyr, Athenagoras, and Clemens Alexandrinus, in whoſe writings we frequently meet with Platonic ſentiments and language; and it is not improbable, that this corruption took its riſe at a ſtill earlier period.

Ammonius Sacca was the principal founder of this new Platonic ſyſtem, and was ſucceeded by his diſciple Plotinus, as he was by Porphyry, the chief of thoſe formed in his ſchool. (See Eclectics.) From the time of Ammonius, who, in order to recommend his Eclectic ſyſtem to the attention of Chriſtians, accommodated his language to the opinions which were then received among them, until the ſixth century, this was almoſt the only ſyſtem of philoſophy that was publicly taught at Alexandria. Origen, and other Chriſtians who ſtudied in his ſchool, were ſo far duped by the artifice of Sacca, as to imagine that they diſcovered, in the ſyſtem of the Platoniſts, traces of a pure doctrine concerning the divine nature, which, on the ground juſt mentioned, they thought themſelves at liberty to incorporate into the Chriſtian faith. Entering upon the office of Chriſtian teachers, under the bias of a ſtrong partiality for Plato and his doctrine, they tinctured the minds of their diſciples with the ſame prejudice, and thus diſſeminated Platonic notions, as Chriſtian truths; little aware, without doubt, how far this practice would corrupt the purity of the Chriſtian faith, and how much confuſion and diſſenſion it would occaſion in the Chriſtian church.

The Platonic ſyſtem of philoſophy was brought into Greece by Plutarch, who renewed at Athens the celebrated Academy, from whence iſſued many illuſtrious philoſophers. The general principles on which this ſect was founded, however the partizans of it might differ with reſpect to particular opinions, was, that truth was to be purſued with the utmoſt liberty, and to be collected from all the different ſyſtems in which it lay diſperſed. None, however, who were ambitious to be ranked among theſe new Platoniſts, called in queſtion the main doctrines; thoſe, for example, which regarded the exiſtence of one God, the fountain of all things; the eternity of the world; the dependence of matter upon the Supreme Being; the nature of ſouls; the plurality of gods; the method of interpreting the popular ſuperſtitions, &c.

That the reader may be able to trace diſtinctly the introduction and progreſs of this new Platonic ſyſtem in the Chriſtian church, we ſhall divide the Chriſtian fathers into two claſſes; namely, thoſe who flouriſhed before and thoſe who flouriſhed after the inſtitution of the Eclectic ſect. (See Eclectics.) The firſt claſs commences with Juſtin Martyr, and the ſecond with Origen. Juſtin Martyr, (ſee Justin Martyr,) after his converſion, retained a ſtrong attachment to the Platonic ſyſtem, and applied his knowledge of this ſyſtem to the illuſtration and defence of the Chriſtian doctrine. Perceiving an agreement between Platoniſm and Chriſtianity, he concluded that whatever was valuable in the former, had either been communicated to Plato by inſpiration, from the Logos, or firſt emanation of the divine nature, or had been tranſmitted by tradition from Moſes and the Hebrew prophets, and might therefore be juſtly claimed as belonging to divine revelation, and incorporated into the Chriſtian creed. By the term Logos he underſtood, not the reaſoning faculty of the human mind, but, after Plato, the emaning reaſon of the divine nature; and he conceived this divine reaſon to have inſpired the Hebrew prophets, and to have been the Chriſt who appeared in the fleſh. He moreover apprehended, that it had been participated not only by the Hebrew patriarchs, but by the more excellent Pagan philoſophers; and conſequently he regarded every tenet in the writings of the Heathens, which he could reconcile with the doctrine of Chriſt, as a portion of divine wiſdom which Chriſtians might juſtly appropriate to themſelves. Having learned from Plato and his followers, in the ſchools of Alexandria, that the knowledge of God is alone to be gained by the contemplation of ideas, which have their primary ſeat in the divine Logos, and that the human mind, in conſequence of its nature as proceeding from the ſoul of the world, is capable of contemplating thoſe divine ideas by means of which it may aſcend to the knowledge of God, Juſtin was neceſſarily led to conclude, that man can only arrive at divine ſcience through the medium of the Logos. Hence, he referred all Chriſtian knowledge to the perception of the divine reaſon inhabiting in man; and thus laid the foundation of an error, ſtill retained by ſome Chriſtian ſects, that Chriſt, or the Word, is a ſubſtantial ray of divine light internally communicated to man. Juſtin alſo borrowed from Plato his notion of angels employed in the government of the elements, the earth, and the heavens, and many other tenets that are not to be found in the ſcriptures. The ſentiments and language of Tatian, who, after his converſion from Heatheniſm to Chriſtianity, became a diſciple of Juſtin Martyr, perfectly agree with thoſe of the Egyptian and Cabbaliſtic philoſophy, and were probably derived from thoſe ſources. The whole tenour of his Apology concurs with what is known of his hiſtory to prove, that he was a Platonic Chriſtian. See Tatian.

Several things in the Apology of Theophilus of Antioch (ſee his article), diſcover his predilection for the Platonic ſyſtem, and his inclination to adapt it to the Chriſtian doctrine. We may alſo rank among the Platonizing fathers, Athenagoras. (See Athenagoras.) Another writer of this period, *viz.* Irenæus, ſeems to have borrowed his ideas and language from the Alexandrian Platoniſts. About the beginning of the third century flouriſhed Tertullian, who frequently makes uſe of Platonic notions and language; but none of the fathers of this period merit higher diſtinction than Clemens Alexandrinus; nor was any one of them led farther aſtray, by philoſophical ſubtlety, from the ſimplicity of the Chriſtian faith. We frequently find him adopting Platonic and Stoic tenets as Chriſtian doctrines, and thus ſowing the ſeeds of error in the Chriſtian church. The moſt celebrated of the Chriſtian fathers, after Ammonius, who, following the idea of Potamo, framed the Eclectic ſyſtem, was Origen; and among other names which diſtinguiſh this period, the principal are Arnobius, Lactantius, Euſebius Pamphilus, Didymus of Alexandria, and Auguſtine. See their reſpective articles.

In the fourth century, under the reign of Valentinian, a dreadful ſtorm of perſecution aroſe againſt the Platoniſts; many of whom, being accuſed of magical practices, and other heinous crimes, were capitally convicted. In the fifth century Proclus gave new life to the doctrine of Plato, and reſtored it to its former credit in Greece; with whom concurred many of the Chriſtian doctors, who adopted the Platonic ſyſtem: among the more eminent of whom we may reckon Syneſius, an African biſhop. The Platonic philoſophers were, in general, oppoſers of Chriſtianity; but in the ſixth century, Chalcidius, whoſe converſion to Chriſtianity has been doubted, gave the Pagan ſyſtem an evangelical aſpect; and thoſe who, before it became the religion of the ſtate, ranged themſelves under the ſtandard of Plato, repaired to that of Chriſt, without any conſiderable change of their ſyſtem. At the beginning of this ſixth century appeared Boethius, who was born at Rome and ſent to Athens to ſtudy philoſophy. In the ſchool of Proclus he became acquainted with the Eclectic ſyſtem; and from the commendations which he beſtows upon Porphyry, as the beſt interpreter of Ariſtotle, he ſeems to have united the Platonic with the Ariſtotelian doctrine. Æneas Gaza, towards the cloſe of the fifth century, in a poem profeſſedly written againſt the Platoniſts, confounds the doctrines of Platoniſm and Chriſtianity. Under the emperor Juſtinian, who iſſued a particular edict, prohibiting the teaching of philoſophy at Athens, which edict ſeems to have been levelled at modern Platoniſm, all the celebrated philoſophers of this ſect took refuge among the Perſians, who were, at that time, the enemies of Rome; and though they returned from their voluntary exile when the peace was concluded between the Perſians and Romans, A.D. 533, they could never recover their former credit, nor obtain the direction of the public ſchools. Thus, ſays Moſheim, expired that famous ſect, which was diſtinguiſhed by the title of the modern or later Platoniſts, and which, for a ſeries of ages, had produced ſuch diviſions and tumults in the Chriſtian church, and which had been, in other reſpects, prejudicial to the intereſts and progreſs of the Goſpel. For a farther account of this ſect, ſee Eclectics.

The knowledge of Alexandrian Platoniſm was, however, revived in the Weſt by Joannes Scotus, who, in the ninth century, tranſlated the books aſcribed to Dionyſius the Areopagite, or St. Denys, and laid the foundation of the myſtical ſyſtem of theology, which afterwards ſo generally prevailed. Thus philoſophical enthuſiaſm, born in the Eaſt, nouriſhed by Plato, educated in Alexandria, matured in Aſia, and adopted into the Greek church, found its way, under the pretext and authority of an apoſtolic name, into the weſtern church, and there produced innumerable miſchiefs.

The firſt Greek who gave occaſion to the revival of Platoniſm in Italy, was Gemiſtius Pletho, a native of Conſtantinople, who was born in 1390, and lived 100 years. He was a zealous advocate for Platoniſm, and maintained a violent controverſy with the Ariſtotelians. In his "Expoſitio Oraculorum Magicorum Zoroaſtris," he exhibits twelve fundamental articles of the Platonic religion, and gives an elegant compendium of the whole Platonic philoſophy. A more moderate adherent to Plato, who maintained his ſyſtem without caſting contempt on the philoſophy of Ariſtotle, or treſpaſſing upon the doctrine of Chriſtianity, was Beſſario, a learned biſhop of Nice, who was appointed by the emperor Michael Palæologus, about the year 1440, together with other Greek divines, to treat with the Latin church concerning an union. He died at Ravenna in 1472. He wrote a defence of the Platonic ſyſtem againſt George of Trebizond. Under the patronage of Coſmo de Medici, Marſilius Ficinus, a Florentine, born in 1433, was educated by Pletho, for the expreſs purpoſe of tranſlating the writings of Plato. It appears, however, from the execution of the taſk aſſigned him, and his other writings, that he was deficient in ſtrength of judgment and correctneſs of taſte. His Latin ſtyle wants that richneſs and dignity which are requiſite in a verſion of Plato. A fellow labourer with Ficinus, in the taſk of editing and tranſlating the writings of Plato, was Joannes Picus of Mirandola, born in 1460; who, for his ſucceſs in reviving the Platonic philoſophy, was honoured with the title of the phœnix of his age. Picus was a zealous ſupporter of Platoniſm, after the model of the Alexandrian ſchool; but not without blending with its doctrine a large portion of Cabbaliſtic myſtery, and confounding with both theſe the doctrine of divine revelation. About this period, a body of Greek ſcholars avowed themſelves zealous advocates for the genuine Ariſtotelian philoſophy; and employed their time and learning in editing and tranſlating the writings of the Stagirite. The principal of thoſe who laboured in this undertaking were Theodore Gaza, George of Trebizond, and Georgius Scholarius. Between theſe philoſophers, on the one part, who followed Plato, and thoſe on the other who followed Ariſtotle, a diſpute aroſe concerning the merit and authority of their reſpective maſters, which was carried on to a moſt ridiculous and extravagant height. It was begun by Pletho, whoſe veneration for Plato led him to oppoſe with great violence the unrivalled dominion which Ariſtotle had for ages poſſeſſed in the ſchools. Georgius Scholarius, on the other hand, zealouſly defended Ariſtotle, and ſtrenuouſly maintained that his opinions are conſonant to the trueſt and beſt doctrines of the Chriſtian religion, and are *even more true*; and that the tenets of Plato, differing from thoſe of Ariſtotle, are *therefore* falſe. George of Trebizond ſupported Scholarius; and Pletho was ably ſeconded by Gaza. Other combatants alſo engaged in the conteſt, and in the proſecution of it expoſed themſelves to ridicule. The partiſans of the Platonic ſyſtem, who, under the patronage of the Medicean family, for a long time maintained their ground againſt the Ariſtotelians, declining with the fortune of their patrons, the advocates for the Peripatetic philoſophy proportionably increaſed, and after a violent ſtruggle, eſtabliſhed a victory.

The doctrines of the later Platoniſts having been revived by the Greek exiles in Italy, their farther ſpread is chiefly to be imputed to the averſion which many good men entertained againſt the Peripatetic philoſophy, on account of the ſhameful impieties to which it had given birth. Perceiving that they could not commit themſelves to the direction of Ariſtotle, without hazarding their religious principles; and not having ſtrength of mind ſufficient to form a ſyſtem of opinions for themſelves, they adopted the philoſophy of Plato in the corrupted ſtate in which it had been tranſmitted, through the Alexandrian and Chriſtian ſchools, to modern times. This philoſophy was the more readily embraced, becauſe it was believed, that the myſteries of Pythagoras, than which none appeared to approach nearer to thoſe of true religion, had been long ſince united with the wiſdom of Plato. In this ſchool they expected to find much divine inſtruction; more eſpecially as they were led to believe, that its doctrines had been, mediately or remotely, derived from divine revelation. And as one error generally produces another, theſe learned men united with this ſyſtem the ſecret or cabbaliſtic philoſophy of the Jews, which, for want of due examination, they conceived to have been the pure doctrine of the ancient Hebrews. Hence aroſe a new compound of tenets, ſufficiently myſterious and paradoxical, which was received by this claſs of philoſophers as the ſum of ancient wiſdom. Whilſt Ficinus was reviving the Platonic philoſophy in Italy, and Faber the Ariſtotelian in France, John Reuchlin, otherwiſe called Capnio, born at Pforzheim, in Suabia, in 1455, profeſſed and taught a myſtical ſyſtem, compounded of Platonic, Pythagoric, and Cabbaliſtic doctrines. George Venet, an obſcure and enthuſiaſtic writer, purſued a ſimilar courſe, and blended ſundry Peripatetic notions with the Platonic and Cabbaliſtic ſyſtems. The myſtic ſyſtem of Cabbaliſtic Platoniſm was ably ſupported by Henry Cornelius Agrippa. A very different mode of reſtoring the Platonic philoſophy was purſued by Franciſcus Patricius, born at Cliſſa, in Illyricum, in 1529. In the ſchools of Italy he profeſſed to unite the doctrines of Ariſtotle and Plato, but in reality undermined that of the former. Being appointed by pope Clement VIII. a preceptor in philoſophy at Rome, he openly diſcovered his averſion to the Ariſtotelian ſyſtem, and adviſed the pope to prohibit the teaching of this philoſophy in the ſchools, and to introduce the doctrine of Plato, as more conſonant to the Chriſtian faith. In the 17th century, Platoniſm found many advocates in Great Britain, owing, in a great meaſure, to the deſire which many able and learned divines at this time entertained of refuting the tenets of Hobbes; and this they thought could not be more effectually done, than by reviving an attention to the doctrine of Plato, both in his own works, and in thoſe of his followers. Of thoſe who ranged themſelves under the banners of Plato, the moſt celebrated are Gale, Cudworth, and More. Brucker's Hiſtory of Philoſophy, by Enfield, vol. i. and ii. Moſheim's Eccl. Hiſt.

PLATONISTS. See Platoniſm and Academics.

PLATONOPOLIS, in *Ancient Geography*, a city which Plotinus requeſted the emperor Galienus to build in Campania. This city had been formerly razed, and Plotinus uſed his intereſt with the emperor, not only to have it rebuilt, but to obtain a grant of the neighbouring territory, that it might be inhabited by a body of philoſophers, and governed by the laws of Plato, under the name of Platonopolis. He promiſed, at the ſame time, that he and his friends would lay the foundation of this philoſophical colony. The emperor was diſſuaded by his friends from acceding to this propoſal.

PLATOON, or Plottoon, formed, by corruption, of the French *peloton, a bottom*, or *clue, of thread*, in *War*, formerly denoted a ſmall body of men, drawn out of a battalion of foot, and placed between the ſquadrons of horſe, to ſuſtain them; or in ambuſcades, ſtraits, and defiles, where there is not room for whole battalions or regiments.

Platoons were alſo uſed when they formed the hollow ſquare, to ſtrengthen the angles.

The grenadiers were generally poſted in platoons.

A battalion was generally divided into ſixteen platoons, excluſive of the grenadiers, which formed two or four platoons more, as occaſion required. At preſent the battalion is generally divided into wings, grand diviſions, diviſions (or companies), ſubdiviſions, and ſections; and the word platoon is ſeldom uſed, except to denote a number (from 10 to 20) of recruits aſſembled for the purpoſe of inſtruction, in which caſe it may be conſidered as ſynonimous with company. See Battalion.

Platoon *Exerciſe*. See Battalion.

Platoon *Firing*. See Battalion and Firing.

Platoon *Pivots*. See Pivot.

PLATTE, or *Shallow River*, in *Geography*, a weſtern branch of the river Miſſouri, remarkable for its quickſands and bad navigation. Near the confluence of this river with the Miſſouri, dwells the nation of the Octolactos, or Otos, conſiſting of about 200 warriors.

Platte, *La*, a ſmaller river of America, in the ſtate of Vermont, which runs into lake Champlain, at Shelburn.

Platte *Forme, La*, a cape on the W. coaſt of St. Domingo. N. lat. 19° 36′. W. long. 74° 2′.—Alſo, a town on the S. ſide of the N. peninſula of St. Domingo; 13 leagues S.E. by S. of the Mole.

PLATTEN, a town of Bohemia, in the circle of Leitmeritz; 4 miles E. of Kamnitz.—Alſo, a town of Bohemia, in the circle of Elnbogen; 27 miles N.E. of Eger. N. lat. 50° 23′. E. long. 12° 45′.

PLATTENBURG, a citadel of Brandenburg, in the Mark of Pregnitz; 4 miles E. of Wilſnach.

PLATTS, a ſmall iſland in the Indian ſea. S. lat. 5° 55′. E. long. 55° 20′.

Platts, on board a *Ship*. See Plats.

PLATTSBURG, in *Geography*, a poſt-town of America, in Clinton county, New York, on lake Champlain; 5 miles W. of Ticonderoga. N. lat. 44° 41′. W. long. 73° 27′. Here are a houſe for public worſhip, a courthouſe, and a gaol. The court of common pleas and grand ſeſſions of the peace ſit here twice a-year; and in the town are artizans of almoſt every kind, who furniſh among themſelves all the materials for building, glaſs excepted. Here alſo be found polite circles. The number of inhabitants is 1409.

PLATUNIUM, in *Botany*, from πλατυνω, *to dilate* or *enlarge*, in alluſion to its large ſpreading calyx; a genus deſcribed by Juſſieu, in the Annales du Muſée, v. 7. 65, with which we are unacquainted. *De Théis*. 371.

PLATYCEROS Ovis, in *Zoology*, the name given by Geſner and ſome others to a ſpecies of ſheep, commonly called *ovis laticauda*, or the broad-tailed ſheep. See Ovis.

Platyceros is alſo a name given by Pliny to the Cervus *Dama*, or fallow deer.

Platyceros, in *Entomology*, a ſpecies of *Lucanus*. See Lucanus *Alces*, and Lucanus *parallelepipedus*. See alſo Tenebrio *Caraboides*.

PLATYLOBIUM, in *Botany*, ſo named, by the writer of the preſent article, from πλωτυς, *broad*, and λοβος, *a pod* or *legume*; becauſe of the breadth of that part, which is further augmented by a dilatation, or wing, running along the back.—Sm. Tr. of Linn. Soc. v. 2. 350. v. 9. 302. Bot. of New Holl. 17. Willd. Sp. Pl. v. 3. 921. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 4. 266.—Claſs and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, bell-ſhaped, two-lipped; the upper lip rounded, very large, divided half way down into two obovate ſegments; the under much ſmaller, in three equal, awl-ſhaped, ſtraight ſegments. *Cor.* papilionaceous. Standard heart-ſhaped, large, aſcending, twice as long as the upper lip of the calyx, with a ſhortiſh, linear, convex claw. Wings half the length of the ſtandard, obovate, each with a plait, and prominent tooth, at the baſe on its lower ſide, and a narrow claw. Keel the length of the wings, of two obovate, concave, converging petals, each with a tooth on its upper edge at the baſe. *Stam.* Filaments ten, united into one ſet for about half their length, ſeparate only at the upper edge, aſcending; anthers ſimple, roundiſh. *Piſt.* Germen on a ſhort ſtalk, oblong, compreſſed; ſtyle recurved; ſtigma ſimple. *Peric.* Legume ſtalked, oblong, compreſſed, almoſt flat, of one cell, its upper edge dilated into a flat longitudinal wing, the valves membranous. *Seeds* ſeveral, oval, compreſſed, each on a curved white ſtalk, with a tumid appendage.

Eſſ. Ch. Calyx two-lipped; the upper lip cloven, rounded, very large. Stamens all connected. Legume ſtalked, compreſſed flat, membranous, winged at the back, of one cell, with many ſeeds.

1. P. *formoſum*. Orange Flat-pea. Sm. Bot. of New Holl. 17. t. 6. Willd. n. 1. Ait. n. 1. Curt. Mag. t. 469. Venten. Malmaiſ. t. 31.—Leaves ovate, ſomewhat heart-ſhaped. Germen all over hairy. Stalk of the legume ſhorter than the calyx. Bracteas ſilky.—Native of New South Wales, from whence ſpecimens, drawings, and ſeeds, were early ſent by Dr. White and others. It is rather difficult to raiſe and to preſerve, but when in perfection proves a great ornament to the greenhouſe from June to Auguſt. The *ſtem* is erect, but very ſlender, and rather weak, buſhy, with numerous, oppoſite, ſpreading branches, all of reddiſh-brown, hairy and round. *Leaves* oppoſite, on ſhort ſtalks, acute, entire, convex, rigid, ſmooth, about an inch long; glaucous beneath. *Stipulas* in pairs, lanceolate, membranous, browniſh. *Flowers* numerous, inodorous, large, on ſhortiſh, ſimple, axillary, crowded *ſtalks*, with a pair of *bracteas* under

the *calyx*, which like them is ſilky. *Standard* and *wings* of an orange yellow, the former crimſon at the back, as well as at the centre in front; wings pale, tipped with crimſon. *Legume* an inch and a half long, and half as broad, obtuſe, with a little ſharp point, ſomewhat hairy all over.

2. P. *parviflorum.* Small-flowered Flat-pea. Sm. Bot. of N. Holl. 18. Willd. n. 2. Ait. n. 2. Curt. Mag. t. 1520.—Leaves lanceolate-ovate. Germen nearly ſmooth. Stalk of the legume longer than the calyx. Bracteas ſmooth.—From the ſame country. Sent to Kew by ſir J. Banks in 1792. It blooms in the ſummer, amongſt other greenhouſe ſhrubs.

3. P. *triangulare.* Triangular-leaved Flat-pea. Brown MSS. Ait. n. 3. Curt. Mag. t. 1508.—"Leaves ſomewhat triangular or haſtate, with ſpinous angles. Flower-ſtalks bracteated at the baſe and ſummit, naked in the middle. Legume ſeveral times longer than the calyx.—Gathered by Mr. Brown in Van Diemen's iſland, and ſent to Kew in 1805. It is kept in the greenhouſe, and flowers from June to September.

PLATYOPHTHALMON, a name given by ſome to antimony, from its uſe among the ladies of old time, to make their eye-brows broad and black.

PLATYPUS, *Duck-billed Platypus*, in *Zoology*, a genus of the claſs and order Mammalia, Bruta, of which the generic character is; mouth ſhaped like the bill of a duck; the feet are palmate. There is but a ſingle

Species.

ANATINUS. This extraordinary animal is placed by Dr. Shaw next to the genus Myrmecophaga. The deſcription of this naturaliſt, who has taken much pains in inveſtigating the characters of the genus, we ſhall tranſcribe, as being the only ſatisfactory account we have of it. "Of all the mammalia yet known, it ſeems the moſt extraordinary in its conformation, exhibiting the perfect reſemblance of the beak of a duck engrafted on the head of a quadruped. So accurate is the ſimilitude, that, at firſt view, it naturally excites the idea of ſome deceptive preparation by artificial means; the very epidermis, proportion, ſerratures, manner of opening, and other particulars of the beak of a ſhoveler, or other broad-billed ſpecies of duck, preſenting themſelves to the view: nor is it without the moſt minute and rigid examination that we can perſuade ourſelves of its being the real beak or ſnout of a quadruped.

"The body is depreſſed, and has ſome reſemblance to that of an otter in miniature: it is covered with a very thick, ſoft, and beaver-like fur, and is of a moderately dark brown above, and of a ſubferruginous white beneath. The head is flattiſh, and rather ſmall than large; the mouth or ſnout, as before obſerved, ſo exactly reſembles that of ſome broad-billed ſpecies of duck, that it might be miſtaken for ſuch: round the baſe is a flat circular membrane, ſomewhat deeper or wider below than above, *viz.* below near the fifth of an inch, and above about an eighth. The tail is flat, furry like the body, rather ſhort and obtuſe, with an almoſt bifid termination; it is broader at the baſe, and gradually leſſens to the tip, and is about three inches in length; its colour is ſimilar to that of the body. The length of the whole animal, from the tip of the beak to that of the tail, is thirteen inches; of the beak an inch and a half. The legs are very ſhort, terminating in a broad web, which on the fore feet extends to a conſiderable diſtance beyond the claws; but on the hind feet reaches no farther than the roots of the claws. On the fore feet are five claws, ſtraight, ſtrong, and ſharp-pointed; the two exterior ones ſomewhat ſhorter than the three middle ones. On the hind feet are ſix claws, longer and more inclining to a curved form than thoſe on the fore feet; the exterior toe and claw are conſiderably ſhorter than the four middle ones; the interior, or ſixth, is ſeated much higher up than the reſt, and reſembles a ſtrong, ſharp ſpur. All the legs are hairy above; the fore feet are naked both above and below; but the hind feet are hairy above and naked below. The internal edges of the under mandible (which is narrower than the upper) are ſerrated or channelled with numerous ſtriæ, as in a duck's bill. The noſtrils are ſmall and round, and are ſituated about a quarter of an inch from the tip of the bill, and are about the eighth of an inch diſtant from each other. There is no appearance of teeth; the palate is removed, but ſeems to have reſembled that of a duck; the tongue alſo is wanting in the ſpecimen. The ears or auditory foramina are placed about an inch beyond the eyes; they appear like a pair of oval holes of the eighth of an inch in diameter, there being no external ear. On the upper part of the head, on each ſide, a little beyond the beak, are ſituated two ſmalliſh oval white ſpots, in the lower part of each of which are imbedded the eyes, or at leaſt the parts allotted to the animal for ſome kind of viſion; for from the thickneſs of the fur, and the ſmallneſs of the organs, they ſeem to have been but obſcurely calculated for diſtinct viſion, and are probably like thoſe of moles, and ſome other animals of that tribe; or perhaps even ſubcutaneous; the whole apparent diameter of the cavity in which they were placed not exceeding the tenth of an inch. When we conſider the general form of this animal, and particularly its bill and webbed feet, we ſhall readily perceive that it muſt be a reſident in watery ſituations; that it has the habits of digging or burrowing in the banks of rivers, or under ground; and that its food conſiſts of aquatics, plants, and animals. This is all that can at preſent be reaſonably gueſſed at: future obſervations, made in its native regions, will, it is hoped, afford us more ample information, and will make us fully acquainted with the natural hiſtory of an animal which differs ſo widely from all other quadrupeds, and which verifies, in a moſt ſtriking manner, the obſervations of Buffon, *viz.* that whatever was poſſible for nature to produce, has actually been produced."

Dr. Shaw obſerves, in a ſubſequent volume, as the reſult of more accurate experiments, that "on laying open the parts beyond the baſe of the bill, it appears that the platypus, like the ant-eaters, is furniſhed with ſmall bony proceſſes reſembling grinding-teeth, imbedded in the gum, but not faſtened or rooted in the jaw: of theſe proceſſes, there are two on each ſide both of the upper and under jaw." Shaw's Gen. Zool. vol. i. and ii.

PLATYRYNCHOS, in *Ichthyology*, a name given by ſome to the naſus, or naſe, a freſh-water fiſh, caught in the Danube, and moſt of the large rivers in Germany, and much reſembling the chub. See CYPRINUS *Naſus*.

PLATYSMA MYOIDES, in *Anatomy*, the thin ſtratum of muſcular fibres placed immediately under the ſkin in the neck. It is deſcribed in the article DEGLUTITION, under the name of latiſſimus colli.

PLATYSTERNOS, a word uſed by the old phyſicians to expreſs a perſon with a very broad cheſt or ſternum.

PLATYZOMA, in *Botany*, from πλατυς, *broad*, and ζωμα, *a belt*, a genus of *Filices* in Mr. Brown's Prod. Nov. Holl. v. 1. 160, nearly allied to *Gleichenia*, from which the author ſays he was induced to ſeparate it, rather on account of its undivided ſtalks, which in *Gleichenia* are forked, than for the ſlight difference in the fructification. The latter ſeems principally to conſiſt in the revolute margins of the leaflets forming a ſort of *involucrum*.

The only ſpecies mentioned is

1. P. *microphyllum.*—Found in the tropical parts of New Holland. A ſmooth fern, with a creeping ſcaly *root.* *Stalks* undivided. *Fronds* pinnate; leaflets extremely numerous, diſtinct, orbicular, entire, minute, covered beneath with ſulphur-coloured powder. *Capſules* few together in each dot. *Seeds* rather large. Some *fronds*, from the ſame root, are compreſſed, nearly thread-ſhaped, and undivided. See GLEICHENIA.

PLATZ, in *Geography*, a town of Bohemia, in the circle of Bechin; ſeven miles W. of Fiſtritz.

PLAU, or PLAUEN, a town of the duchy of Mecklenburg, on a lake called the "Plauer See;" 15 miles E. of Parchim. N. lat. 53° 50′. E. long. 12° 23′.

PLAVA, a town of Servia; 20 miles S.W. of Jenibaſar.

PLAUEN, a town of Saxony, in the county of Schwartzburg, on the Gera; 16 miles N.W. of Schwartzburg. N. lat. 50° 45′. E. long. 11° 2′.—Alſo, a town of Saxony, in the Vogtland, on the Elſter, in which is a manufacture of cotton and cloth; 22 miles S.W. of Zwickau. N. lat. 50° 23′. E. long. 12° 8′.—Alſo, a town of Brandenburg, in the Middle Mark, ſeated on a lake formed by the Havel, which gives name to a canal that runs from thence to the Elbe. This town has a manufacture of porcelain; ſix miles W. of Brandenburg. N. lat. 52° 29′. E. long. 12° 30′.

PLAUER SEE, a lake of the duchy of Mecklenburg, about 20 miles in circumference; E. of Plau.

PLAUSCHNITZ, a town of Bohemia, in the circle of Boleſlaw; three miles E.S.E. of Turnau.

PLAUSEN, a town of Pruſſia, in Ermeland; 14 miles E. of Heilſberg.

PLAUSUS, among the Romans. See ACCLAMATION.

PLAUTEN, in *Geography*, a town of Pruſſia, in Oberland; 16 miles S.E. of Marienwerder.

PLAUTUS, MARCUS ACCIUS, in *Biography*, a celebrated Latin writer of comedy, was a native of Sarſina, a ſmall town in Umbria. He was thought not only to have been of mean parentage, but the ſon of a ſlave. Few facts have come down to us that at all illuſtrate his life. He came to Rome, and obtained not only fame but emolument from his dramatic compoſitions, which were repreſented about a century and a half before the Chriſtian era. Plautus is ſaid to have acquired conſiderable property, and to have been tempted, in order to increaſe it, to engage in trade, but that, like many other literary ſpeculators, he ſucceeded ſo ill, that he was reduced to ſo great poverty, as to hire himſelf as a labourer to grind in a mill. Yet even in this toilſome ſituation his mind remained undepreſſed, and he compoſed three comedies. He died in the year 184 B.C. Anciently a great number of comedies were current under the popular name of Plautus, but of theſe the greater number was merely retouched by him, and the beſt Roman critics admitted only about twenty-five of his genuine compoſitions. Twenty of theſe are ſtill extant, but ſome of them are in a mutilated ſtate. Of the character they bore among his countrymen we have the moſt decided teſtimony. The learned Varro ſaid, if the Muſes were to ſpeak Latin, they would uſe no other ſtyle than that of Plautus. By Cicero the wit of Plautus is called elegant, refined, ingenious, and facetious. "To a modern reader," ſays an able critic, "the humour of Plautus will often appear ſtrong and genuine, but coarſe and indelicate, and intermixed with quibbles and witticiſms. His plays are, however, lively, and generally entertaining, and the language is a rich treaſury of the Latin tongue. Many of his pieces, like thoſe of the other dramatiſts, are profeſſed tranſlations from the Greek, and it is probable that all his plots are borrowed from the Grecian theatre." The beſt editions of Plautus are the Variorum by Gronovius.

PLAUZAT, in *Geography*, a town of France, in the department of the Puy de Dôme; 10 miles S. of Clermont Ferrand.

PLAY, LUSUS. See GAME, and GAMING.

PLAY, in the *Doctrine of Chances*, is uſed for the probability of the play's ending in a given number of games.

PLAY, in *Poetry*, &c. See DRAMA, TRAGEDY, COMEDY, &c.

PLAYFORD, JOHN, in *Biography*, a ſtationer and muſician, ſeller of muſical books and inſtruments, and clerk of the Temple church.

In 1655 he publiſhed the firſt edition of his "Introduction to the Skill of Muſic," a compendium compiled from Morley, Butler, and other more bulky and abſtruſe books, which had ſo rapid a ſale, that, in 1683, ten editions of it had been circulated through the kingdom. The book, indeed, contained no late diſcoveries or new doctrines, either in the theory or practice of the art; yet the form, price, and ſtyle, were ſo ſuited to every kind of muſical readers, that it ſeems to have been more generally purchaſed and read, than any elementary muſical tract that ever appeared in this or in any other country.

John Playford was born in the year 1613, and ſeems, by what means is now not known, to have laid in a conſiderable ſtock of muſical knowledge, previous to becoming the vender of the chief productions of the principal compoſers of the time. As he was the firſt, ſo he ſeems the moſt intelligent printer of muſic during the ſeventeenth century; and he and his ſon Henry appear to have acquired the eſteem of the firſt maſters of the art; and without a ſpecial licence, or authorized monopoly, to have had almoſt the whole buſineſs of furniſhing the entire nation with muſical inſtruments, muſic books, and muſic paper, to themſelves; as, during more than the firſt fifty years of the laſt century, Walſh and his ſon had afterwards.

In 1655, this diligent editor alſo publiſhed, in two ſeparate books, ſmall 8vo. "Court Ayres, by Dr. Charles Colman, William Lawes, John Jenkins, Simpſon, Child, Cook, Rogers, &c."

Theſe being publiſhed at a time when there was properly no court, were probably tunes which had been uſed in the maſques performed at Whitehall during the life of the late king.

It was honeſt John Playford who new ſtrung the harp of David, and publiſhed, in 1671, the firſt edition of his "Pſalms and Hymns in ſolemn Muſick, in foure Parts on the common Tunes to Pſalms in Metre uſed in Pariſh-churches. Alſo ſix Hymns for one Voice to the Organ," folio. The ſeveral editions of this work publiſhed in various forms, at a ſmall price, rendered its ſale very general, and pſalm-ſinging in parts, a favourite amuſement in almoſt every village in the kingdom.

PLAYFORD, HENRY, the ſecond ſon of John, ſucceeded his father as a muſic ſeller, at firſt at his ſhop in the Temple, but afterwards in the Temple Exchange, Fleet-ſtreet.

The muſic books advertiſed by him were but few compared with thoſe publiſhed by his father. Among them were the Orpheus Britannicus, and the ten ſonatas and airs of Purcell.

Henry Playford publiſhed, in 1701, what he called the ſecond book of the "Pleaſant Muſical Companion, being a choice collection of catches for three or four voices; publiſhed chiefly for the encouragement of the muſical ſocieties which will be ſpeedily ſet up in the chief cities and towns of England."

We know not what effect this advertiſing title-page had upon the nation, but believe that the publication of Purcell's catches in two ſmall volumes of the elder Walſh in queen Anne's time, was the means of eſtabliſhing catch clubs in almoſt every town in the kingdom, where tobacco, ale, and pſalm-ſinging were to be found.

It is conjectured that Henry Playford ſurvived his father but a ſhort time, for we meet with no publication by him after 1710.

PLAY-HOUSE. See THEATRE, AMPHITHEATRE, &c.

The moſt ancient Engliſh play-houſes were the Curtain in Shoreditch, and the Theatre. In the time of Shakſpeare, who commenced a dramatic writer about the year 1592, there were no leſs than ten theatres open, four private houſes, and ſix that were called public theatres. Moſt, if not all of Shakſpeare's plays, were performed either at the Globe, which was an hexagonal building, partly open to the weather, and partly covered with reeds, on the ſouthern ſide of the river Thames, called the Bank-ſide, and a public theatre, where they always acted by day-light; or at the theatre in Black-friars, which was a private play-houſe, and where plays were uſually repreſented by candle-light. Both theſe belonged to the ſame company of comedians, *viz.* his majeſty's ſervants, which title they aſſumed after a licence had been granted to them by king James, in 1603; having before this time been called the ſervants of the lord chamberlain. The exhibitions at the Globe ſeem to have been calculated chiefly for the lower claſs of people, and thoſe at Black-friars for a more ſelect and judicious audience. The former was a ſummer, and the latter a winter theatre. Many of our ancient dramatic pieces were performed in the yards of carriers' inns, in which, in the beginning of queen Elizabeth's reign, the comedians, who then firſt united themſelves in companies, erected an occaſional ſtage. The form of theſe temporary play-houſes ſeems to be preſerved in our modern theatres. Many circumſtances concur to render it probable, that our ancient theatres, in general, were only furniſhed with curtains, which opened in the middle, and a ſingle ſcene compoſed of tapeſtry, ſometimes ornamented with pictures. In the year 1605, Inigo Jones exhibited an entertainment at Oxford, in which moveable ſcenes were uſed; but they were not then uſed in the public theatres. When ſir William Davenant firſt opened, by virtue of his patent, the duke of York's theatre in Lincoln's-inn-fields, in the ſpring of the year 1662, with one of his own plays, the Siege of Rhodes, then ſcenes made their firſt appearance upon the Engliſh ſtage; and about the ſame time actreſſes were alſo introduced, probably by him, in imitation of the foreign theatres; and Mrs. Betterton is ſaid to have been the firſt woman that appeared on the Engliſh ſtage. Before this time, female characters were repreſented by boys or young men. In the time of Shakſpeare plays began at one o'clock in the afternoon, and the exhibition was uſually finiſhed in two hours; and ſo late as 1667, they commenced at three o'clock. See Malone's Supplemental Obſervations to Stevens's edition of Shakſpeare.

If any perſons ſhall in plays, &c. jeſtingly or prophanely uſe the name of God, they ſhall forfeit 10*l.* (Stat. 1 Jac. I. cap. 21.) And players ſpeaking any thing in derogation of religion, &c. are liable to forfeitures and impriſonment. (1 Eliz.) Alſo acting plays or interludes on a Sunday is ſubject to penalties, by 1 Car. I. cap. 1. No perſon ſhall act any new play, or an addition to an old one, &c. unleſs a true copy thereof, ſigned by the maſter of the play-houſe, be ſent to the lord chamberlain fourteen days before it be acted, who may prohibit the repreſenting any ſtage play; and perſons acting contrary to ſuch prohibitions ſhall forfeit 50*l.* and their licences, &c. (Stat. 10 Geo. II. cap. 28.) And by this ſtatute, no licence is to be given to act plays, but in the city and liberties of Weſtminſter, or places of his majeſty's reſidence. Ibid.

PLAZIA, in *Botany*, a genus in the Flora Peruviana, p. 92, named after John Plaza, a Spaniſh botaniſt, mentioned reſpectfully by Cluſius. *De Théis.* 371.

PLEA, PLACITUM, in *Law*, that which either party allegeth for himſelf in court, in a cauſe then depending to be tried.

Pleas are either *of the crown*, or *common pleas*.

PLEAS *of the Crown* comprehend all crimes and miſdemeanors, in which the king, on behalf of the public, is the plaintiff. Such are treaſons, felonies, miſpriſions of either, and mayhem.

PLEAS, *Common*, include all civil actions depending between ſubject and ſubject. The former of theſe were the proper object of the juriſdiction of the court of king's bench; the latter of the court of common pleas.

PLEAS are of two ſorts; *viz. dilatory* pleas, and pleas *to the action*. For an account of dilatory pleas, ſee DILATORY.

Pleas *to the action*, are ſuch as diſpute the very cauſe of ſuit.

A plea to the action is to anſwer to the merits of the complaint; which is done either by confeſſing or denying it. (See CONFESSION *of action.*) To this head may be referred the practice of what is called a "ſet-off;" by which the defendant acknowledges the juſtice of the plaintiff's demand on the one hand; but on the other, ſets up a demand of his own to counterbalance that of the plaintiff, either in the whole or in part; as if the plaintiff ſues for ten pounds due on a note of hand, the defendant may ſet off nine pounds due to himſelf for merchandize ſold to the plaintiff, and in caſe he *pleads* ſuch ſet-off, muſt pay the remaining balance into court. This anſwers very nearly to the *compenſatio*, or *ſtoppage*, of the civil law (Ff. 16. 2. 1.), and depends on the ſtatutes 2 Geo. II. c. 22. and 8 Geo. II. c. 24. which enact, that where there are mutual debts between the plaintiff and defendant, one debt may be ſet againſt the other, and either pleaded in bar, or given in evidence upon the general iſſue at the trial; which ſhall operate as payment, and extinguiſh ſo much of the plaintiff's demand.

Pleas that totally deny the cauſe of complaint are either the *general*, or a *ſpecial* plea, in bar. The *general* iſſue, or general plea, traverſes, thwarts, and denies at once the whole declaration, without offering any ſpecial matter whereby to evade it. Thus, in debt on contract, it is, *nihil debet*, he owes nothing; in debt on bond, *non eſt factum*, it is not his deed; in action of the caſe upon a promiſe, *non aſſumpſit*, he hath not promiſed; in treſpaſs upon the caſe, *not guilty*; in covenant, *performance of covenants*, &c. In real actions, *nul fort*, no wrong done; *nul diſſeiſin*, no diſſeiſin; and in a writ of right, that the tenant has more right to hold than the demandant has to demand. Theſe pleas are called the general iſſue, becauſe they amount at once to an iſſue, or a fact affirmed on one ſide, and denied on the other. Formerly the general iſſue was ſeldom pleaded, except when the party meant wholly to deny the charge alleged againſt him. But when he meant to diſtinguiſh, deny, or palliate the charge, it was always uſual to ſet forth the particular facts in what is called a *ſpecial* plea; which was originally intended to apprize the court and the adverſe party of the nature and circumſtances of the defence, and to keep the law and the fact diſtinct. And it is an invariable rule, that every defence which cannot be thus ſpecially pleaded, may be given in evidence, upon the general iſſue at the trial. Of late, on account of the chicane and delay that have attended ſpecial pleading, the courts have, in ſome inſtances, and the legiſlature in many more, permitted the general iſſue to be pleaded, thus leaving every thing open, the fact, the law, and the equity of the caſe, and have allowed ſpecial matter to be given in evidence at the trial.

Special pleas, *in bar* of the plaintiff's demand, are very various, according to the circumſtances of the defendant's caſe. As, in real actions a general releaſe, or a fine, both of which may deſtroy and bar the plaintiff's title. Or, in perſonal actions, an accord, arbitration, conditions performed, nonage of the defendant, or ſome other fact which precludes the plaintiff from his action. A *juſtification* is likewiſe a ſpecial plea in bar; as in actions of aſſault and battery, *ſon aſſault demeſne*, that it was the plaintiff's own original aſſault; in treſpaſs, that the defendant did the thing complained of in right of ſome office which warranted him ſo to do; or, in an action of ſlander, that the plaintiff is really as bad a man as the defendant ſaid he was. A man may alſo plead the ſtatutes of limitation in bar. (See *Statutes of* LIMITATION.) An eſtoppel is likewiſe a ſpecial plea in bar. See ESTOPPEL, BAR, and ABATEMENT.

The conditions and qualities of a plea are, 1. That it be ſingle, and containing only one matter; for duplicity begets confuſion. But by ſtatute 4 & 5 Ann. c. 16. a man, with leave of the court, may plead two or more diſtinct matters or ſingle pleas; as in an action of aſſault and battery, theſe three, not guilty, *ſon aſſault demeſne*, and the ſtatute of limitation. 2. That it be ſtrict and poſitive, and not argumentative. 3. That it have convenient certainty of time, place, and perſons. 4. That it anſwer the plaintiff's allegations in every material point. 5. That it be ſo pleaded as to be capable of trial. Special pleas are uſually in the affirmative, ſometimes in the negative, but they always advance ſome new fact not mentioned in the declaration; and then they muſt be averred to be true in the common form; “and this he is ready to verify.” This is not neceſſary in pleas of the general iſſue; thoſe always containing a denial of the facts before advanced by the other party, and therefore putting him upon the proof of them.

It is a rule in pleading that no man be allowed to plead ſpecially ſuch a plea as amounts only to the general iſſue, or a total denial of the charge; but in ſuch caſe he ſhall be driven to plead the general iſſue in terms, whereby the whole queſtion is referred to a jury. But if the defendant, in an aſſiſe or action of treſpaſs, be deſirous to refer the validity of his title to the court rather than to the jury, he may ſtate his title ſpecially, and at the ſame time *give colour* to the plaintiff, or ſuppoſe him to have an appearance or colour of title, bad indeed in point of law, but of which the jury are not competent judges. When the plea of the defendant is thus put in, if it does not amount to an iſſue, or total contradiction of the declaration, but only evades it, the plaintiff may plead again, and *reply* to the defendant's plea; either traverſing it, that is, totally denying it; as if on an action of debt upon bond, the defendant pleads *ſolvit ad diem*, that he paid the money when due, here the plaintiff in his *replication* may totally traverſe this plea, by denying that the defendant paid it; or he may allege new matter in contradiction to the defendant's plea; as when the defendant pleads *no award made*, the plaintiff may reply, and ſet forth an actual award, and aſſign a breach; or the replication may *confeſs and avoid* the plea, by ſome new matter or diſtinction, conſiſtent with the plaintiff's former declaration; as, in an action for treſpaſſing upon land of which the plaintiff is ſeiſed, if the defendant ſhews a title to the land by deſcent, and that therefore he had a right to enter, and gives colour to the plaintiff, the plaintiff may either traverſe and totally deny the fact of the deſcent; or he may confeſs and avoid it by replying, that true it is ſuch deſcent happened, but that ſince the deſcent the defendant himſelf demiſed the lands to the plaintiff for term of life. To the replication the defendant may *rejoin*, or put in an anſwer called a *rejoinder*. The plaintiff may anſwer the rejoinder by a *ſur-rejoinder*; upon which the defendant may *rebut*; and the plaintiff anſwer him by a *ſur-rebutter*; which pleas, replications, rejoinders, ſur-rejoinders, rebutters, and ſur-rebutters, anſwer to the *exceptio*, *replicatio*, *duplicatio*, *triplicatio*, and *quadruplicatio* of the Roman laws. Inſt. 4. 14. Bract. l. 5. tr. 5. c. 1.

The whole of this proceſs is denominated the *pleading*; in the ſeveral ſtages of which it muſt be carefully obſerved, not to depart or vary from the title or defence, on which the party has once inſiſted. For this (which is called a *departure* in pleading) might occaſion endleſs altercation, therefore the replication muſt ſupport the declaration, and the rejoinder muſt ſupport the plea, without departing out of it. As in the caſe of pleading no award made, in conſequence of a bond of arbitration, to which the plaintiff replies, ſetting forth an actual award; now the defendant cannot rejoin that he hath performed this award, for ſuch rejoinder would be an entire departure from his original plea, which alleged that no ſuch award was made; therefore he has now no other choice, but to traverſe the fact of the replication, or elſe to demur upon the law of it. Yet in many actions the plaintiff who has alleged in his declaration a general wrong, may, in his replication, after an evaſive plea by the defendant, reduce that general wrong to a more particular certainty, by aſſigning the injury afreſh with all its ſpecific circumſtances in ſuch manner as clearly to aſcertain and identify it, conſiſtently with his general complaint; which is called a *new* or *novel aſſignment*. Although duplicity in pleading muſt be avoided for various reaſons, yet it is often expedient to plead in ſuch a manner, as to avoid any implied admiſſion of a fact, which cannot with propriety or ſafety be poſitively affirmed or denied. And this may be done by what is called a *proteſtation*; by which the party interpoſes an oblique allegation or denial of ſome fact, proteſting (by the gerund, *proteſtando*) that ſuch a matter does or does not exiſt; and at the ſame time avoiding a direct affirmation or denial. The uſe of this proteſtation is to ſave the party from being concluded with reſpect to ſome fact or circumſtance, which cannot be directly affirmed or denied without falling into duplicity of pleading; and which yet, if he did not thus enter his proteſt, he might be deemed to have tacitly waived or admitted.

In any ſtages of the pleadings, when either ſide advances or affirms any new matter, he uſually avers it to be true, “and this he is ready to verify;” on the other hand, when either ſide traverſes or denies the facts pleaded by his antagoniſt, he uſually tenders an iſſue, as it is called; the language of which varies with the party by whom the iſſue is tendered; for if the traverſe or denial comes from the defendant, the iſſue is tendered thus, “and of this he puts himſelf upon the country,” thereby ſubmitting himſelf to the judgment of his peers; but if the traverſe lies upon the plaintiff, he tenders the iſſue, or prays the judgment of the peers againſt the defendant in another form; thus, “and this he prays may be inquired of by the country.” But if either ſide (*e. g.* the defendant) pleads a ſpecial negative plea, not traverſing or denying any thing that was before alleged, but diſcloſing ſome new negative matter ; as when the ſuit is on a bond, conditioned to perform an award, and the defendant pleads negatively, that no award was made, he tenders no iſſue upon this plea ; becauſe it does not yet appear whether the fact will be diſputed, the plaintiff not yet having aſſerted the exiſtence of any award ; but when the plaintiff replies, and ſets forth an actual ſpecific award, if then the defendant traverſes the replication, and denies the making of any ſuch award, he then, and not before, tenders an iſſue to the plaintiff. For when, in the courſe of pleading, they come to a point which is affirmed on one ſide, and denied on the other, they are then ſaid to be at iſſue ; all their debates being at laſt contracted into a ſingle point, which muſt now be determined either in favour of the plaintiff or defendant. Blackſt. Com. b. iii.

Plea, in *Equity*, may be either to the juriſdiction, ſhewing that the court has no cognizance of the cauſe ; or to the perſon, ſhewing ſome diſability in the plaintiff, as by outlawry, excommunication, and the like ; or in bar, ſhewing ſome matter, wherefore the plaintiff can demand no relief, as an act of parliament, a fine, a releaſe, or a former decree. And the truth of this plea the defendant is bound to prove, if put upon it by the plaintiff.

Plea *to Indictment*, is the plea of the priſoner, or defenſive matter alleged by him on his arraignment, if he does not confeſs, or ſtand mute. Waiving the plea of ſanctuary, which is now abrogated (ſee Sanctuary) ; there are five pleas of this kind. 1. A plea to the juriſdiction, which is when an indictment is taken before a court that hath no cognizance of the offence ; as if a man be indicted for a rape at the ſheriff's tourn, or for treaſon at the quarter-ſeſſions ; in theſe, or ſimilar caſes, he may except to the juriſdiction of the court, without anſwering at all to the crime alleged. (2 Hal. P. C. 256.) 2. A demurrer to the indictment. (See Demurrer.) 3. A plea in abatement, which is principally for a miſnomer, a wrong name, or a falſe addition to the priſoner. But the priſoner derives little benefit from dilatory pleas of this kind ; becauſe, if the exception be allowed, a new bill of indictment may be framed, according to what the priſoner in his plea avers to be his true name and addition. 4. A ſpecial plea in bar, which affects the merits of the indictment, and gives a reaſon why the priſoner ought not to anſwer it at all, nor put himſelf upon his trial for the crime alleged. Theſe pleas are of four kinds : a former acquittal, a former conviction, a former attainder, or a pardon. Here we may obſerve that, though in civil actions, in which a man may chuſe what plea in bar to make, he is concluded by that plea and cannot recur to another ; in criminal proſecutions, when a priſoner's plea in bar is found againſt him upon iſſue tried by a jury, or adjudged againſt him in point of law by the court, ſtill he ſhall not be concluded or convicted thereon, but ſhall have judgment of *reſpondeat ouſter*, and may plead over to the felony the general iſſue, not guilty. (2 Hal. P. C. 239.) For the law allows many pleas by which the priſoner may eſcape death ; but only one plea, in conſequence of which it can be inflicted, *viz.* on the general iſſue, after an impartial examination and deciſion of the facts, by the unanimous verdict of a jury. 5. The general iſſue, a plea of *not guilty*, upon which plea alone the priſoner receives his final judgment of death.

Plea *in Bar of Execution*, may be either inſanity, pregnancy, the king's pardon, an act of grace, or diverſity of perſon, *viz.* that he is not the ſame that was attainted and the like. In this laſt caſe a jury ſhall be impannelled to try this collateral iſſue, *viz.* the identity of his perſon, and not whether guilty or innocent ; for that has been decided before. In theſe collateral iſſues, the trial ſhall be *inſtanter*, and no time allowed the priſoner to make his defence, or produce his witneſſes, unleſs he will make oath that he is not the perſon attainted ; neither ſhall any peremptory challenges of the jury be allowed the priſoner, though formerly ſuch challenges were held to be allowable, whenever a man's life was in queſtion.

Pleas *of the Sword.* Ranulph earl of Cheſter, 2 Hen. III. granted to his barons of Cheſhire an ample charter of liberties, " exceptis placitis ad gladium meum pertinentibus."

The reaſon of the exception was, that William the Conqueror gave the earldom of Cheſter to his half-brother Hugh, commonly called Lupus, anceſtor of this Ranulph. " Tenere ita libere ad gladium, ſicut ipſe rex tenuit Angliam & coronam."

Accordingly, in all indictments for felony, murder, &c. in the county palatine, the form was, " Contra pacem domini comitis, gladium & dignitatem ſuam ;" or, " Contra dignitatem gladii Ceſtriæ." Such were the pleas for the dignity of the earl of Cheſter.

Pleas, *Court of Common*, called alſo common bench. See Court *of Common Pleas.*

PLEADING, Placitatio, a diſcourſe ſpoken at the bar, in defence of the cauſe of a party.

From the time of the Conqueſt, all pleading was performed in French till the time of Edward III., when it was appointed, that the pleas ſhould be pleaded in Engliſh, but that they ſhould be entered, or recorded, in Latin. But now by 4 Geo. II. cap. 26. it is enacted, that all proceedings in courts of juſtice ſhall be in Engliſh.

At Athens, and even in France and England, it was prohibited to have any formed, or prepared pleading, or to amuſe the court with long artificial harangues ; only, in important matters, it was the ſettled cuſtom to begin the pleadings with a paſſage in holy ſcripture.

It is but of late years that eloquence was admitted to the bar, where it has been much practiſed and encouraged.

Among the Athenians, an equal time was allowed both parties to plead, which was meaſured by a water hour-glaſs ; and in order to ſee juſtice done in this reſpect, there was an officer appointed to diſtribute the water to each, whence he was called *ephydor.*

Pleadings, in the ſtricteſt ſenſe, are all the allegations of the parties to a ſuit, made after the count, or declaration, till iſſue is joined : or, more generally, *pleadings* are the mutual altercations between the plaintiff and defendant ; which at preſent are ſet down and delivered into the proper office in writing, though formerly they were uſually put in by their counſel *ore tenus*, or *viva voce*, in court, and then minuted down by the chief clerks, or prothonotaries ; whence in our old law French, the pleadings are frequently denominated the *parol.* The firſt of theſe is the *declaration*, which ſee. When the plaintiff hath ſtated his caſe in the declaration, it is incumbent on the defendant within a reaſonable time to make his *defence*, and put in a *plea ;* or elſe the plaintiff will at once recover judgment by *default*, or *nihil dicit* of the defendant. (See Defence.) After defence made, the defendant muſt put in his *plea.* But, before he defends, if the ſuit is commenced by *capias* or *latitat*, without any ſpecial *original*, he is entitled to demand one *imparlance*, or *licentia loquendi ;* and may, before he pleads, have more granted by conſent of the court ; to ſee if he can end the matter amicably without farther ſuit, by talking with the plaintiff ; a practice which is ſuppoſed to have ariſen from a principle of religion, in obedience to the precept of the goſpel (Matth. v. 25.) ;

which precept has a plain reference to the Roman law of the 12 tables, which expreſsly directed the plaintiff and defendant to make up the matter, while they were *in the way*, or going to the prætor. There are many other previous ſteps which may be taken by a defendant before he puts in his plea. When theſe proceedings are over, the defendant muſt then put in his excuſe or plea. For an account of the different pleas, and the further proceſs by pleading; ſee PLEA, *ſupra*.

PLEASANT, in *Geography*, a town of Clermont county, in Ohio, containing 1245 inhabitants.—Alſo, in Fairfield county, containing 988 inhabitants.

PLEASANT, *Mount*. See MOUNT *Pleaſant;* adding in that article after Pennſylvania, containing, in 1810, 1105 inhabitants.—Alſo, *Mount Pleaſant* in Waſhington county, containing 1165; and *Mount Pleaſant* in Weſtmoreland, containing 1780 inhabitants, both in the ſame ſtate.—Alſo, in Jefferſon county, Ohio, containing 846 inhabitants.

PLEASANT *Point*, a N.E. headland in Merry-meeting bay, Lincoln county and ſtate of Maine.—Alſo, a fertile and agreeably ſituated point of land, on the weſtern bank of the Paſſamaquoddy river, about 15 miles from the mouth of the river, and four above Mooſe iſland. On this point reſide the remains of the Paſſamaquoddy tribe of Indians, conſiſting of about 400 in number, and thought to be on the decline. They have a Roman Catholic prieſt, and lately, a reſpectable meeting-houſe has been erected at the expence of the ſtate. Unacquainted with agriculture, their ſummer employment is that of fiſhing, and ſhooting porpoiſes, the oil of which they extract, and ſell to the Americans for the uſe of lamps; and in winter they occupy themſelves in hunting. They have ſome idea of moral obligation, but are not diſtinguiſhed for their honeſty or fidelity. The women are graceful and delicate in their manners, and modeſt in their dreſs. The men are ſullen and unſociable.—Alſo, the eaſtern boundary of Hawk's, or Sandwich river, in the harbour of Chebucto.

PLEASANT *River*, a ſmall village, with a poſt-office, on the ſea-coaſt of Waſhington county, in Maine, at the head of Narraguagus bay; 16 miles N.E. of Goldſborough.

PLEASURE, the effect of a ſenſation, or perception, agreeable to the mind, or of the gratification of ſome appetite.

Pleaſures may be diſtinguiſhed into two kinds. The firſt, thoſe which anticipate, or go before the reaſon: ſuch are all agreeable ſenſations. Theſe are popularly called *pleaſures of ſenſe*, or *of the body*.

The ſecond are thoſe which do not precede, or anticipate, either the ſenſes or reaſon. Theſe we call *pleaſures of the mind*. Such is the joy ariſing from a clear perception of ſome future good, or the confuſed ſenſation of a preſent one.

For an inſtance of each. A man frequently finds pleaſure in eating a fruit he was before unacquainted with; this is *anticipating pleaſure*, which he feels before he knows the fruit to be good. On the other hand, a hungry hunter expects, or perhaps actually finds victuals; where the joy he conceives is a pleaſure that follows from the knowledge of his preſent or future good.

Pleaſure and *pain* ſeem to be no other than engines in nature's hand, by which we are directed to conſult our own preſervation, and avoid our ruin. To things that may contribute to the one, as food, &c. ſhe has annexed pleaſure; and to thoſe that may conduce to the other, as hunger, diſeaſes, &c. pain.

Among the multiplicity of things to be done, and to be avoided, for the preſervation of animal life, &c. how ſhould we have diſtinguiſhed between the one and the other, but for the ſenſation of pleaſure or pain? Theſe are not only ſpurs to urge us on, but alſo guides, to direct us whither we are to go. Wherever nature has fixed a pleaſure, we may take it for granted, ſhe there enjoins a duty; and ſomething is to be there done, either for the individual, or for the ſpecies.

Hence it is, that our pleaſures vary at different ſtages of life; the pleaſures, *e. gr.* of a child, a youth, a grown man, an old man, &c. all tending to thoſe particular things required by nature in that particular ſtate of life, either for the preſervation, ſimply, or, jointly, for that and propagation, &c.

Hence, from the different conſtitutions of the body, at different ages, it were very eaſy to account for all the particular taſtes and pleaſures thereof: not by deducing the pleaſures mechanically from the diſpoſition of the organs in that ſtate, but by conſidering what is neceſſary for the perfection and well-being of the individual in that ſtate, and what is to contribute to that of the ſpecies. In a child, *e. gr.* mere preſervation in the preſent ſtate is not enough, it muſt likewiſe grow: to bring this to paſs, nature has made the returns of hunger, &c. more frequent, as well as more acute, and the pleaſures of feeding more exquiſite. And that the exceſs of aliment, in proportion to the bulk of the body, may be diſpenſed with, ſhe has made one of the great pleaſures of the ſtate to conſiſt in a ſeries of ſportive exerciſes; by means of which the parts of the body come to be opened and expanded, and arrive at maturity. This done, the pleaſures that conduced to it diſappear; and others, ſuited to the new ſtate, ſucceed.

In the Hartleyan ſyſtem, the capacity of pleaſure and pain is one of the faculties of the human mind, by which a man becomes capable of action, enjoyment, or ſuffering. Our affections, or paſſions, are feelings ariſing from the perception of pleaſure or pain, or, in other words, of natural good or evil, according to the circumſtances in which they are placed. "By the affections," ſays Dr. Hartley, "we are excited to purſue happineſs and all its means, and to flee from miſery and all its apparent cauſes." The primary affections in his ſyſtem are ten; five grateful, and five ungrateful: the former are love, deſire, hope, joy, and pleaſing recollection: the latter are hatred, averſion, fear, ſorrow, and diſpleaſing recollection. (See AFFECTION and PASSION.) The exiſtence of this capacity of pleaſure and pain we derive from conſciouſneſs; and what pleaſure and pain are, we learn from experience; theſe being feelings which cannot be expreſſed by definition. Natural good produces pleaſure, and that which produces pain is natural evil. Our pleaſures and pains are either ſenſible or intellectual, that is, they are the effect of either ſenſations or ideas. The pleaſurable and painful ſenſations he thus explains by his theory of vibrations. Moderate vibrations are the cauſes of pleaſure, whilſt violent vibrations occaſion pain; hence the ſame ſenſation, which in a moderate degree is pleaſurable, may, by increaſing beyond certain limits, become exquiſitely painful, as in the caſe of heat. Dr. Hartley conjectures, that the preciſe limit between pleaſure and pain is the ſolution of continuity in the nerve that vibrates. Hence, Hartley and his diſciples alſo account for the pleaſure which accompanies the recovery from painful diſorders, and from the recollection of paſt pains, dangers, and troubles. The vigorous vibrations, which occaſion pain, ſubſide by length of time within the limits of pleaſure. Hence, it has been ſuggeſted, we may account, at leaſt in part, for the exiſtence of evil in the univerſe, and are able to aſſign a reaſon, why a ſtate of probation, to beings conſtituted like ourſelves, ſhould be in a conſiderable degree a ſtate of ſuffering.

ing. Pains the moſt exquiſite and durable, it has been ſaid, may ultimately fall within the limits of pleaſure, and may be even eſſential to the production of the greateſt good. Dr. Hartley, in the ſequel of his "Treatiſe on Man," has ſhewn how, upon his ſyſtem of aſſociation and vibration, our five ſenſes, *viz.* feeling, taſte, ſmell, ſight, and hearing, produce intellectual pleaſures and pains, or the different affections, which are modifications of pleaſure and pain. Arranging the affections under ſix general claſſes, *viz.* imagination, emulation, ſelf-intereſt, ſympathy, theopathy, and the moral ſenſe; he traces them up to the aſſociation of ideas, and deduces them either from ſenſible pleaſures or pains, which are evidently original, or from the combination of other intellectual pleaſures or pains, which are derived from ſenſible ones. The pleaſures and pains of imagination ariſe from the perception of natural or artificial beauty or deformity; and theſe he diſtinguiſhes into ſeven kinds. The pleaſures and pains of ambition ariſe from the opinions of others concerning us; the ſenſe of honour and of ſhame. Thoſe of ſelf-intereſt ariſe from the poſſeſſion or want of the means of happineſs, and ſecurity from a ſubjection to the hazards of miſery. (See SELF-INTEREST.) For the pleaſures and pains of ſympathy, theopathy, and the moral ſenſe, ſee theſe ſeveral articles. See alſo *Mental* PHILOSOPHY.

PLEASURE *Boat*, among the *Ancients*. See THALAMEGUS.

PLEASURE *Garden*, in *Ornamental Gardening*, is that ſort of garden which is formed near to, or that ſurrounds a country-houſe or reſidence; and which is contrived for the purpoſe of curioſity, ornament, or entertainment. This ſometimes comprehends the whole pleaſure ground, but at other times is totally diſtinct from it. Pleaſure gardens ſhould conſtantly be laid out according to the nature and ſituation of the particular places where they are to be formed, being of greater or leſs extent as circumſtances may direct. They are moſtly planted either wholly or in the greateſt part with flowers and ſhrubs of the more beautiful and ornamental kinds, that they may afford as much beauty and variety as poſſible. In their forms they may be ſquare, oblong, or ſomewhat circular, and have the boundaries of the diviſions formed by the arrangements of curious ſhrubberies, embelliſhed with collections of the moſt rare, beautiful, and curious flowering ſhrubs; the interior parts being divided into many narrow compartments, either in the parterre method with ſtraight beds and borders, or into plain four-feet wide beds arranging parallel, with two-feet wide alleys between each, walks being carried all round next to the outer boundaries, after which borders ſurrounding the whole diviſions, and within theſe the different divided parts for the beds, as already noticed, which ſhould in general be raiſed in a gently rounding manner, the edges being ſet with dwarf-box, thrift, and pinks by way of variety, and the alleys and walks laid with the beſt and fineſt gravel.

In theſe diviſions may be planted the moſt curious and valuable hyacinths, tulips, polyanthos-narciſſuſes, jonquils, ranunculuſes, anemones, as well as moſt other ſorts of rare, hardy, bulbous, and tuberous-rooted flowers, each kind moſtly in a ſeparate manner, eſpecially of thoſe of the more choice ſorts, as being neceſſary, not only for the ſake of diſtinction, but for the convenience of occaſionally giving them protection from ſevere and inclement weather. In theſe ſituations, there may likewiſe be put out curious collections of the fineſt deſcriptions of fibrous-rooted flowering plants, ſuch as carnations, polyanthuſes, auriculas, and many other kinds, ſome of which being placed in ſeparate beds, as thoſe of the more valuable ſorts, and others diſperſed in different compartments, in order to give the greateſt poſſible degrees of variety. Still further, in other compartments, there may be exhibitions containing great varieties of all the different kinds of both the bulbous and fibrous-rooted ſorts of flowering plants.

Gardens of this kind ſhould conſtantly, in every part, be kept clean, neat, and perfectly in order.

PLEASURE *Ground*, in *Gardening*, any ſort of ornamented ground round a reſidence. It comprehends all the ornamental compartments or diviſions of ground and plantation; ſuch as lawns, plantations of trees and ſhrubs, flower compartments, walks, pieces of water, &c. whether ſituated wholly within the ſpace generally conſidered as pleaſure ground, or extended over hahas, or by other communications, to the adjacent fields, parks, paddocks, or out grounds.

In deſigns for pleaſure grounds, modern improvements reject all formal works, ſuch as long ſtraight walks, regular interſections, ſquare graſs plots, correſponding parterres, quadrangular and angular ſpaces, incloſed with high clipped hedges, &c., as well as all other uniformities; inſtead of which, open ſpaces of graſs ground of varied forms and dimenſions, and winding walks, all bounded with plantations of trees, ſhrubs, and flowers, in various clumps and other diſtributions, are exhibited in a variety of imitative rural forms, as curves, projections, openings, and cloſings, in imitation of a natural aſſemblage, having all the various plantations open to the walks and lawns. A ſpacious open lawn of graſs ground being generally firſt exhibited immediately in the front of the manſion, or main habitation, ſometimes widely extended in open ſpace on both ſides to admit of greater proſpect, &c., and ſometimes more contracted towards the habitation, widening gradually outward, and having each ſide embelliſhed with plantations of ſhrubbery, groves, thickets, &c., in clumps, and other parts, in ſweeps, curves, and projections, towards the lawn, &c., with breaks or openings of graſs ſpaces at intervals, between the plantations; and ſerpentine gravel walks winding under the ſhade of the trees; extended plantations being alſo carried round next the outer boundary of the ground, in various openings and cloſings, having alſo gravel walks winding through them, for ſhady and private walking; and in the interior diviſions of the ground ſerpentine winding walks exhibited, and elegant graſs openings, arranging various ways, all bordered with ſhrubberies, and other tree and ſhrub plantations, flower compartments, &c., diſpoſed in a variety of different rural forms and dimenſions, in eaſy bendings, concaves, projections, and ſtraight ranges, occaſionally; with intervening breaks or openings of graſs ground between the compartments of plantations, &c., both to promote rural diverſity, and for communication and proſpect to the different diviſions; all the plantations being ſo variouſly arranged, as gradually to diſcover new ſcenes, each furniſhing freſh variety, both in the form of the deſign in different parts, as well as in the diſpoſition of the various trees, ſhrubs, and flowers, and other ornaments and diverſities.

So that in theſe deſigns, according to modern gardening, a tract of ground of any extent may have the proſpect varied and diverſified exceedingly, in a beautiful repreſentation of art and nature, ſo that in paſſing from one compartment to another, new varieties preſent themſelves in the moſt agreeable manner; and even if the figure of the ground be irregular, and its ſurface has many inequalities, in riſings and fallings, and other irregularities, the whole may be improved without any great trouble of ſquaring and levelling, as by humouring the natural form, even the very irregularities may be made to conceal their natural deformities, and carry along with them an air of diverſity and novelty.

In theſe rural works, however, we ſhould not entirely aboliſh all appearance of art and uniformity; for theſe, when properly applied, give an additional beauty and peculiar grace to all natural productions, and ſet nature in the faireſt and moſt advantageous point of view. One principal point in laying out a pleaſure ground, is for the deſigner to take particular care that the whole extent of his ground be not taken in at one view, as where the contrary is the caſe, there is a tameneſs and want of proper effect produced.

It is impoſſible to give any directions for planting a pleaſure ground; as the plan may be varied exceedingly, according to the natural figure, poſition, and ſituation of the land, and taſte of the deſigner.

In reſpect to the ſituation, it muſt be immediately contiguous to the main houſe, whether high or low ſituated: however, a ſomewhat elevated ſituation, or the ſide or ſummit of ſome moderate riſing ground, is always the moſt eligible on which to erect the chief habitation, arranging the pleaſure ground accordingly; ſuch an expoſure being the moſt deſirable, both for the beauty of the proſpect and healthfulneſs of the air; a low level ſituation neither affording a due proſpect of the ground, nor the adjacent country, beſides being liable to unwholeſome dampneſs, and ſometimes inundation in winter: there are, however, many level ſituations, forming plains or flats, that poſſeſs great advantages both of ſoil and proſpect, and the beauties of water without too much moiſture; there are alſo ſometimes large tracts of ground, conſiſting both of low and high ſituations, as level plains, hollows, eminences, declivities, and other inequalities, which may be ſo improved as to make a moſt deſirable pleaſure ground, as the ſcene may be varied in the moſt beautiful manner imaginable; but as the choice of ſituation and ſcope of ground is not always attainable, every one muſt regulate his plan in the moſt commodious manner poſſible, agreeable to the nature of the particular ſituation, extent of ground, and plan which has been adopted.

The extent of pleaſure grounds may be varied, according to that of the eſtate or premiſes, and other circumſtances, as from a quarter or half an acre to thirty or forty or more.

The ground for this purpoſe ſhould previouſly be well fenced in, by a wall, paling, hedge, or parts of each ſort, and in ſome parts a foſſe or haha, where it may be neceſſary to extend the proſpect, either at the termination of a lawn, walk, or avenue; and the cloſe fences ſhould generally be concealed withinſide, particularly the wall and paling fences, by a range of cloſe plantation, unleſs where the wall may be wanted for the culture of wall fruit. But ſometimes, when the pleaſure ground adjoins to a fine park, paddock, or other agreeable proſpect, the boundary fence on that ſide is often either a low edge, or a haha; but many prefer the latter, eſpecially at the termination of any ſpacious opening, both to extend the proſpect more effectually, and give the ground an air of greater extent, than it really has, at a diſtance; the haha being ſunk, nothing like a fence appears, ſo that the adjacent park, fields, &c. appear to be connected with the grounds.

The arrangement of the ſeveral diviſions, both internal and external, muſt be wholly regulated by the nature and extent of the ground.

And in whatſoever mode ſuch grounds are laid out, the whole of the different quarters, walks, and other parts, ſhould be kept in an exact and neat order.

According to Mr. Loudon, the pleaſure ground may conſiſt of ſcenes of different expreſſions of avowed art, as thoſe of gardening; and of nature, as thoſe of pictureſque improvement, ſuch as tranquil or ſequeſtered glades, romantic glens, flowery meads, furzy heaths, tangled dingles, wooded dells, rocky ſteeps, and numberleſs others, which are to be met with in a varied or pictureſque country, and are either to be heightened in effect, or preſerved from cultivation by the improver. Wherever the pleaſure ground is not under ſome of the particular ſcenes of ornamental gardening, it ſhould be fed at leaſt by ſheep, and often by horſes, cattle, &c., which ſhould be allowed to come cloſe to the terrace wall that ſeparates the lawn from the manſion; for what can be more dull and unnatural, than the modern method of ſurrounding a houſe by a naked lawn totally deſtitute of animation?

A hollow winding dell or dingle, containing a brook or rill overhung with wood, and its banks diverſified by broken ground preſenting various coloured earths, and among the low growths old trunks of trees, roots, and ſtones, or dells of a grander character, containing bold, perpendicular, projecting, or irregular, maſſive rocks, overhung with huge trees, buſhes, ferns, and creepers, grouped and combined in an infinite diverſity of ways,—the ſtream, interrupted by the rocks, tumbling over in roaring cataracts, foaming caſcades, or interrupted only by gentle falls,—and perhaps in ſome places, where the dell widens into a valley, ſpreading itſelf into a cryſtal lake, varied by little iſlands and woody projections, all heightened by the uſual appendages of animation, the ſinging of birds, the fragrance of flowers, from what is conſidered to be among the moſt enchanting kinds of recluſe pleaſure ground ſcenery. When a place is fortunate enough to have ſuch a romantic chain of pictureſque beauty as this, it ſhould ſeldom be touched by the hand of art. It may happen, that ſome improvement may be made, by ſhewing, in a partial manner, rocks, roots, or ſtones, that are perhaps totally concealed; by augmenting a natural caſcade, or by ſupplying ivy, or ſome other creepers, or evergreens, &c.; but in general little more can be attempted with propriety. The principal operation, that in any caſe can be undertaken in ſuch a ſcene, is, where it may be requiſite to lead through a walk, or road, either to obſerve its beauties, or as an approach to ſome other part of the reſidence. The difficulty of executing either of theſe will be great to thoſe, who think of nothing but undulating ſweeps, ſhaven lawns, and ſerpentine gravel walks; but by thoſe accuſtomed to admire this kind of ſcenery, the operation will eaſily be accompliſhed. See RESIDENCE.

PLEASURE *of the King*, in *Law*, is uſed in connection with the infliction of puniſhment for any crime, not to ſignify any extrajudicial will of the ſovereign, but ſuch as is declared by his repreſentatives, the judges in his courts of juſtice: "voluntas regis in curia, non in camera." 1 Hal. P.C. 375.

PLEAU, LA, in *Geography*, a town of France, in the department of the Correze, and chief place of a canton, in the diſtrict of Tulles; 18 miles E. of Tulles. The place contains 655, and the canton 6355 inhabitants, on a territory of 232½ kiliometers, in 8 communes.

PLEAUX, a town of France, in the department of the Cantal, and chief place of a canton, in the diſtrict of Mauriac; 8 miles S.W. of Mauriac. The place contains 2584, and the canton 10,667 inhabitants, on a territory of 182½ kiliometres, in 12 communes.

PLEBANUS was anciently the title of a rural dean.

The denomination aroſe hence, that theſe deaneries were then affixed to the *plebania*, or chief mother-church within ſuch a diſtrict; which, at firſt, was uſually ten pariſhes.

PLEBANUS ſeems alſo to have been uſed for a pariſh-prieſt of ſuch a large mother-church, as was exempt from the juriſdiction of the ordinary; ſo that he had the authority of a rural dean committed to him by the archbiſhop; to whom the church was immediately ſubject.

PLEBEIAN, Plebeius, a perſon of the rank of the populace, or common people.

The term is chiefly uſed in ſpeaking of the ancient Romans; who were divided, about the time of Tarquin's expulſion, into ſenators, knights, and plebeians, or commons.

The plebeians were thoſe who could not claim their deſcent from the ancient ſenators, appointed by Romulus, and the kings who ſucceeded him.

Plebeian *Games*, were games celebrated by the Roman people, in remembrance, as ſome ſay, of their reconciliation with the ſenators, after the expulſion from the city, in the year of Rome 261; or, according to others, in token of their public rejoicing, when the kings were driven from Rome, A.U.C. 245, and the people enjoyed their liberty. Theſe games were celebrated in the circus for three days, and commenced on the ſeventh of the calends of December. Adrian inſtituted plebeian games in the circus, A.U.C. 874.

PLEBISCITUM, among the Romans, a law enacted by the common people, at the requeſt of the tribune, or ſome other plebeian magiſtrate, without the intervention of the ſenate.

Plebiscitum is more particularly applied to the law which the people made, when, upon ſome miſunderſtanding with the ſenate, they retired to the Aventine mount.

PLECH, in *Geography*, a town of Germany, in the principality of Culmbach; 21 miles S. of Pegnitz.

PLECHAS, a word uſed by Hippocrates to expreſs that region of the body which is terminated backward by the anus, forward by the pudenda, and ſideways by the hips.

PLECTANÆ, a word uſed by ſome to expreſs the cornua uteri, and by others, for any plexus of veſſels.

PLECTRANTHUS, in *Botany*, received that name from l'Heritier, in alluſion to the *ſpur*, πληκτρον, of the corolla, which he conceived to be an eſſential part of the generic character.—L'Herit. Stirp. 85. Schreb. 396. Willd. Sp. Pl. v. 3. 168. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 3. 425. Brown Prodr. Nov. Holl. v. 1. 505. (Germanea; Juſſ. 116. Lamarck Illuſtr. t. 514.)—Claſs and order, *Didynamia Gymnoſpermia*. Nat. Ord. *Verticillatæ*, Linn. *Labiatæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, ſomewhat bell-ſhaped, ſhort, two-lipped; upper lip ovate, broadeſt, aſcending; lower four-cleft, acute, the two lower ſegments rather the longeſt. *Cor.* of one petal, ringent, reverſed; tube compreſſed, longer than the calyx: one lip, which is turned uppermoſt, broadeſt, three-cleft; its middle ſegment very large, emarginate; lateral ones ſmall: the other, directed downwards, narrower, entire, ovate, concave. Nectary a ſpur or prominence, from the baſe of the tube of the corolla, pointing upwards. *Stam.* Filaments four, declining, awl-ſhaped, two of them rather the ſhorteſt; anthers ſimple. *Piſt.* Germen four-lobed; ſtyle thread-ſhaped, the length and poſition of the ſtamens; ſtigma cloven, acute. *Peric.* none, the calyx containing the four roundiſh *ſeeds*.

Eſſ. Ch. Upper lip of the calyx largeſt; lower four-cleft. Corolla reverſed, ringent, its tube ſpurred on the upper ſide. Stamens ſimple.

Such are the characters of this genus, as originally defined by its author, who conſidered the reverſed corolla, or flower; the ſpur or prominence of the tube; and the ſimple ſtamens; as eſſential marks. The two latter eſpecially were ſuppoſed to diſtinguiſh it from Ocimum; ſee that article. Mr. Brown however, looking more deeply into this latter genus, and finding ſeveral of its ſpecies without any tooth or appendage to their filaments, has referred ſuch to *Plectranthus*, waving the conſideration of the ſpur. He therefore gives the following character of *Plectranthus*.

Calyx two-lipped, ſtriated, the lower lip divided; the baſe tumid beneath when in fruit. Upper lip of the corolla three-cleft, the middle ſegment two-lobed; lower lip longer, undivided, (moſtly concave.) Stamens declining; their filaments without teeth, (ſometimes united at the baſe;) anthers of one cell, beardleſs.

This includes, not only the *Plectranthus* of other authors, and the toothleſs ſpecies of *Ocymum*, but alſo the *Dentidia* and *Coleus* of Loureiro. Mr. Brown does not admit *Lavandula carnoſa* into this genus, from which he ſays it differs in calyx and infloreſcence, though agreeing in corolla, ſtamens and ſtigma, conſtituting, in his opinion, a genus by itſelf. (See Lavandula, at the end.) All the ſix New Holland ſpecies of Mr. Brown's *Plectranthus* are deſtitute of a ſpur. As the queſtion is rather doubtful, while the whole genus of *Ocymum* requires to be critically examined, we ſhall here exhibit only ſuch ſpecies of the genus before us as we conceive to anſwer to its original idea.

1. P. *fruticoſus*. Shrubby Plectranthus. L'Herit. Stirp. 85. t. 41. Willd. n. 1. Ait. n. 1. (Germanea urticifolia; Lamarck Dict. v. 2. 690.)—Nectary ſpurred. Cluſters compound. Flower-ſtalks three-cleft. Stem ſhrubby, downy.—Found at the Cape of Good Hope, from whence Mr. Maſſon ſent it in 1774 to Kew. This is a greenhouſe ſhrub, flowering copiouſly from June to September. Every part has a fragrant ſcent. The *ſtem* is clothed with fine ſhort down, unſpotted. *Leaves* oppoſite, ſtalked, ovate, ſtrongly ſerrated like thoſe of a common nettle, veiny, roughiſh. *Flowers* copious, in pale violet cluſters.

2. P. *galeatus*. Helmet Plectranthus. Vahl. Symb. v. 1. 43. Willd. n. 2.—Nectary gibbous. Partial flower-ſtalks branched. Leaves ovate, ſomewhat heart-ſhaped, pointed, ſerrated.—Native of Java. *Stem* villous, furrowed. *Leaves* ſtalked, broadly ovate, villous, eſpecially the veins beneath. *Cluſter* terminal; the flower-ſtalks oppoſite, branched, without *bracteas*. *Corolla* downy; its lower lip hooded.

3. P. *nudiflorus*. Naked-flowered Plectranthus. Willd. n. 3.—Nectary gibbous. Panicle racemoſe, naked. Leaves heart-ſhaped, rugged; the upper ones claſping the ſtem.—Suppoſed to be a native of China; Willdenow having ſeen it in gardens under the name of *Ocimum chinenſe*. *Root* perennial. *Stem* erect, ſquare, downy, ſcarcely ſix inches high. Lower *leaves* ſtalked, two or three inches long, coarſely toothed, rugoſe, ſmooth, except the veins at the back. *Panicle* a foot or more in length; each whorl of four cluſters an inch long, turned one way, with two ſmall heart-ſhaped *bracteas*. *Corolla* ſmall, cloſed, downy.

4. P. *Forſkolaei*. Bearded Plectranthus. Vahl. Symb. v. 1. 44. Willd. n. 4. Ait. n. 2. (P. barbatus; Andr. Repoſ. t. 594.)—Nectary gibbous. Cluſters naked. Stem even, quadrangular.—Native of Arabia. *Forſkäll.* Commerſon gathered it in Madagaſcar and the Mauritius, and lord Valentia ſent it to England in 1806. The whole *herb* is downy. *Root* tuberous, increaſing prodigiouſly in its native foil. *Leaves* ovate, crenate, bluntiſh, ſtalked. *Flowers* in a long, whorled, upright *cluſter*, pendulous, pale purple, hairy externally.

5. P. *craſſifolius*. Thick-leaved Plectranthus. Vahl. Symb. v. 1. 44. Willd. n. 5.—Nectary gibbous. Cluſters bracteated. Leaves ovate, fleſhy.—Native of Egypt.

Differs from the laſt, according to Vahl, in its fleſhy *leaves*, and in having ovate membranous *bracteas*.

6. P. *punctatus*. Dotted Plectranthus. L'Herit. Stirp. 87. t. 42; not 41. Willd. n. 6. Ait. n. 3. (Ocymum punctatum; Linn. Suppl. 275.)—Nectary gibbous. Cluſter denſe. Stem herbaceous, tumid, hairy.—Native of Africa, where it is ſaid to have been found by Mr. Bruce the famous traveller. This ſpecies is biennial, flowering in the greenhouſe from January to May. The tumid, fleſhy, purple-dotted, hairy *ſtem* diſtinguiſhes it. The *footſtalks* are ſhort. *Corolla* very pale blue.

7. P. *carnoſus*. Denſe-ſpiked Plectranthus. (Lavandula carnoſa; Linn. fil. Diſſ. 9. t. 2. Am. Acad. v. 10. 52. t. 3. Ait. Hort. Kew. v. 3. 383. Katu-Kurka; Rheede Hort. Malab. v. 10. 179. t. 90. Nepeta indica, rotundiore folio; Moriſ. Sect. 11. t. 6. f. 7.)—Nectary gibbous. Spikes ovate, denſe. Leaves ovate, ſomewhat heart-ſhaped, fleſhy, wavy or ſerrated.—Found by Koenig, on dry walls and rocks, at Sadraſs in the Eaſt Indies, flowering in the hotteſt ſeaſon, after which the foliage appears. The *ſtem* is ſhrubby, but ſucculent, finely hoary. *Leaves* ſtalked, ovate or ſlightly heart-ſhaped, wavy, or more or leſs deeply ſerrated, very fleſhy, minutely hoary, varying greatly in ſize. *Spikes* generally three or four to each branch, ſtalked, ſolitary and ſimple, ovate, thick, very much crowded, the *calyces* ſingularly reflexed, or imbricated downward. *Corolla* yellowiſh. Rheede ſpeaks of this plant as aromatic, and uſeful againſt the bite of ſome ſerpents. It was ſent to Kew in 1788 by ſir Joſeph Banks, and is kept in the ſtove, flowering in June and July; but the *root* is ſaid to be only biennial.

PLECTRONIA, ſo named by Linnæus, from πληκτρον, *a cock's ſpur*, which its thorns very much reſemble.—Linn. Mant. 6. Schreb. 153. Willd. Sp. Pl. v. 1. 1152. Mart. Mill. Dict. v. 3. Juſſ. 382. Lamarck Illuſtr. t. 146.—Claſs and order, *Pentandria Monogynia*. Nat. Ord. akin to *Rhamni*, Juſſ. Linnæus refers it to his *Contortæ*, in his Prælectiones in Ord. Nat. 408.

Gen. Ch. *Cal.* Perianth ſuperior, of one leaf, turbinate, with five ſlight teeth, the mouth cloſed with five hairy ſcales, pemanent. *Cor.* Petals five, lanceolate, ſeſſile, inſerted into the mouth of the calyx. *Stam.* Filaments five, very ſhort; anthers two-lobed, roundiſh, each ſheltered by one of the ſcales of the calyx. *Piſt.* Germen inferior; ſtyle thread-ſhaped, ſhorter than the calyx; ſtigma ovate. *Peric.* Berry oblong, of two cells. *Seeds* ſolitary, oblong, compreſſed.

Eſſ. Ch. Petals five, inſerted into the mouth of the calyx, which is cloſed by five hairy ſcales. Berry inferior, with two ſeeds.

1. P. *ventoſa*. Linn. Mant. 52. (P. corymboſa; Burm. Prodr. Cap. 6. Rhamnus foliis ſubrotundo-acuminatis, fructu racemoſo; Burm. Afr. 257. t. 94.)—Native of woods at the Cape of Good Hope, flowering in September; a ſtranger, as yet, in our gardens. This is a *tree*, whoſe trunk and principal branches are armed with very conſiderable, long, tapering, ſimple, oppoſite ſpines. The *leaves* are oppoſite, ſtalked, elliptical, acute at each end, entire thick-edged, ſomewhat wavy and revolute, ſmooth on both ſides; poliſhed above; paler and opaque beneath; with one rib, and many tranſverſe veins. *Flowers* ſmall, yellow, in compound, axillary, denſe *cluſters*, about twice the length of each *footſtalk*; their *ſtalks* oppoſite, angular, rather downy, with oppoſite, minute, deciduous *bracteas* under their ſubdiviſions.

We are at a loſs for the meaning of the ſpecific name given by Linnæus, which is not ſo good as Burmann's. The *tree* is ſaid to be well calculated for making hedges. The habit and appearance of every part ſeem rather to juſtify the opinion of Linnæus than of Juſſieu, reſpecting the natural order to which this plant belongs, but the inferior germen, if it be really ſo, is adverſe to both.

PLECTRONITÆ. See CONICTHYODONTES.

PLECTRUM, a word uſed by ſome anatomical writers to expreſs the ſtyloid proceſs of the os petroſum; by others for the uvula; and by others for the tongue.

PLECTRUM, πληκτρον, a machine of wood or ivory uſed by the ancients in playing upon the lyre, crooked and pointed at both ends, in uſing which there was more ſpirit given to the tone, and leſs danger of hitting the wrong ſtring than by uſing the finger. The quill uſed in playing on the mandoline, is in miniature what we may ſuppoſe the plectrum to have been with reſpect to the lyre.

PLEDGE, in *Law*. See VADIUM.

PLEDGE. See PROCESS.

PLEDGE, *Plegius*, a ſurety, or gage, either real or perſonal, which the plaintiff, or demandant, is to find, for his proſecuting the ſuit.

The word is ſometimes alſo uſed for frank pledge.

To PLEDGE, in *Drinking*, denotes to warrant, or be ſurety to one, that he ſhall receive no harm while he is taking his draught.

The phraſe is referred, by our antiquaries, to the practice of the Danes, heretofore, in England; who frequently uſed to ſtab, or cut the throats of the natives while they were drinking.

PLEDGERY, or PLEGGERY, ſuretiſhip, or an undertaking, or anſwering for another.

The appellant ſhall require the conſtable and mareſchal to deliver his pleggs, and to diſcharge them of their pledgery; and the conſtable and mareſchal ſhall aſk leave of the king to acquit his pleggs, after that the appellant is come into the liſts to do his devoir. Orig. Jur. ex Vet. Cod. MS. in Bibl. Selden.

PLEDGES *of Goods for Money*, &c. See PAWN and BAILMENT.

PLEDGET, in *Surgery*, a kind of flat tent, made not to enter a wound, but to be laid upon it, to imbibe the ſuperfluous humours, and keep it clean and dry.

PLEEA, in *Botany*, a name of Michaux's, which ſeems intended to expreſs the ſuperabundance of ſtamens compared with others of its kindred, from πλείων, *more*. Mich. Boreal. Amer. v. 1. 247. Purſh Am. Sept. v. 1. 275.—Claſs and order, *Enneandria Trigynia*. Nat. Ord. *Tripetaloideæ*, Linn. *Junci*, Juſſ.

Gen. Ch. *Cal.* Sheath of one leaf. *Cor.* of one petal, divided to the baſe into ſix ſpreading, nearly equal, linear-lanceolate, acute ſegments, permanent. *Stam.* Filaments nine, awl-ſhaped, ſhorter than the corolla, inſerted into the baſe of its ſegments; anthers oblong, verſatile, of two cells, opening lengthwiſe. *Piſt.* Germen ſuperior, oblong, triangular; ſtyles none; ſtigmas three, ſeſſile, linear, obtuſe. *Peric.* Capſule covered by the permanent cloſed corolla, roundiſh-triangular, of three cells, without any manifeſt partitions, except the inflexed margins of the valves, the cells burſting longitudinally at their inner edge, the valves ſplitting at the top. *Seeds* numerous, oblong, cylindrical, ſlightly curved, inſerted into the margins of the valves, each by a ſhort ſtalk.

Eſſ. Ch. Corolla in ſix deep ſpreading ſegments. Capſule triangular, of three cells. Seeds numerous, oblong, inſerted into the margins of the valves. Sheaths ſimple, ſingle-flowered.

1. P. *tenuifolia*. Michaux Boreal. Amer. v. 1. 248. t. 25.

Purſh v. 1. 278.—The only ſpecies; a native of open wet woods in Lower Carolina. *Michaux.* The *root* is perennial, reſembling that of an *Iris.* *Leaves* few, radical, ſheathing at the baſe, erect, very narrow, ſmooth, flattened, taper-pointed, about half as tall as the common *flower-ſtalk,* which is radical, about a foot and half high, ſimple, erect, round, ſmooth, nearly naked. *Cluſter* terminal, erect, ſimple, of ſix or eight yellowiſh-brown ſtalked *flowers,* the ſize of *Ornithogalum umbellatum,* each accompanied by a tubular pointed *ſheath* as long as the flower of its ſtalk. This plant agrees in number of *ſtamens,* though not of *piſtils,* with our *Butomus umbellatus,* a genus of the ſame natural order, but the ſtructure of the *ſeeds,* and their inſertion, are both different, as well as the *infloreſcence.*

PLEGII *de Retorno,* &c. in *Law.* See Replevy and Retorno *Habendo.*

PLEGIIS Acquietandis, a writ that lies for a ſurety, againſt him for whom he is ſurety, in caſe he pay not the money at the day. Fitz. Nat. Brev.

PLEGORRHIZA, in *Botany,* from πληγη, *a wound,* and ῥιζα, *a root,* becauſe the root of this plant is uſed by the inhabitants of Chili as a vulnerary. Molin. Chil., the German edition, 140. Willd. Sp. Pl. v. 2. 487. Juſſ. 438.—Claſs and order, *Enneandria Monogynia.*

Eſſ. Ch. Calyx none. Corolla of one petal. Capſule of one cell. Seed ſolitary.

1. P. *adſtringens.* Willd. n. 1. (P. Guajcuru; Molina as above.)—Native of the northern provinces of Chili. *Stem* woody. Radical *leaves* collected into a tuft, ſtalked, oval, ſimple, undivided; thoſe on the branches ſeſſile, ovate. *Flowers* numerous, ſtalked, terminal. *Corolla* undivided. *Stamens* nine, very ſhort. *Anthers* oblong. *Germen* orbicular. *Style* cylindrical, the length of the ſtamens. *Stigma* ſimple. *Capſule* oblong, rather compreſſed. *Seed* of the ſame ſhape. Juſſieu reckons a *calyx,* what Willdenow, as above, terms *corolla,* and adviſes that the genus ſhould be compared with his orders of *Lauri* and *Polygoneæ.*

PLEGRA, in *Ancient Geography,* a town of Aſia, in the interior of Galatia, in the country of the Paphlagonians: placed by Ptolemy between Zagira and Sacora.

PLEIADES, Πλειαδες, in *Aſtronomy,* an aſſemblage of ſeven ſtars in the neck of the conſtellation Taurus.

They are thus called from the Greek ϖλειν, *navigare, to ſail;* as being terrible to mariners, on account of the rains and ſtorms that frequently riſe with them.

The Latins call them *vergiliæ,* from *ver, ſpring;* becauſe of their riſing about the vernal equinox.

The largeſt is of the third magnitude, and is called *Lucida Pleiadum.* See Taurus.

There are now only ſix ſtars viſible in Pleiades, and this appears to have been the caſe ſo long ago as the time of Ovid:

"Quæ ſeptem dici, ſex tamen eſſe ſolent."

Pleiades, in *Mythology,* were the ſeven daughters of Atlas, called Maya, Electra, Taygeſa, Aſteropa, Alcione, Celeno, and Merope. Theſe Atlantides, it is ſaid, were tranſlated to the heavens, and formed the Pleiades; the meaning of which fable is, that Atlas firſt obſerved theſe ſtars, and called them by the names of his daughters.

Pleiades, *Poetical,* is a name which the Greeks gave to ſeven celebrated poets, flouriſhing under the reign of Ptolemy Philadelphus.

In imitation of the Greeks, Ronſard formed a Pleiades of French poets under the reign of Henry II. It conſiſted of Daurat, Ronſard, du Bellay, Belleau, Baif, Tyard, and Jodelle.

On the ſame model, ſome of their authors afterwards projected a new Pleiades of the Latin poets of the laſt century; but they were not agreed about the names of thoſe that ſhould compoſe it; much leſs on him who ſhould be the Lucida Pleiadum. M. Baillet named F. Rapin, F. Commire, F. de la Rue, M. de Santeuil, M. Menage, M. du Perier, and M. Petit.

PLEIN River, in *Geography,* the northern head-water of Illinois river; it interlocks with Chicago river, a water of lake Michigan, and five miles below Dupage lake, through which it paſſes; it joins Theakiki river, which comes from the eaſtward. Thence the united ſtream takes the name of Illinois. The land between theſe branches is rich, and intermixed with ſwamps and ponds.

PLEINFELD, or Bleinfeld, a town of Bavaria, inſulated in Anſpach; 22 miles S.E. of Anſpach. N. lat. 49° 3′. E. long. 10° 55′.

PLEINEFOUGE'RES, a town of France, in the department of the Ille and Villaine, and chief place of a canton, in the diſtrict of St. Malo. The town contains 2726, and the canton 12,878 inhabitants, on a territory of 167½ kiliometres, in 11 communes.

PLEINTING, a town of Bavaria, on the Danube; 5 miles S.S.E. of Oſterhof.

PLEISKE, a river of Brandenburg, which runs into the Oder; 9 miles above Francfort.

PLEISNITZ, a town of Hungary, 25 miles W. of Caſchau.

PLEISSA, a river of Saxony, which runs into the Elſter, near Leipſic.

PLEISSEN, or Pleissa, a lordſhip of Germany, in the principality of Heſſe Rhinfels, inſulated in the duchy of Brunſwick. It takes its name from an old caſtle ſituated on a mountain.

PLEISVEDEL, a town of Bohemia, in the circle of Leitmeritz; 8 miles S.W. of Leypa.

PLE'LAN, a town of France, in the department of the Ille and Villaine, and chief place of a canton, in the diſtrict of Montfort; ſix poſts E.N.E. of Vannes. The place contains 2917, and the canton 13,316 inhabitants, on a territory of 325 kiliometres, in 8 communes.—Alſo, a town of France, in the department of the Northern Coaſts, and chief place of a canton, in the diſtrict of Dinan; 6 miles E. of Loudeac. The place contains 854, and the canton 3903 inhabitants, on a territory of 122½ kiliometres, in 9 communes.

PLEMMYRIUM, in *Ancient Geography,* a promontory on the eaſtern coaſt of Sicily, over-againſt Syracuſe, of which it was the port, according to Thucydides. It is alſo mentioned by Virgil.

PLEMMYROS, a word uſed by the old Greek writers to expreſs a redundance of humours. Its proper ſignification is the flowing in of the tide.

PLEMPIUS, Vopiscus Fortunatus, in *Biography,* an eminent phyſician, was born at Amſterdam, of a diſtinguiſhed family, in December 1601. He received his claſſical education at Gand, and ſtudied philoſophy at Louvain, whence he repaired to Leyden, and commenced his medical ſtudies. He ſubſequently travelled into Italy, and paſſed the principal portion of his time at Padua and Bologna, having the advantage of purſuing his anatomical inveſtigations under the direction of Spigelius at the former place, and of taking his degree of doctor at the latter. On his return to Holland, he ſettled in the practice of his profeſſion in his native city, where he acquired a high reputation; and was induced to accept the invitation of Iſabella, princeſs of the Low Countries, to the vacant profeſſorſhip of the Inſtitutes of Medicine, at Louvain, of which he took poſſeſſion in 1633. At the ſame time he abjured the Proteſtant faith, became a Catholic, and took a new degree of doctor, in conformity with the rules of the univerſity. In the following year, however, he quitted this chair, for the profeſſorſhip of pathology. He was ſoon afterwards nominated principal of the college of Breugel. He died at Louvain in December 1671, aged ſeventy.

Plempius increaſed the reputation of Louvain by the extent of his attainments, and was an able controverſialiſt, diſtinguiſhing himſelf in all the public queſtions that came under diſcuſſion. He left the following works. "A Treatiſe on the Muſcles," in Dutch. "Ophthalmographia, ſive de Oculi Fabricâ, Actione, et Uſu," Amſt. 1632; Lovæn. 1648. A tranſlation of the Anatomy of Cabrolius into Dutch, with notes; Amſt. 1633. "Fundamenta, ſeu Inſtitutiones Medicinæ;" Lov. 1638, 1644, &c. In the firſt edition of this work, Plempius doubted the circulation of the blood; but in the ſecond, he was a ſtrenuous advocate for that doctrine. "Animadverſiones in veram Praxim curandæ Tertianæ propoſitam à Doctore Petro Barba;" ibid. 1642. "Antimus Coningius Peruviani pulveris defenſor, repulſus à Melippo Protymo;" ibid. 1655. Coningius is the aſſumed name of Honoratus Fabri; Protymus was that aſſumed by Plempius in order to decry the uſe of cinchona. "Avicennæ Canonis Liber primus et ſecundus ex Arabica Lingua in Latinam tranſlatus;" ibid. 1658. "Tractatus de Affectuum Pilorum et Unguium;" ibid. 1662. "De Togatorum Valetudine tuendâ Commentarius;" Brux. 1670. The two following are generally aſcribed to this author, though Mangetus and Lipenius (probably miſinterpreting the initial) aſcribe them to Francis Plempius; *viz.* "Munitio Fundamentorum Medicinæ V. F. Plempii adverſus Jacobum Primeroſium;" Amſt. 1659. "Loimographia, ſive, Tractatus de Peſte;" ibid. 1664. Eloy Dict. Hiſt. de la Medecine.

PLENARTY, in *Law*, a term uſed in eccleſiaſtical matters, to denote that a benefice is full, or poſſeſſed of an incumbent.

In which ſenſe it ſtands oppoſed to *vacancy*.

Inſtitution, by ſix months, is a good plenarty againſt a common perſon, but not againſt the king, without induction. See Institution and Induction.

PLENARY, formed of the Latin *plenarius*, of *plenus*, *full*, ſomething complete, or full. Thus we ſay, the pope grants plenary indulgences, *i. e.* full and entire remiſſions of the penalties due to all ſins.

PLENE Administravit, in *Law*, is a plea pleaded by an executor or adminiſtrator, where they have adminiſtered the deceaſed's eſtate faithfully and juſtly before the action brought againſt them. On *plene adminiſtravit*, pleaded by an executor, if it be proved that he hath goods in his hands which were the teſtator's, he may give in evidence, that he hath paid to the value of his own money, and need not plead it ſpecially; for when an executor before the action hath paid the money in equal degree with that demanded by the plaintiff, he may plead fully adminiſtered generally, and give the ſpecial matter in evidence. 2 Lill. Abr. 330.

PLENEUF, in *Geography*, a town of France, in the department of the North Coaſts, and chief place of a canton, in the diſtrict of St. Brieuc; 20 miles W.N.W. of Dinan. The place contains 1243, and the canton 6502 inhabitants, on a territory of 115 kiliometres, in 5 communes.

PLENILUNIUM, compounded of *plenus*, and *luna*, in *Aſtronomy*, that phaſis or ſtate of the moon, properly called the *full moon*.

PLENIPOTENTIARY, compounded of *plenus*, *full*, and *potentia*, *power*, a perſon who has full power and commiſſion to do any thing.

The word is chiefly underſtood of the miniſters or ambaſſadors ſent from princes or ſtates to treat of peace, marriages, and other important matters.

The firſt thing done in conferences of peace, is, to examine the power of the plenipotentiaries. See Treaty.

PLENITUDE, Plenitudo, the quality of a thing that is full, or that fills another.

In phyſic, it is chiefly uſed for a redundancy of blood and humours.

Phyſicians reckon two kinds of plenitude. The one called *ad vires*, when the abundance of the blood oppreſſes the patient's ſtrength.

The other *ad vaſa*, when it fills the veſſels too much; ſwelling them to a degree of burſting.

PLENNA, a word uſed by ſome writers to expreſs any mucous humour.

PLENUM, in *Phyſics*, a term uſed to ſignify that ſtate of things, in which every part of ſpace, or extenſion, is ſuppoſed to be full of matter. It is uſed in oppoſition to a *vacuum*, which is a ſpace ſuppoſed devoid of all matter.

The Carteſians adhere firmly to the doctrine of an abſolute plenum. This they do on this principle, that the eſſence of matter conſiſts in extenſion; and hence, indeed, the conſequence is very eaſy, that wherever there is ſpace or extenſion, there is alſo matter. But this principle we have elſewhere ſhewn to be falſe; and, therefore, the conſequence drawn from it falls to the ground. See Matter.

That there is a real vacuum, in the nature of things, is likewiſe demonſtrated by arguments *à poſteriori*, under Vacuum.

PLEONASM, Pleonasmus, formed from ϖλεονασμος, *q. d. ſuperabundancy*, in *Rhetoric*, a figure of ſpeech, by which we make uſe of words, ſeemingly needleſs or ſuperfluous, in order to expreſs a thought with the greater force and energy.

Such is, *I ſaw it with my own eyes*; or, *he heard it with his own ears*, &c.

The pleonaſm is called by the Latins *redundantia*.

Pleonaſm, by grammarians, is uſually defined a fault in diſcourſe, wherein we ſay more than is neceſſary.

M. Vaugelas will not allow the phraſe, *I ſaw it with my own eyes*, to be a pleonaſm; inaſmuch as there are no ſuperfluous words in it; none but what are neceſſary to give a ſtronger aſſurance of the thing affirmed. It is ſufficient that one of the phraſes ſay ſomewhat more than the other, to avoid the imputation of a pleonaſm.

In effect, though we give the name pleonaſm to any thing that is not neceſſary, or that enters the diſcourſe independently of the ſenſe or conſtruction, yet there are frequently words which, in that view, would be pertinent, and even are uſed to good purpoſe, to give a greater force or grace to diſcourſe, and to aſcertain the truth of what is ſaid.

He ſpoke with his mouth, is a pleonaſm in Engliſh; it is none in Latin: Virgil ſays, *ſic ore locutus*. Some French authors deny *unir enſemble*, *to unite together*, to be a pleonaſm.

PLEROSIS, a word uſed by the old Greeks to expreſs the repletion or reſtoring the body to its natural ſtate, after it has been emaciated by ſickneſs.

PLEROTICS, Πληρωτικα, formed from πληροω, *I fill*, in *Medicine*, a kind of remedies, otherwiſe called *incarnatives*, and *ſarcotics*.

PLES, in *Geography*, a town of Ruſſia, in the government of Koſtrom, on the Volga; 16 miles S. of Koſtrom. N. lat. 57° 15'. E. long. 41° 14'.

PLESHY, a village and pariſh, ſituated in the hundred of Dunmow, and county of Eſſex, England, though now containing, according to the parliamentary returns of 1811, only 46 houſes, and 221 inhabitants, was a place of diſtinguiſhed conſequence in ancient times. Gough and Morant are both of opinion that it was the ſcite of a Roman ſtation, from the number of urns and Roman bricks which have been dug up here, and from the boldneſs and regularity of the entrenchment ſurrounding the village. The vallum of this work is ſtill very perfect on three ſides, and appears to have had four original entrances through it into the incloſed area. Theſe circumſtances, however, though plauſible reaſons for aſſigning to Pleſhy a Roman origin, are not concluſive evidence. In the Saxon era no mention is made of this place; indeed its authentic hiſtory does not commence till the reign of king Stephen, when we are informed that it was veſted in the crown by the king's marriage with Maud, granddaughter of Euſtace, earl of Boulogne, by whom it is probable the caſtle here was firſt erected. Stephen granted it to William de Magnaville, high conſtable of England, who procured licence to fortify the caſtle from Henry II. Hence we conjecture that he was the perſon who conſtructed the foſſe, as well as the immenſe keep, which remains to this day a proud monument of the ancient grandeur and ſtrength of this once majeſtic fortreſs. The keep is oval ſhaped, and meaſures about 890 feet in circumference, and forty-five paces in breadth at the top.

Humphrey de Bohun, earl of Hereford, having ſucceeded to the eſtate and honours of the Magnavilles, obtained leave of Edward I. to enlarge his park at Pleſhy, by incloſing 150 additional acres. In this family the caſtle and manor continued till the year 1372, when Thomas of Woodſtock, afterwards duke of Glouceſter, became poſſeſſed of them, and of the dignity of high conſtable, by his marriage with Eleanor, eldeſt daughter, and co-heireſs of Humphrey, the laſt male heir of the Bohuns. This nobleman, whoſe buſy life and tragical fate form conſpicuous features in the hiſtory of England, was decoyed from the caſtle by his nephew, king Richard II., and treacherouſly put to death. Pleſhy, after that event, devolved to Edmund, earl of Stafford, in right of Anne, the duke's daughter. It afterwards fell to the crown, and was annexed to the duchy of Lancaſter. From that period the caſtle ſeems to have been totally neglected, but the date of its demolition is not mentioned. Leland ſays that this place was anciently called Tumbleſtoun, and that Pleſſy is a corruption for Caſtel de Placeto. A college for a maſter and eight ſecular prieſts, two clerks, and two choriſters, was founded here by Thomas of Woodſtock in 1393. The original endowments were ſubſequently augmented by various benefactors: and at the time of the diſſolutions its revenues were valued at 139*l.* 3*s.* 10*d.* *per annum* clear. This houſe was granted by Henry VIII. to ſir John Gates, who razed all the old buildings, the college-church excepted, which he however alſo partly deſtroyed. It continued in a ruinous ſtate till the beginning of the laſt century, when biſhop Compton, having been promoted to the ſee of London, repaired ſuch portions of it as were ſtanding, and added a neat body of brick. The principal monuments here are thoſe of ſir William Jolliffe, knt., and his nephew, Samuel Tuffnell, eſq., whoſe family here poſſeſſed the manor for upwards of half a century. Some memorial of the former conſequence of Pleſhy appears in the election of a mayor annually from among the freeholders of the village, at the court-leet for the manor. This cuſtom is ſingular, and ſeems to indicate that Pleſhy was at one time a corporate town. Beauties of England and Wales, vol. v., by John Britton and E. W. Brayley, from Morant's "Hiſtory, &c. of Eſſex," folio; and Gough's "Hiſtory and Antiquities of Pleſhy," 4to.

PLESMONE, a word uſed by the ancients to ſignify plenitude or ſatiety.

PLESSEVITZA, in *Geography*, a mountain of Croatia; 12 miles N.W. of Bihacs.

PLESSOW, a town of the duchy of Warſaw; 8 miles W. of Kaliſch.

PLESTIN, a town of France, in the department of the North Coaſts, and chief place of a canton, in the diſtrict of Lannion; 7 miles S.W. of Lannion. The place contains 4862, and the canton 9460 inhabitants, on a territory of 105 kiliometres, in 7 communes.

PLESUR, a river of the Griſons, which runs into the Rhine at Coire.

PLESZ, or PLESSE, a town and fortreſs of Sileſia, and capital of a lordſhip, in the principality of Ratibor, on the borders of Poland, ſurrounded with walls, flanked with towers, and containing two churches; 17 miles N.N.E. of Teſchen. N. lat. 49° 57′. E. long. 18° 56′.

PLETCHBERG, a mountain of Switzerland, in the canton of Berne; 22 miles S.S.E. of Thun.

PLETHORA, πληθωρα, in *Medicine*, from πληθω, *impleo*, fullneſs of habit, or an abundance of blood.

Every increaſe of the fluids is ſometimes called plethora; but the medical authors who ſpeak definitely, limit the term to a ſuperabundance of good blood. (See Van Swieten, Comment. ad Aph. 106.) This, then, is ſcarcely to be conſidered as itſelf a diſeaſe, but a degree of high health, bordering upon diſeaſe; a condition which prediſpoſes to diſeaſe, and renders the perſon liable to be diſordered by any exciting cauſe, by which the equilibrium of the circulation may be accidentally diſturbed.

The mechanical phyſicians aſcribed many of the morbid actions of the ſyſtem to plethora; and they remarked, that an abundance of blood was inconvenient to the animal economy in a relative manner only, in different caſes, *viz.* relative to the quantity, to the ſpace occupied, to the bulk, and to the patient's ſtrength. The firſt, plethora *ad molem*, or *ad vaſa*, ſignified the abſolute over-abundance of blood, as ſeen by the florid diſtention of the minute veſſels, and detected by a full, oppreſſed, and labouring pulſe. This occurs generally in vigorous conſtitutions, where the digeſtive powers are ſtrong and active, and the waſte from exerciſe diſproportioned to the ſupply. The ſecond, or plethora *ad ſpatium*, is produced when, the quantity of the circulating fluids remaining the ſame, the capacity of the veſſels is diminiſhed; as may be exemplified in the ſtate of the circulation in cold weather, or in the cold fit of fevers. The third, or plethora *ad volumen*, implies the contrary condition, or that in which, the quantity remaining the ſame, the bulk is augmented, as by external heat, inflammatory diſeaſes, ſtimulating food and drink, violent paſſions, &c. The blood, however, is not capable of much expanſion; and both this and the preceding condition are occaſioned rather by a change in the diſtribution of the blood, than by any actual variation in its condition. By cold, it is driven from the extreme veſſels to thoſe of the interior; by heat, it is admitted into the relaxed veſſels of the external parts. The laſt, or plethora *ad vires*, ſignifies only a comparative weakneſs of the circulating powers; ſo that although the quantity of blood be not ſuperabundant, yet it is greater than the veſſels are enabled to diſtribute freely.

After all theſe refinements of pathology, it will be obvious that there is, in fact, but one kind of actual plethora, which is a real ſuperabundance of blood, and is therefore the cauſe of a prediſpoſition to diſeaſe, eſpecially to fevers, to all inflammatory affections, ſuch as gout and pleuriſy, to apoplexy, lethargy, palſy, and the rupture of blood-veſſels. This plethoric ſtate is produced by a vigorous digeſtive power in the ſtomach, eſpecially in certain conſtitutions, which poſſeſs a lax contexture of the venous ſyſtem; and its production is favoured by taking copiouſly of food that is nutritious and eaſy of digeſtion, by quietneſs and compoſure of mind, by much ſleep, and by indolence and inactivity as to muſcular exertion. (See Corpulence.) The ſymptoms by which the exiſtence of this plethoric ſtate are indicated, are thus enumerated by Van Swieten: we know that it is preſent, he ſays, if there be a great redneſs over the whole body, eſpecially where the cuticle is fine and delicate, as in the corners of the eyes, the inſide of the eyelids, noſe, mouth, lips, and throat; if the veins are diſtended, and the pulſe at the ſame time is full and ſtrong; and if upon unuſual motion, or expoſure to heat, or taking of wine, a ſenſe of fullneſs and diſtention is felt throughout the body, and this is followed by dullneſs and drowſineſs. Comment. loc. cit.

The cure of this plethoric ſtate is not always eaſy. Blood-letting is attended with temporary relief; but it is apt to be followed by an increaſe of the fullneſs, if other circumſtances are not attended to. But with it ſhould be combined a ſyſtem of diet, more cooling and ſpare, and of leſs nutritious ſubſtances, of regularity and freedom in the relaxation of the bowels, and a gradual attainment of the power of corporeal exertion, by taking exerciſe at firſt by way of geſtation, and ſubſequently by the more active uſe of the muſcles, even by bodily labour, if that prove requiſite.

PLETHRON, a Grecian meaſure, by ſome ſaid to contain 1444, by others 10,000 ſquare feet. Arbuthnot.

PLETTENBERG, in *Geography*, a town of Germany, in the county of Mark, on the Elſe and the Oeſter, governed by its own magiſtracy. The pariſh-church belongs in common to the Lutherans and Calviniſts. The inhabitants are employed partly in agriculture and breeding of cattle, and partly in the manufacture of coarſe cloths and ſmith's work, particularly ſcythes; beſide other handicrafts; 28 miles S. of Hamm.

Plettenberg's *Bay*, a bay on the S.E. coaſt of Africa. Cape Seal, at the ſouthern extremity of the bay, is in S. lat. 34° 6′. E. long. 23° 48′. Variation of the compaſs 27° 12′ W. The tide flows at full or change 3^h 10^m, and riſes or falls five or ſix feet perpendicular. This bay ſcarcely ſeems capable, by any expence, of being rendered ſecure, even for ſmall craft, in the winter months; but, in the ſummer ſeaſon, ſhips may remain without any danger. Weſtward of this bay, at the diſtance of about eighteen miles, is *Knyſna*, which ſee. Plettenberg's bay is a diviſion of the diſtrict of Zwellendam, which begins at the Kayman's river, and continues to the inacceſſible foreſts of Sitſikamma. The whole of this tract of country is very beautiful, agreeably diverſified by hill and dale, and lofty foreſts. Within ſeven miles of the bay are large timber-trees, and the ſurface is almoſt as level as a bowling-green, over which the ſeveral roads are carried. The peaſantry who inhabit this diſtrict are moſtly wood-cutters, who earn a very hard ſubſiſtence. The great diſtance from the Cape of Good Hope, being 400 miles of bad road, allows them little profit on a load of timber, when ſold at the deareſt rate in the Cape market, ſo that they prefer diſpoſing of it at the bay for a mere trifle. Plank of thirteen or fourteen inches in width, and an inch thick, may be purchaſed on the ſpot at the rate of 3*d. per* foot in length. The bark of ſeveral of the creeping plants in the foreſt might be employed as ſubſtitutes for hemp: and the iron ores, near the baſe of the mountain, might be worked by clearing away the wood, of which there is an inexhauſtible ſupply. Barrow's Africa, vol. ii.

PLETZDORF, a town of Bavaria, in the biſhopric of Bamberg; ſix miles W.N.W. of Burg Eberach.

PLETZKY, a town of Saxony; two miles W. of Gommern.

PLEVEN, a town of European Turkey, in Bulgaria, on the Vid; 28 miles S. of Nicopoli.

PLEUGLIA, a town of European Turkey, in Servia; 40 miles W. of Jembaſar.

PLEVIN, Plevina, in *Law*, a warrant or aſſurance, the ſame with pledge. See Pledge, Replevin, &c.

PLEUMANGAT, in *Geography*, a town of France, in the department of the North Coaſts; 13 miles S.S.W. of Dinan.

PLEUMARTIN, a town of France, in the department of the Vienne, and chief place of a canton, in the diſtrict of Chatellerault. The place contains 1205, and the canton 7143 inhabitants, on a territory of 280 kiliometres, in 12 communes.

PLEUMAUDAN, a town of France, in the department of the North Coaſts; ſix miles S.S.W. of Dinan.

PLEUNOS, a town of Africa, in Barca. N. lat. 31° 40′. E. long. 25° 20′.

PLEURA, in *Anatomy*, the ſerous membrane, which lines the cavity of the thorax. See Lung.

PLEURISY, Pleuritis, in *Medicine*, an inflammation of the *pleura*, or membrane ſurrounding the lungs.

The pleuriſy has been generally diſtinguiſhed by medical writers from the peripneumony, or inflammation of the ſubſtance of the lungs; by the greater acuteneſs of the pain in the ſide, increaſed on inſpiration, the greater hardneſs and ſtrength of the pulſe, the dryneſs of the cough, and the greater violence of the fever. It is in fact, however, only a modification of the ſame diſeaſe with the peripneumony; whence Dr. Cullen gave the ſame generic name *pneumonia* to both. We ſhall, therefore, refer the reader to the former article, where all the modifications of pneumonic inflammation are diſcuſſed at length. See Peripneumony.

PLEURITIS, the pleuriſy.

PLEUROCYSTUS, in *Natural Hiſtory*, the name of one of the general arrangements of the echini marini.

The word is derived from the Greek πλευρον, *the ſide*, and κυστος, *the anus*.

The echini of this diviſion are diſtinguiſhed from the others, by having their anus neither on the ſummit, nor in any part of the baſe, but in ſome part of the ſuperficies of one of the ſides.

PLEURODYNE, in *Medicine*, from *pleura* and ὀδυνη, *pain*, ſignifies a pain of the ſide, independent of inflammation, as *pleuritis* denotes the pain ariſing from inflammation.

A ſtitch or pain in the ſide often occurs, independently of any acute inflammation of the lungs, pleura, or contiguous organs, and it is generally increaſed by the action of breathing. It has been often denominated a falſe or *ſpurious pleuriſy*. The pain, however, is ſeldom ſeated in the membrane called the *pleura*, but often in the muſcles of the cheſt, ſometimes in the other membranous parts; and it may ariſe from rheumatiſm affecting thoſe parts, from ſpaſm or cramp, from a plethoric condition, or from a nervous and hyſterical ſtate, in which the circulation is languid and irregular: it may alſo be connected with a gouty, ſyphilitic, or ſcorbutic habit. Sauvages has diſtributed the pleurodyne into eighteen ſpecies, according to its origin from one or other of theſe cauſes. (See his Noſol. Method. claſs v. gen. ii.) The term is now moſt commonly applied to *rheumatic* pains affecting the muſcles of the ribs and the diaphragm. See Rheumatism.

PLEURON, in *Ancient Geography*, the name of two towns in Ætolia, the *Old* and the *New*; the former ſituated near Calyon, and the latter near mount Aracynthus.

PLEURONECTES, in *Ichthyology*, a genus of fiſhes of the order Thoracici, of which the generic character is; head ſmall; eyes ſpherical, both on the ſame ſide of the head, and near each other; mouth arched; jaws unequal, toothed; gill-membrane with from four to ſeven rays; the cover generally of three laminæ; the body is convex and coloured above; flat and paler beneath; the vent is nearer the head.

This genus, which conſiſts of about thirty ſpecies, comprehends thoſe which are denominated flat-fiſh. The ſtructure of this fiſh is conſidered as one of the moſt curious deviations from the general uniformity or regularity obſerved by nature in the external figure of animals, in which, with a few exceptions, both ſides of the body are perfectly ſimilar: but in the genus Pleuronectes, the animal is ſo conſtituted, that one ſide appears to repreſent the back, and the oppoſite ſide the abdomen. They ſwim obliquely or on their ſides, and the two eyes are always placed on one ſide, and it is from this circumſtance that the ſections into which the ſpecies are divided, are conſtituted; that is, according as the eyes are on the right or the left ſide. The fiſh of this genus reſide at or near the bottom of the water, owing to their having no air-bladder: they often bury themſelves in the ſand as far as the head, by which means they eſcape the jaws of the more rapacious tribes; the eyes are covered with a nictitant membrane; the noſtrils are double and contiguous; the belly is without ribs; the fins are ſoft, and moſtly with ſimple rays; the ventral and pectoral long, the tail generally rounded, with bifid rays.

A. *Eyes both on the right Side of the Head.*

TRICHODACTYLUS. Body rough; pectoral fins filiform. This is only known from the deſcription of Artedi, who ſays that it is rough, of a grey colour, with duſky variegations. It is a native of the Indian ſeas, and found about Amboina.

ZEBRA. Body with numerous tranſverſe bands. This is reckoned a very elegant ſpecies, and readily diſtinguiſhable by its colours, the upper part being white, with a browniſh caſt towards the back, and marked from head to tail by numerous, double, deep brown, tranſverſe bands, paſſing acroſs the fins themſelves. It is rather larger than the common ſole. It is a native of the Indian ſeas, and in conſiderable eſteem as an article of food.

PLAGIUSA. Body oblong, ſomewhat rough; dorſal and anal fins joined to the tail. It inhabits Carolina; the body is pale and cinereous.

OCELLATUS. Body with four dark brown ocellate ſpots; the irids are white. Found in the ſea about Surinam.

* HIPPOGLOSSUS; Holibut. The body of this ſpecies is perfectly ſmooth; the tail is lunate. This ſpecies not only exceeds in ſize all the reſt of the preſent genus, but may be conſidered as one of the largeſt of fiſhes, properly ſo called, having been found of the weight of three or four hundred pounds. It is a native of the Mediterranean and Northern ſeas, but appears to arrive at its greateſt ſize in the latter: it is the moſt voracious of the whole tribe, preying on a variety of other fiſhes, as well as upon different kinds of crabs, ſhell-fiſh, &c. It is of a longer or more ſlender form than moſt other flat-fiſh. It is not much regarded as an article of food.

CYNOGLOSSUS. Body oblong, ſmooth; teeth obtuſe; tail a little rounded. It is extremely allied to the preceding, and has been regarded rather as a variety than a diſtinct ſpecies. It is a native of the Northern ſeas, and found in conſiderable numbers in deep bays about the coaſts of Greenland.

* PLATESSA; Plaiſe. Body ſmooth; behind the left eye there is a row of ſix tubercles reaching to the lateral line. The plaiſe is eaſily diſtinguiſhed from the others of the genus by its ſhape and colours, being very broad and flat; of a fine paliſh brown above, marked both on the body and fins by pretty numerous orange-coloured ſpots; the under ſide is white. It is an inhabitant of the Mediterranean, the Baltic, and Northern ſeas, and is found in conſiderable plenty about our own coaſts. The fleſh is very good, eſpecially of thoſe that run to a large ſize.

* FLESSUS; Flounder. Lateral line rough; ſhort ſpines on the right ſide of the fins. The flounder is an inhabitant of the ſame ſeas as thoſe in which the plaiſe is found. It is extremely common about our own coaſts, and frequents our rivers at a conſiderable diſtance from the ſalt waters; it is in conſiderable eſteem as food, and great quantities are brought to the London markets.

* ROSEUS; Roſe-coloured Flounder. Body roſy; fins pale yellow-brown. It is frequently taken in the Thames.

* LIMANDA; Dab. Scales very ſmall, ciliate; ſpinules at the root of the dorſal and anal fins with obtuſe teeth. It inhabits the European ſeas; is leſs and thinner than the flounder; feeds on worms and inſects, eſpecially ſmall crabs; it ſpawns in June; the fleſh is reckoned very good.

* LÆVIS; Smear-dab. Brown, with obſcure yellow ſpots, beneath white, with five large duſky ſpots; ſcales ſmooth; the dorſal fin has ſeventy-nine rays. It is about eighteen inches long, and the fleſh is reckoned good for food.

LIMANDOIDES. Body oblong, rough; lateral line ſtraight, broad. It is found in the Northern ſeas; it reſembles the plaiſe; the fleſh is very good.

SOLEA; Sole. Body oblong, rough; the upper jaw is longer. The ſole is an inhabitant of the Northern, Baltic, Mediterranean, and American ſeas, and grows to the length of two feet or more, and to the weight of ſix or eight pounds; its general ſize is, however, very much ſmaller. It is covered with ſmall rough ſcales of an oblong form, each terminated by numerous ſpines, and very ſtrongly faſtened to the ſkin. Theſe ſcales, from the elegance of their ſtructure, have long ſince formed objects for the microſcope; an erroneous idea ſometimes prevails that the ſpiny end of the ſcale is that by which it is inſerted into the ſkin. This fiſh delights in lying at the bottom of the coaſts which it frequents, preying on ſmall ſhell-fiſh, ſpawn, ſea-inſects, &c.: it is generally taken by the trawl-net. The chief fiſhery is ſaid to be at Brixham, in Torbay.

* ARNOGLOSSUS; Smooth Sole. Thin, pellucid, white, ſmooth. It is found, though but ſeldom, on the coaſts of Cornwall.

LINGUATULA. Vent on the left ſide; the teeth are very ſharp.

GLACIALIS. Very ſmooth; above brown, beneath white; middle rays of the dorſal and anal fins rough, with ſmall ſpines. It inhabits ſandy places in the Frozen ſea, and is about nine inches long.

PLATESSOIDES. Body above with brown ſpots. It inhabits ſandy places in the mouths of rivers in Greenland; it is ſcarcely a foot long; feeds on ſmall worms and fiſh; in *ſhape* it reſembles the R. linguatula; in its *ſcales*, the ſole; and in its *ſpots*, the plaiſe.

B. *Eyes both on the left Side of the Head.*

LINEATUS. Body rough, barred with black; it has no pectoral fins. It inhabits North America.

Bilineatus. Lateral line double, and alſo without pectoral fins. It is a native of China.

Punctatus. Body broad and very rough. It inhabits the deep ſandy places of the Northern ſea. It is reckoned a great delicacy in Denmark.

* Rhombus; Pearl. Body ſmooth. It is found in European ſeas, and is the broadeſt of its ſize, except the turbot; the body is covered with ſmall ſcales, deep brown, with dirty yellow ſpots, beneath white; the fleſh is very good, but inferior to the turbot deſcribed below.

Dentatus. Body oblong, ſmooth; teeth extending out of the mouth. It inhabits Carolina.

* Maximus; the Turbot. Body rough. This fine fiſh, ſo highly prized by epicures, inhabits the European and Mediterranean ſeas: grows ſometimes to thirty pounds weight; it is very voracious, and feeds on inſects, worms, and teſtaceous animals; the body is ſquarer than any other ſpecies; it is covered with obtuſe, unequal, ſpinous tubercles; above it is brown, varied with yellow; beneath it is white, ſpotted with brown; the fleſh is firm and excellent. For the method of catching turbot, ſee the article Turbot.

* Passer; Whiff. Lateral line much curved, prickly. It is a native of European ſeas, and is about a foot long; the fleſh is good.

Papillosus. Lateral line curved; body papillous. It inhabits America, and is ſuppoſed to be a variety of the laſt.

Mancus. Head tuberculate; pectoral fins unequal. It inhabits the ſandy bottoms of the Braſil and Pacific ſeas.

Argus. Body variegated; tail rounded; jaws equal. It is found in the neighbourhood of the Caribbee iſlands; the body is covered with ſmall ſoft ſcales, and variegated with yellow ſpots, which are dotted with brown, and edged with blue; the body is ſprinkled with brown points.

Lunatus. Body with ſcattered, blue, half ocellate ſpots. It is a native of the North American ſeas; the tail is lunate.

Japonicus. Tongue rough. It is a native of the Japan ſeas. It is about ſix inches long; the colour is browniſh above, and whitiſh beneath; rays of the dorſal and anal fin ſo extremely numerous as to be counted with difficulty.

PLEURO-PERIPNEUMONY, or Pleuro-pneumony, in *Medicine*, a term employed to denote the moſt common form of pulmonary inflammation, in which both the pleura and the lungs are involved in the diſeaſe at the ſame time. See Peripneumony.

PLEURORTHNOPŒA, a term uſed by medical writers to expreſs that kind of pleuriſy in which the patient cannot breathe, unleſs in an erect poſture.

PLEUROTHALLIS, in *Botany*, from πλευρα, *the ſide*, and θαλλος, *a bough* or *frond*, apparently in alluſion to the lateral inſertion of the infloreſcence, the whole plant often conſiſting of but a ſimple leaf with its ſtalk; and at the ſide, where both unite, the flowers are produced.—Brown MSS. Ait. Hort. Kew. v. 5. 211.—Claſs and order, *Gynandria Monogynia.* Nat. Ord. *Orchideæ.*

Eſſ. Ch. Lip of the nectary connected, by a joint, with the baſe of the column. Two lower calyx-leaves combined underneath. Maſſes of pollen two, without a furrow. *Br.*

1. P. *ruſcifolia.* Butcher's-broom leaved Pleurothallis. (Dendrobium ruſcifolium; Swartz Orchid. 94. Willd. Sp. Pl. v. 4. 135. Epidendrum ruſcifolium; Jacq. Amer. 226. t. 133. f. 3. Linn. Sp. Pl. 1353. Helleborine ruſci majoris folio; Plum. Ic. 171. t. 176. f. 2.)—Stem elongated. Leaf ſolitary, ovato-lanceolate. Flowers aggregate, at the baſe of the leaf.—Native of woods in the Weſt Indies. It flowers in the ſtove in May and June. The perennial *roots* conſiſt of numerous long ſimple fibres, growing paraſitically on the branches or ſtems of trees. *Plants* ſeveral, about a ſpan high, forming a tuft, like ſmall lilies of the valley, but the *flowers* are not much elevated. Their form we have not had an opportunity of ſeeing.—We preſume the two other ſpecies in Plumier's tab. 176, belong to the ſame genus; but the above is alone mentioned in Hort. Kew.

PLEURS, Plurs, or *Piuro*, in *Geography*, a town of Switzerland, which was formerly large and flouriſhing, and ſubject, as well as Chiavenna, to the Griſons. It is ſaid to have contained three churches, many large houſes, and a ſtone bridge over the Maria, and that its population amounted to at leaſt 1500 inhabitants, who carried on no inconſiderable commerce. But it was totally overwhelmed by the fall of mount Conto, which terrible cataſtrophe happened on the 25th of Auguſt, 1618. The valley in which it was ſituated is very narrow, and the whole town was buried in one undiſtinguiſhed ruin. A contemporary account relates, that the cloud of duſt and rubbiſh was ſo great as to cover the heavens like ſmoke, and even to extend as far as Chiavenna; the inhabitants of which place, alarmed at the phenomenon, were ſtill more terrified at the ſudden diſappearance of the river Maria, the courſe of which was ſtopped by the fallen fragments of rock, and apprehenſive that the torrent had undermined Chiavenna, they precipitately fled in great numbers to the mountains. A part of the ancient walls, and the ruins of a country houſe, belonging to the richeſt family in the place, are the only remains of its former exiſtence.

PLEURTUIT, a town of France, in the department of the Ille and Villaine, and chief place of a canton, in the diſtrict of St. Malo. The place contains 6596, and the canton 10,973 inhabitants, on a territory of 75 kiliometres, in 4 communes.

PLEUVAULT, a town of France, in the department of the Côte d'Or; 12 miles S.E. of Dijon.

PLEXUS, in *Anatomy*, a term applied to various parts of the body, and particularly where ſeveral nerves or bloodveſſels are united together. The plexus choroides is ſituated in the lateral ventricle of the brain. (See Brain.) The plexus pampiniformis is made up of the ramifications and unions of the ſpermatic veſſels. (See Generation.) In the nervous ſyſtem plexuſes are frequent, particularly in the great ſympathetic. See Nervous *Syſtem.*

PLEYBEN, in *Geography*, a town of France, in the department of Finiſterre, and chief place of a canton, in the diſtrict of Chateaulin; five miles N.E. of it. The place contains 3972, and the canton 14,404 inhabitants, on a territory of 375 kiliometres, in 9 communes.

PLEYBERG, a town of the duchy of Carinthia, formerly called "Auffenſtein;" 20 miles E. of Clagenfurt.

PLIANT *Mealy Tree*, in *Gardening*, a common tree in plantations. See Viburnum.

PLICA, in *Medicine*, commonly mentioned with the epithet *Polonica*, becauſe the diſeaſe is endemic in Poland, and the neighbouring countries, is an affection of the hair, which becomes matted together, and thickened, ſo as to form maſſes which cannot be unravelled, in conſequence of the depoſition of a morbid matter in and about the hair.

The diſeaſe is called *Koltum*, or *Koltek*, in Poland; and by the Germans *Weichſel-zopff*, on account of its prevalence in the region watered by the Weichſel, or Viſtula. Sauvages and the noſologiſts have denominated it *Trichoma.* As the diſeaſe is never ſeen in this country, except by the accidental viſit of a perſon affected with it from the country where it prevails, we can only deſcribe it after the writers who have witneſſed it. The moſt clear and conciſe account of it is given by M. de la Fontaine, ſurgeon at Warſaw, in his ſurgical and medical treatiſes on various ſubjects reſpecting Poland, publiſhed in German, from which we ſhall extract the following hiſtory.

The ſymptoms which precede the morbid affection of the hair are very various, and often put on the appearance of other diſeaſes. Thus pſeudo-rheumatic pains are ſometimes the antecedents of the malady: and it is ſaid that apoplexy, mania, and various nervous diſeaſes are apt to occur, as well as inflammations, particularly of the eyes, indurations of the glands, gangrene, and caries, more particularly of the naſal bones and cranium. Sometimes, however, the *plica* comes on without any previous ſymptom, even in the courſe of one night; and violent paſſions of the mind, eſpecially rage and terror, are ſaid to have cauſed it inſtantaneouſly. The moſt common ſymptoms of its approach are, a ſenſe of weight and torpidity in all the limbs, pains in the back, giddineſs, difficulty of breathing, ringing in the ears, with an increaſed ſecretion of cerumen, dull pains in the orbits of the eyes and lacrymal glands, with an augmented flow of tears, head-ache, violent itching and prickling in the hairy ſcalp, pain in the præcordia, and depreſſion of ſpirits. In many patients there is a remarkable change in the appetite, a craving for ſpirituous liquors, and for new and ſtrange kinds of food, while they loathe the things which they uſed to reliſh moſt. But the moſt certain ſigns that a plica will ſoon be formed, are clammy ſweats about the head, with a diminution of pains, and a ſenſation of tightneſs, as if the upper parts of the head were drawn together.

The hairs now begin to grow greaſy, and emit a remarkably diſagreeable ſmell. The patient has frequent alternations of ſhivering and heat, and feels an unpleaſant prickling cold under his nails. Under theſe circumſtances, a ſort of criſis takes place, upon the depoſition of the morbid matter upon the hair and nails, and the ſymptoms of ill health immediately diſappear, except in ſome rare caſes, where a new depoſition is to take place, and the criſis is therefore imperfect. The matter is depoſited in the hairs, and ſometimes in greater quantity than they can contain; they then burſt, and a prodigious quantity is poured out between them, glueing them together. It is not true, that the hairs extend ſo much that blood flows out of them, as has been affirmed, or that they bleed on being cut. Occaſionally the matter is not only depoſited in the hairy ſcalp, but upon the hair of the pubis, of the arm-pits, or upon the nails. If the ſymptoms continue, a ſecond plica will certainly be formed, but not until the firſt has ſeparated from the head, and new hair has grown: it is never certain, however, that a ſecond will not be formed; for the diſeaſe often takes on a kind of periodic form. A conſtant ſenſe of cold about the head, and particularly at the temples, is a ſure ſign of its returning.

Sometimes the whole matter is depoſited in one half of the hair, the other half remaining ſound: in which caſes, the previous ſymptoms attack only one ſide of the body. The peculiar form of the matting depends upon the previous faſhion of the hair: moſt of the men cut it ſhort, while the women, on the contrary, have uncommonly long and beautiful hair. The morbid matter is firſt depoſited in the rete Malpighii, from whence it penetrates into the hair, ſometimes ſlowly, ſometimes rapidly. The moiſture oozing out from the hairs bind them ſo together, that it is impoſſible to ſeparate them again: if the whole hair be affected, it forms a kind of cap; if it flow out more partially, ſeveral tails or rope-like plicæ are produced. Some days after the maſs of diſeaſe has been formed, it begins to emit an odour like that of rancid fat; and when it is touched, it excites a pricking unpleaſant ſenſation in the fingers. M. Fontaine diſſected a patient, in whom the plica had come on juſt before death, and he found the bulbs of the hair larger than natural, from which he preſſed out a pale yellow clammy mucus. In another, in whom the plica was already old, he found nothing remarkable. The plica is apt to be productive of prodigious numbers of lice, from which the patient ſuffers even more than from the diſeaſe.

All writers have divided the *plica* into ſeveral ſpecies, according to the various forms which it aſſumes. Sauvages has deſcribed three ſpecies. 1. *Trichoma cirroſum*, or what the French call *plique en cordons*, is the moſt common form, when it appears in long tails or cords, as before mentioned. It was called abſurdly enough by Schultz, plica *mas*, or the male plica. 2. *Trichoma villoſum*, the plica *femina* of Schultz, when the diſeaſe is more generally diffuſed. And 3. The *Trichoma Polonicum*, when it ſuddenly extends to a great ſize, and forms a cap over the head. M. Alibert, in the treatiſe "Sur les Maladies de la Peau," which he is now conducting, has alſo divided *la plique* into three ſpecies, and points out ſeveral varieties under each. His firſt is Plique *multiforme*, or Plica *caput-meduſæ*, which applies to the tail-like or ſerpentine agglutinations, which may not be inaptly compared to the fabulous head of Meduſa. His ſecond ſpecies is Plique *à queue*, ou *ſolitaire*, or Plica *longi-cauda*, in which the plicæ are not divided, as in the former ſpecies, but reunite and form one tail-like maſs, not unlike the tail of a quadruped, often acquiring a great length. And his third is Plique *en maſſe*, or Plica *cæſpitoſa*, in which a conglomerated maſs is formed over the head, without any tail-like diviſions. Theſe arbitrary claſſifications afford at leaſt ſome diſtinct notion of the varieties of appearance which the diſeaſe aſſumes.

The proximate cauſe of the plica, according to M. de la Fontaine, is a peculiar morbid matter, which is clammy and acrid, has its ſeat in the lymph, and is depoſited critically upon the hair or nails. When it is depoſited upon the nails, either of the hands or the feet, they become larger, thicker, prominent, deformed, horny, and ill-coloured, but not black.

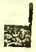
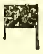
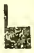
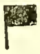
The exciting cauſes are altogether uncertain; for neither the air, water, nor food, ſeems to have any influence in producing it; nor are cleanlineſs and regular combing the hair any defence againſt it. Experience ſhews, however, that it is a contagious diſeaſe, and very often congenital; at the ſame time, thoſe to whom it is communicated by contact are ſaid to have it ſlightly, and to be eaſily cured. It ſpares no ſex, age, or condition, nor even newly arrived ſtrangers, and ſome infants bring it into the world with them: the lower claſſes of the people, however, ſuffer moſt from it; and thoſe who have ſoft brown hair are moſt frequently affected, though no colour eſcapes. The plica is never white; but when it drops off in old people, it is ſometimes ſucceeded by white hairs. Poles, who travel, are ſometimes affected with it in other countries, and even their children. There is no accurate hiſtory of its origin: the Greeks, Romans, and Arabians have not mentioned the diſeaſe; but ſome modern writers affirm that it was imported from Tartary in the year 1387. It now prevails in Tartary, White and Red Ruſſia, Lithuania, and from the ſource of the Viſtula to the Carpathian mountains; but is more frequent in ſome diſtricts than in others.

The method of cure recommended for plica varies with the circumſtances of the caſe. When fever is preſent, moderate evacuations muſt be reſorted to; but blood-letting is to be employed with great caution. M. de la Fontaine compares the diſeaſe with the ſmall-pox, in which, when the febrile action is too feeble to produce the eruption, it muſt be increaſed; when it is too violent, it muſt be diminiſhed. Hence the patient muſt be, in ſome inſtances, ſupported by generous diet; while, in others, a ſpare regimen muſt be adopted. In order to bring about the criſis, the ſame writer recommends the uſe of ſudorifics, and appears, indeed, to conſider antimony as a ſpecific in this diſeaſe. The older phyſicians praiſe the lycopodium as poſſeſſed of ſpecific powers, but without any good grounds; and the common people believe in a great number of ſpecific remedies, but the diſeaſe has not become leſs frequent, notwithſtanding theſe ſuppoſed means of cure. Mercurials, eſpecially when carried to the extent of exciting ſalivation, are ſaid to be highly detrimental in every caſe; but if the diſeaſe be complicated with ſyphilis, the corroſive muriate of mercury is very beneficial.

External remedies are almoſt always neceſſary; ſuch as the application of warmth to the head, in the form of vapour, warm bath, or fomentations made with the decoctions of various plants: a decoction of ſoap is eſteemed beneficial when the head-ache is ſevere. Sinapiſms and bliſters are likewiſe applied with advantage. The plica may, or may not, be cut off according to circumſtances. After a complete criſis, it ſeparates from the head, and remains attached only by ſound hair. This may take place in a few days, weeks, or months. If it has loſt its peculiar ſmell and greaſy appearance, has become dry, and all concomitant ſymptoms have ceaſed, it may be cut off by dividing the ſound hair: for it is remarkable, that even an old plica cannot be cut in the middle without giving pain. The new hair may be waſhed with warm water, and combed out. If, however, the plica be new, ſit faſt on the head, cauſe a prickling in the fingers when touched, and the general ſymptoms have not ſubſided, it muſt not on any account be cut off. The moſt dreadful accidents often immediately enſue from ſuch practice. Some have become inſtantly blind, or have died from apoplexy, or in epileptic convulſions. The people are ſo much afraid of this, that they will ſeldom permit the plica to be cut off, even when it may be done with ſafety. If bad conſequences follow the cutting off of the plica, the moſt certain and ſpeedy remedy is to apply it in its former ſituation. This muſt be done before it becomes dry; and it is almoſt incredible, ſays M. de la Fontaine, that, after one, two, three, or more days, it will again adhere to the head. He does not maintain that it grows to the ſtumps of the hair; but that innumerable examples prove, that a kind of callus is formed, as in a fractured bone. If the plica be not brought to adhere again, the patient, if he ſurvive, remains exceſſively ſick, until the hair grow, and a new plica be formed. The Jews, who are bigotted to their own cuſtoms and methods of cure, never permit it to be cut off, and nothing can be more diſguſting than one whoſe beard and whiſkers are affected with this diſeaſe.

If the morbid matter be depoſited on the ſurface of the body, it is ſaid to occaſion malignant and obſtinate ſores, which give a great deal of trouble. If it have a tendency to depoſit itſelf in the nails, it muſt be encouraged by the application of ſtimulants, ſuch as tincture of cantharides, bliſters, or by touching a freſh plica with the fingers. The nails do not ſeparate ſo readily as the hair, and can only be ſafely cut off when new nails have begun to grow; and this often does not happen. The Poles believe, that keeping their hair ſhort, or even ſhaving the head, is a preſervative againſt this diſeaſe; but, on the contrary, the men ſuffer much more than the women, whoſe hair is long; and it at laſt affects the hair on other parts of the body.

M. de la Fontaine recommends a mild, attenuant, and corrective diet, as in other diſeaſes proceeding from acrimony of the fluids, with the uſe of ripe fruits. The correctneſs of his advice, however, may be juſtly queſtioned, ſince he informs us, that the diet of the common people in Poland conſiſts almoſt, if not entirely, of vegetables, which are generally made ſour. He concludes by this ſingular obſervation, that, if all theſe means be inadequate to produce the criſis, *inoculation* of the diſeaſe will often effect it; and that this is performed by putting on a cap, which has juſt been worn by one who has a recent plica. See Duncan's Annals of Medicine, vol. i. ſect. 1. Haller, Diſputationes Med. tom. i. art. 16, 17. Alibert, Précis Theorique et Pratique ſur les Maladies de la Peau, p. 92, et ſeq. Memoirs of the Literary and Philoſophical Society of Mancheſter, vol. iv. part 2.

Plica, Lat. a pleat, a fold, a wrinkle, the name of a muſical character in the firſt time-table that was formed. It was a kind of ligature, or retardation (*ſignum moroſitatis*, ſays de Muris); it ſerved for a ſeries of notes in paſſing from one ſound to another by regular degrees from a ſemitone to a 5th aſcending, and deſcending: it was of four kinds: 1. The long plica aſcending, a ſquare figure with one ſingle ſtroke or tail aſcending, . 2. The long plica deſcending has two ſtrokes or tails, one longer than the other, . 3. The ſhort plica aſcending has a ſingle tail on the left ſide turned up, . The 4th plica has a ſingle tail on the left ſide deſcending, .

PLICARIA, in *Botany*, a name uſed by ſome for the club-moſs.

PLICATED Leaf. See Leaf.

PLIGHT, in our old *Law Books*, a term which ſignifies the eſtate, with the quality of the land; though ſometimes it extends alſo to the rent-charge, and the poſſibility of a dower. Coke's Inſt. fol. 221.

PLINIA, in *Botany*, ſo named by Plumier, in memory of the famous Roman naturaliſt; ſee Pliny. Plum. Gen. 9. t. 11. Linn. Gen. 270. Schreb. 337. Willd. Sp. Pl. v. 2. 998. Mart. Mill. Dict. v. 3. Juſſ. 342. Lamarck Illuſtr. t. 428.—Claſs and order, *Icoſandria Monogynia*. Nat. Ord. *Heſperideæ*, Linn. *Roſaceis affine*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, ſmall, of one leaf, flat, in five acute reflexed ſegments. *Cor.* Petals five, ovate, concave, widely ſpreading. *Stam.* Filaments twenty, inſerted into the calyx, capillary, longer than the corolla; anthers globoſe. *Piſt.* Germen ſuperior, roundiſh; ſtyle awl-ſhaped, wavy; ſtigma ſimple. *Peric.* Drupa globoſe, furrowed, of one cell. *Seed.* Nut ſolitary, large, ovate, rough, cloven at the ſummit.

Eſſ. Ch. Calyx in five ſegments. Petals five. Drupa ſuperior, furrowed. Nut rough.

Obſ. Every botaniſt, who has attended, in any manner, to the ſubject, is aware of the great obſcurity that envelops this genus, which depends chiefly on the authority of Plumier, and which no ſucceeding botaniſt has been able to verify; except perhaps Allamand, from whoſe communications Linnæus corrected the generic character as above. Some have ſuppoſed Plumier to have been totally miſtaken, as to the germen being ſuperior, and that *Plinia* is no other than an *Eugenia.* Linnæus, and Allamand poſſibly, confounded theſe genera in their ideas; for their *P. rubra* is, as every body knows, *Eugenia uniflora.* See Willd. Sp. Pl. v. 2. 962, where its multifarious ſynonyms are correctly ſtated; ſee alſo our article EUGENIA. We ſubjoin all we can find upon record of the original and only ſpecies of *Plinia,* of which we have never been ſo fortunate as to ſee a ſpecimen.

1. P. *crocea.* Orange-fruited Plinia. Linn. Mant. 244. Willd. n. 1. (P. pinnata; Linn. Sp. Pl. ed. 1. 516. ed. 2. 735. P. pentapetala; Linn. Mant. 402. P. fructu croceo, odorato; Plum. Ic. 219. t. 225.) By Plumier's figure, which is our only guide, this appears to be a *tree,* with round alternate *branches.* The *leaves* are oppoſite, nearly ſeſſile, ovate, pointed, entire, about three inches long and one broad, apparently ſmooth, with one rib, and many tranſverſe incurved veins. *Flowers* ſcattered over the larger branches, nearly ſeſſile, ſolitary, ſcarcely ſo big as a hawthorn bloſſom, the tapering *ſtyle* projecting beyond the numerous *ſtamens,* which are themſelves longer than the *petals.* *Fruit* globular, ſaffron-coloured and fragrant, according to Plumier, the ſize of a large gooſeberry, deeply furrowed and wrinkled. *Nut* more ſlightly furrowed, or rather quite globular and only ſtriated, large, with a thin ſhell, and full kernel.

Burmann, the editor of Plumier, miſconceived the *leaves* to be abruptly pinnate, taking the whole branch for a leaf. Linnæus adopted this error, and having once made a falſe ſtep, he floundered deeper and deeper in trying to correct himſelf, altering the ſpecific name time after time, and contraſting the plant with one of a different genus; into which laſt miſtake he was indeed led by his correſpondent Allamand. We do not preſume to throw any new light on this obſcure point of botanical hiſtory, but what we have collected may ſerve to aſſiſt thoſe who may be ſo fortunate as to meet, in ſome part of the Weſt Indies or of South America, with the plant Plumier deſcribed. Dr. Swartz, who inveſtigated the former with great induſtry, ſeems never to have ſeen the *Plinia;* nor has he, in his *Obſervationes Botanicæ,* 203, done more than indicate the generic confuſion, to which we have ſufficiently adverted.

PLINIA, in *Gardening,* compriſes a plant of the exotic ſhrubby kind for the ſtove, of which the ſpecies cultivated is the red-fruited plinia, or myrtle (P. pedunculata.)

Method of Culture.—It is increaſed by the ſeeds, which ſhould be procured from abroad, and which ſhould be ſown in pots, filled with rich mould, plunging them in a bark hot-bed, when they appear in the ſame ſeaſon. They may alſo be increaſed by planting cuttings of the young ſhoots, in the later ſpring and ſummer months, in pots filled with good earth, covering them with hand or bell-glaſſes, and watering them occaſionally. They may be ſo rooted as to be fit for removing into ſeparate pots the ſame year.

It is a plant highly ornamental in ſtove collections, from its flowering in the winter ſeaſon.

PLINIANA, in *Geography,* a town or rather village of Italy, in the department of the Lario; ſix miles N. of Como. This place is remarkable for a ſingular fountain, which is ſtill to be ſeen in the ſame ſtate as deſcribed by Pliny, lib. iv. ep. 30. This ſpring burſts from a rock, and falls in natural caſcades into the lake of Como. It ebbs and flows three times a day; gradually riſing until it forms a conſiderable ſtream, and then as gradually ſubſiding till it becomes almoſt dry.

PLINLIMMON, a mountain of Wales, in the N. part of the county of Cardigan, on the borders of Montgomeryſhire.

PLINTH, from πλινθος, *brick,* in *Architecture,* a flat ſquare member, in form of a brick: ſometimes, alſo, called the ſlipper.

The plinth is uſed as the foot, or foundation of columns: being that flat ſquare table, under the mouldings of the baſe and pedeſtal, at the bottom of the whole order; ſeeming to have been originally intended to keep the bottom of the primitive wooden pillars from rotting.

The plinth is alſo called the *orle* or *orlo.*

Vitruvius alſo calls the Tuſcan abacus, plinth, from its reſembling a ſquare brick.

PLINTH *of a Statue,* &c. is a baſe or ſtand, either flat, round, or ſquare, ſerving to ſupport a ſtatue, &c.

PLINTH *of a Wall,* is a term for two or three rows of bricks advancing out from the wall; or in the general for any flat high moulding, ſerving in a front wall to mark the floors; or to ſuſtain the eaves of a wall, and the larmier of a chimney.

PLINTHITIS, a kind of alum found in ſome of the iſlands of the Archipelago, and called alſo *placitis,* from its uſually being found in thin cakes.

PLINTHIUM, a name given by the ancients to a machine invented for the making extenſion of diſlocated or fractured limbs. Oribaſius deſcribes ſeveral kinds.

PLINY, the elder, CAIUS PLINIUS SECUNDUS, in *Biography,* a diſtinguiſhed Roman writer, was born, it is thought, at Verona, in the reign of Tiberius, A.D. 23. He was deſcended from an illuſtrious family, and ſerved in the army during the wars in Germany. He roſe to various public employments under the emperors Nero, Veſpaſian, and Titus. It is ſaid that there is ſcarcely a man of buſineſs who was ſo devoted to ſtudy, or comprehended ſuch an extent of literary reſearch. The following is the mode of his ſpending his time at Rome, when he was high in the poſſeſſion of the imperial favour. Before day-break he waited upon Veſpaſian, who was alſo an early riſer, and then proceeded to execute the emperor's orders. On returning home he employed the reſt of the day in ſtudy. After taking a light repaſt, he reclined in the ſun according to the Roman cuſtom, while a book was read to him, from which he took notes. He never peruſed any work without making extracts, as he was accuſtomed to ſay "that no book was ſo bad as not to afford ſomething valuable." He then bathed, ſlumbered a little, and riſing freſh, as if to a new day, ſtudied till ſupper time. Even during that repaſt a reader was at his ſide, as there was upon all his journies; and a vacant hour never occurred which he did not employ in reading and writing. Of his avarice of time, his nephew, the younger Pliny, gives the following inſtance: one of his friends having obliged the reader to repeat ſomething that he had pronounced improperly, "Did you underſtand him?" ſaid Pliny, "I did," he replied. "Why then did you ſtop him? We have loſt more than ten lines by the interruption." He always went from place to place in a ſedan, that he might read on his road, and reproved his nephew for walking as ſo much time loſt. The plan thus adopted by the philoſopher, it might be ſuppoſed, would have precluded all original obſervation and reflection; but he was diligent in natural purſuits, and it was his ardent curioſity and thirſt of knowledge that occaſioned his death. He had the command of the fleet ſtationed at Miſenum, when, in the month of Auguſt, A.D. 79, a great eruption of Veſuvius broke out. On its firſt appearance he ſteered directly to the ſpot, as well for the humane purpoſe of giving aſſiſtance to the fugitives, as for viewing the progreſs of the eruption. The volcano raged with the utmoſt fury, and ſpread alarm through all the vicinity. While others were flying he ordered his pilot to ſteer directly acroſs to Stabiæ, where his friend Pomponianus had a villa. He there landed, and paſſed the night in the houſe. In the mean time ſhowers of aſhes almoſt blocked up his apartments, while the walls were ſhaken with an earthquake, and towards the morning it appeared neceſſary to quit the place. In his flight he was ſuffocated, being then in the 56th year of his age, high in reputation and dignity, and in great eſteem with the emperor Titus. His works are as follow; "On the Uſe of the Javelin on Horſeback;" "On the Life of Pomponius Secundus;" "Of the Wars in Germany," in twenty books; "On Oratory," three books; "On Grammar," eight books; "On the Hiſtory of his own Times," thirty-one books; "On Natural Hiſtory," thirty-ſeven books. Of all theſe works, that on natural hiſtory is the only one that has come down to our times, and it is regarded as one of the moſt valuable relics of claſſical antiquity. The editions of this work were very numerous at an early period, and many learned men have employed their talents in correcting the text. Hardouin was ſuppoſed to be one of the moſt ſucceſsful as well as induſtrious editors. His edition, in five volumes 4to., Par. 1685, was ſuperior to any at that time publiſhed. He has been ſucceeded by others, and in 1779, Brotier gave a new edition at Paris, in ſix vols. 12mo., which is much eſteemed.

PLINY, the younger, C. PLINIUS CÆCILIUS SECUNDUS, born at Como, in the reign of Nero, A.D. 62, was the ſon of L. Cæcilius, by a ſiſter of the elder Pliny. He was ſent to Rome for education, and after perfecting himſelf in the Greek language, he was placed under the tuition of Quintilian and Nicetes. His diſpoſition and talents cauſed him to be adopted by his uncle Pliny, and deſtined to be the heir of his name and fortune. He was in the eighteenth year of his age when the eruption of mount Veſuvius took place, which proved fatal to his uncle. He had imbibed ſo much of his uncle's ardour for ſtudy, that he choſe to remain reading the hiſtory of Livy, rather than accompany his uncle to a nearer view of the intereſting but fatal phenomenon. He began to plead cauſes ſoon after his uncle's death, but his labours in this way were ſoon interrupted by a campaign into Syria, with the rank of military tribune. He did not, however, wholly abandon his literary purſuits in that ſituation, but availed himſelf of the preſence of the philoſophers Euphrates and Artemidorus, who had been baniſhed Rome, with the other profeſſors of philoſophy, by Veſpaſian. After his return his reputation for eloquence ſtood ſo high, that when he was likely to harangue the people, vaſt crowds attended, and he was ſure to be greeted with the loudeſt applauſes, in which even the judges ſometimes joined. In the reign of Domitian he was raiſed ſucceſſively to the offices of quæſtor, tribune of the people, and prætor. Under Nerva he was appointed to the office of prefect of the Saturnian treaſury. In the third conſulate of the emperor Trajan, Pliny was one of the honorary conſuls termed *ſuffecti*, and on this occaſion he returned public thanks to the emperor in an oration, which he afterwards enlarged to the panegyric of Trajan. After this the care of the channel, and the banks of the Tiber, was next conferred upon him, with the augurate; and then he was appointed proconſul; whence he wrote to Trajan that curious letter concerning the primitive Chriſtians, which is extant among his epiſtles. Pliny's letter is eſteemed as almoſt the only genuine monument of eccleſiaſtical antiquity, relating to the times immediately ſucceeding the apoſtles, it having been written within about forty years after the death of the apoſtle Paul. It has been preſerved by Chriſtians themſelves, as a clear and unſuſpicious evidence of the purity of their doctrine and practice, and is frequently appealed to by the early writers of the church againſt the unprovoked calumnies of their adverſaries. It is not known what became of Pliny after his return from Bithynia; antiquity is alſo ſilent as to the time of his death; but it is conjectured, that he died either a little before or ſoon after Trajan; that is, about the year 116.

It appears that he loſt his firſt wife in the beginning of Nerva's reign, and that ſoon after he married his beloved Calphurnia: he never had any children. He was one of the greateſt wits, and one of the worthieſt men among the ancients. He had fine parts, which he cultivated with great care. He wrote and publiſhed a great number of pieces; but nothing has eſcaped the wreck of time except the books of Letters, and the panegyric upon Trajan. This has ever been regarded as a maſter-piece of excellent compoſition. It is an elaborate ſpecimen of true eloquence, chiefly of value as containing enlarged views of the duties of a ſovereign. Some writers have ſaid, that no panegyriſt was ever poſſeſſed of a finer ſubject, and on which he might better indulge in all the flow of eloquence, without incurring the ſuſpicion of flattery and falſehood; but others obſerve, that as it was compoſed at the very beginning of Trajan's reign, it has but little weight as a teſtimony to the merits of that excellent emperor. It might perhaps have been the happy means of fixing his character, and it is no ſmall praiſe if it produced this ſort of effect, and that the youthful emperor was determined by a life of virtue to deſerve all the encomia paid to him. His epiſtles, in ten books, are much to be prized for the anecdotes with which they abound, of the characters and incidents of the times, and likewiſe for the purity and elevation of their moral ſentiments, which impreſs a favourable idea of the writer. They were no doubt intended for the public. Every epiſtle is a kind of hiſtorical ſketch, in which we have a view of him in ſome ſtriking attitude either of active or contemplative life. They ſtrongly mark that love of applauſe which was unqueſtionably his ruling paſſion, and afford ſome curious facts relative to the modes of feeding a writer's vanity in thoſe times. They exhibit the writer as a profeſſed rhetorician, entertaining and perhaps wearying his friends with long and laboured orations and recitations, commanding conſtant plaudits by virtue of his rank, his wealth, and his truly eſtimable qualities; but he was probably in ſome inſtances the dupe of adulation. The beſt editions of Pliny the younger are the Variorum by Veenhuſius; and that by Longolius. His epiſtles have been tranſlated into Engliſh by lord Orrery and Mr. Melmoth; the verſion of the latter is ſingularly elegant. Pliny contributed largely to the maintenance of a public profeſſor for the inſtruction of youth in the place of his nativity; aſſigned an annual revenue for the ſupport of children of both ſexes, whoſe parents had been reduced to poverty; and founded a public library.

PLISA, in *Geography*, a town of Lithuania, in the palatinate of Minſk; 21 miles E. of Minſk.

PLITE *of Lawn*, in our *Old Writers*, ſeems to be an ancient meaſure, as a yard or ell, at this time: it is mentioned in the ſtat. 3 Ed. IV. cap. 5.

PLIVA, in *Geography*, a river of Boſnia, which runs into the Verbas.

PLIUSA, a river of Ruſſia, which runs into the Baltic, between Nerva and Ivangorod.

PLIUSKINA a town of Ruſſia, in the government of Irkutſk; 20 miles N.E. of Verchnei-Udinſk.

PLIWISCHEN, a town of Pruſſia, in the province of Samland; 28 miles E. of Konigſberg.

PLOCAMA, in *Botany*, ſo named by Dr. Solander, from πλοκαμος, *a head of hair*, in alluſion to its long pendulous entangled branches.—Ait. Hort. Kew. ed. 1. v. 3. 508. ed. 2. v. 2. 63. Schreb. 797. Willd. Sp. Pl. v. 1. 1210. Mart. Mill. Dict. v. 3.—Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Rubiaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth ſuperior, of one leaf, minute, five-toothed, permanent. *Cor.* of one petal, bell-ſhaped, in five deep oblong ſegments. *Stam.* Filaments five, ſhort, inſerted into the tube; anthers linear, erect, ſomewhat incumbent. *Piſt.* Germen inferior, globoſe; ſtyle thread-ſhaped, ſwelling upwards, longer than the ſtamens; ſtigma obtuſe, undivided. *Peric.* Berry nearly globoſe, of three cells. *Seeds* ſolitary, linear-oblong.

Eſſ. Ch. Calyx ſuperior, with five teeth. Corolla bell-ſhaped, five-cleft. Berry of three cells. Seeds ſolitary.

1. P. *pendula*. Drooping Plocama. Ait. n. 1. Willd. n. 1.—Native of the Canary iſlands, from which country it was ſent to Kew by Mr. Maſſon in 1779; and of the Cape of Good Hope, from whence we have a ſpecimen communicated by Mr. Lambert. It is, or was, kept in the greenhouſe at Kew; but no time of flowering being mentioned, the plant is perhaps now loſt, without having ever been figured, or fully deſcribed. The *ſtem* is ſhrubby, erect, two or three feet high, roundiſh, ſmooth, with generally alternate *branches*, of which the uppermoſt are extremely numerous, drooping or pendulous, ſlender, obſcurely quadrangular, roughiſh, leafy. *Leaves* oppoſite, on ſhort ſtalks, linear, acute, entire, very narrow, ſmooth, ſomewhat fleſhy. *Stipulas* ſmall, acute, between the footſtalks, permanent, and at length forming a narrow ring, round each joint of the ſtem or branch. *Flowers* terminal, axillary, or from the upper forks of the branches, ſmall, on ſhort, ſimple, roughiſh *ſtalks*, either ſolitary, or two or three together. *Berry* not half the ſize of a currant. The whole plant, except the old *ſtem*, turns black in drying.

PLOCE, in *Rhetoric*, a figure by which a word is repeated, by way of emphaſis; in ſuch manner, as not only to expreſs the ſubject, but ſome particular character or property of it.

Cruelty! yes, cruelty beyond all example. His wife's a wife indeed! So Cicero ſays, Young Cato wants experience, but yet he is Cato.

PLOCKEN-ALBEN, in *Geography*, a mountain of Carinthia; ſix miles S.E. of Mauten.

PLOCZKO, or PLOZK, a town of the duchy of Warſaw, late of Poland, and capital of a palatinate of the ſame name in Maſovia, ſituated on an eminence near the Viſtula: the ſee of a biſhop, ſuffragan to the archbiſhop of Gneſna. It is alſo the reſidence of a palatine, a caſtellan, and a ſtaroſta: and contains ſeveral churches richly ornamented, one of which is the cathedral. The provoſt or dean is ſovereign of the nobility who reſide here, and is accordingly ſtyled prince of that territory. In the caſtle is a gymnaſium or ſeminary. The provincial court of judicature is held in this town: and a good trade is carried on by its inhabitants; 64 miles W.N.W. of Warſaw. N. lat. 52° 17′. E. long. 19° 35′.

PLOEMUR, a town of France, in the department of the Morbihan; two miles W. of L'Orient.

PLOEN, or PLON, a town of the duchy of Holſtein, which has ſeveral times been deſtroyed by fire; 23 miles N.N.W. of Lubeck. N. lat. 54° 10′. E. long. 10° 22′.

PLOERMEL, a town of France, and principal place of a diſtrict, in the department of the Morbihan. The place contains 4512, and the canton 11,800 inhabitants, on a territory of 207½ kiliometres, in ſix communes. N. lat. 47° 40′. W. long. 2° 59′.

PLOESTI, a town of Walachia; 200 miles E. of Belgrade.

PLOEUC, a town of France, in the department of the North Coaſts, and chief place of a canton, in the diſtrict of St. Brieuc; 10 miles S. of St. Brieuc. The place contains 5073, and the canton 12,800 inhabitants, on a territory of 170 kiliometres, in ſix communes.

PLOGASTEL, a town of France, in the department of Finiſterre, and chief place of a canton, in the diſtrict of Quimper; ſeven miles W. of Quimper. The place contains 1047, and the canton 10,809 inhabitants, on a territory of 230 kiliometres, in 13 communes.

PLOK-PENIN, in *Commerce*, a term uſed in the public ſales at Amſterdam for a little ſum given by the laſt bidder.

The plok-penin is a kind of earneſt, by which it is ſignified, that the commodity is adjudged to him.

The plok-penin differs according to the quality of the commodity, and the price of the lot. Sometimes it is arbitrary, and depends on the pleaſure of the buyer; and, ſometimes, it is regulated by the ordinances of the burgomaſters.

PLOMBIERES, in *Geography*, a town of France, in the department of the Voſges, and chief place of a canton, in the diſtrict of Remiremont; ſix miles S.W. of Remiremont. The place contains 1109, and the canton 9947 inhabitants, on a territory of 215 kiliometres, in ſix communes.

PLOMNITZ, a town of Sileſia, in the county of Glatz; two miles N.W. of Habelſchwerdt.

PLOMO, in *Metallurgy*, a name given by the Spaniards, who have the care of the ſilver mines, to the ore of that metal, when it is found adhering to the ſurface of ſtones, and incruſting their cracks and cavities in the form of ſmall and looſe grains of gunpowder. Though theſe grains be but few in number, and the reſt of the ſtone have no ſilver in it, yet they are always very happy in meeting with it, as it is a certain token that there is a very rich vein ſomewhere in the neighbourhood. And if in digging forwards they ſtill meet with theſe grains, or the plomo in greater quantity, it is a certain ſign that they are getting more and more near the good vein.

PLONCOUR, in *Geography*, a town of France, in the department of the Finiſterre; eight miles S.W. of Quimper.

PLONE, a river of Pomerania, which runs into the Dammiſch ſee, at Damme.

PLONEVEZ *de Faou*, a town of France, in the department of the Finiſterre; eight miles W. of Carhaix.

PLONGEON, in *Ornithology*. See COLYMBUS.

PLONKETS, in our *Old Writers*, a kind of coarſe woollen cloth. 1 Ric. III. cap. 8.

PLONSK, in *Geography*, a town of the duchy of Warſaw; 22 miles N. of Ploczko.

PLOSAWO, a town of Poland, in the palatinate of Belcz; 28 miles W.S.W. of Belcz.

PLOSS, a town of Germany, in the principality of Culmbach; ſix miles N.W. of Bayreuth.

PLOT, ROBERT, in *Biography*, a natural philoſopher and antiquary, was born, in 1641, at Borden, near Sittingbourn, in Kent. He was educated at Magdalen Hall, Oxford, where he took his degree of L.L.D. in 1671. Soon after this he became diſtinguiſhed for his zeal in philoſophical and natural ſcience, and was made a fellow of the newly conſtituted Royal Society, of which learned body he was elected one of the ſecretaries in 1682. In the following year he was appointed the firſt keeper of Aſhmole's muſeum at Oxford, and at the ſame time profeſſor of chemiſtry in the univerſity. Antiquities were the leading objects of his purſuit, and in 1687 he was made regiſter to the earl marſhal's court, and in 1695 the Mowbray-herald extraordinary.

nary. He died in 1696. He is principally known in the literary world by his two county natural hiſtories, which were the firſt of the kind publiſhed in England, and were exemplifications of a great plan which he had formed for a natural hiſtory of the whole kingdom. The "Natural Hiſtory of Oxfordſhire" was publiſhed firſt in 1677, and again in 1705, with additions and corrections by Mr. Burman. That of "Staffordſhire" was publiſhed in 1679, and reprinted in 1686. It was decorated with views of the ſeats of the nobility and gentry. It is at preſent extremely ſcarce Both theſe county hiſtories include not only all that properly belongs to the natural hiſtory, but whatever relates to arts, manners, and antiquities, and all other memorabilia. As ſecretary to the Royal Society, he conducted the publication of their Tranſactions from N° 143 to 166 incluſive, and he communicated to it ſome papers of his own. Since his death two letters of Dr. Plot's have been publiſhed relative to antiquities in Kent and Thetford. He left a number of manuſcripts, among which were large collections for a natural hiſtory of Kent. Biog. Brit.

Plot, or *Plott*, in *Gardening*. See Grass-*plat*, &c.

Plot, in *Dramatic Poetry*, the fable of a tragedy or comedy; or the action repreſented therein.

Plot is more particularly uſed for the knot or intrigue which makes the difficulty and embarraſs of a piece.

The unravelling puts an end to the plot.

Plot, in *Surveying*, the plan or draught of any parcel of ground, *e. gr.* a field, farm, or manor, ſurveyed with an inſtrument, and laid down in the proper figure and dimenſions. See Plotting.

PLOTILE, in *Geography*, a town of Samogitia; 25 miles N.N.W. of Miedniki.

PLOTINOPOLIS, in *Ancient Geography*, a town of Thrace, upon the river Hebrus; 22 miles from Trajanopolis, according to the Itinerary of Antonine.

PLOTINUS, in *Biography*, a Platonic philoſopher, was born at Lycopolis, a city of Egypt, in or about the year 204. In very early life he began to ſhew a great ſingularity both in taſte and manners. He began to ſtudy philoſophy at about the age of twenty, and for ſome time he attended the lectures of different famous profeſſors, who then abounded in Alexandria, but he was diſſatisfied with all their ſyſtems, and attached himſelf to Ammonius, who attempted to reconcile the different opinions then ſubſiſting among the philoſophers, and founded a diſtinct eclectic ſchool, in which he taught his diſciples certain ſublime doctrines, and myſtical practices, which he communicated to them under a ſolemn injunction of ſecrecy. With the inſtructions of ſuch a preceptor, Plotinus, whoſe mind had a ſtrong tincture of enthuſiaſm, was highly delighted, and he told his friend, that he had now met with a tutor in all reſpects ſuited to his wiſhes. Under this maſter he proſecuted his philoſophical ſtudies during eleven years, and became a deep proficient in the abſtruſe ſubtleties, and myſtical flights of his ſyſtem. Upon the death of Ammonius, he determined to travel into Perſia and India, to learn wiſdom of the Magi and Gymnoſophiſts. In this reſolution he was encouraged by the example of Apollonius Tyanæus, whoſe pretenſions to the magic arts were ſaid to be derived from theſe ſources. For ſome time Plotinus conſidered himſelf to be under an obligation not to diſcloſe the doctrines which he had learned in the ſchool of Ammonius, in conſequence of the injunction of ſecrecy to which he had ſubmitted, but two of his fellow-pupils having publicly taught the myſteries of their maſter, he thought himſelf abſolved from his engagement, and became a lecturer in philoſophy upon eclectic principles. During ten years he confined himſelf to oral diſcourſe, but at length he found it neceſſary, as well for the convenience of his pupils, as for himſelf, to commit the ſubſtance of what he delivered to writing. The novelty of his plan of inſtruction drew after him a crowd of auditors, among whom were perſons of high rank of both ſexes. To the inſtructions of thoſe who were willing to become his auditors he devoted himſelf with the greateſt ardour and aſſiduity. He frequently prepared himſelf for his ſublime contemplations by watching and faſting; hence his enthuſiaſtic paſſions were ſometimes raiſed to ſuch a pitch, that he believed he was under the immediate protection of a genius, or familiar ſpirit, of the moſt eminent order, who was not merely a dæmon, but a god. The ſuperiority which he fancied belonged to his tutelar genius, inflated him with a degree of pride, that bordered upon impiety, or perhaps inſanity. He, however, enjoyed ſo high a reputation for wiſdom and integrity, that many private quarrels were referred to his arbitration, and ſeveral perſons of both ſexes, when upon their death beds, ſent for him to take upon him the care of their eſtates, and the guardianſhip of their children. Such offices he never refuſed, and he diſcharged them in a manner that gave the higheſt ſatisfaction to the parties concerned. His excellent character ſecured to him the eſteem of many perſons of high rank, and particularly of the emperor Gallienus, and his empreſs Salonina. The romantic turn of his mind was ſufficiently ſhewn, by the uſe which he made of his intereſt at court. (See Platonopolis.) He died in the year 270, when he was in the 66th year of his age. When he found his end approaching, he ſaid to Euſtochius, "the divine principle within me is now haſtening to unite with that divine being which animates the univerſe;" expreſſing by theſe words a leading principle of his philoſophy, that the human ſoul is an emanation from the divine nature, and will return to the ſource whence it proceeded. By his diſciple and biographer, Porphyry, he is repreſented as having poſſeſſed the power of working miracles: this was probably ſaid with a view of depreciating the Chriſtian religion, of which Porphyry was a great enemy. The treatiſes of Plotinus, which are fifty-four in number, were diſtributed by his biographer under ſix claſſes, called Euneads. Proclus wrote commentaries upon them. At the requeſt of Coſmo de Medici, Marſilius Ficinus made a Latin verſion of them, which was firſt publiſhed at Florence, under the title of "Plotini Opera ex interpet. Marſilii Ficini, cum commentariis, necnon Vita Plotini à Porphyrio conſcripta 1492." The Greek text was afterwards publiſhed at Baſil, from a manuſcript ſtated by Lambecci to be in the Imperial library, accompanied with the verſion of Ficinus in 1580. Dr. Enfield, in his abridgment, &c. of Brucker's Phil., ſpeaking of Plotinus, ſays "that he made it the main ſcope and end of his life to dazzle his own mind, and the minds of others, with the meteors of enthuſiaſm, rather than illuminate them with the clear and ſteady rays of truth. How much is to be regretted that ſuch a man ſhould have become, in a great degree, the preceptor of the world, and ſhould, by means of his diſciples, have every where diſſeminated a ſpecies of falſe philoſophy, which was compounded of ſuperſtition, enthuſiaſm, and impoſture. The muddy waters ſent forth from this polluted ſpring, were ſpread through the moſt celebrated ſeats of learning, and were even permitted to mingle with the pure ſtream of Chriſtian doctrine. Not only at Rome, where Plotinus taught, but firſt in Alexandria, and afterwards in many of the principalities of Aſia Minor, and even at Athens, the ancient ſeat of wiſdom, the ſyſtem of Ammonius

monius and Plotinus was embraced and propagated by men, who, in learning and abilities, were greatly ſuperior to its founders." Enfield's Hiſt. Phil.

PLOTTING, among *Surveyors*, the art of deſcribing or laying down on paper, &c. the ſeveral angles and lines of a tract of ground ſurveyed by a theodolite, or the like inſtrument, and a chain.

In ſurveying with the plain-table, the plotting is needleſs; the ſeveral angles and diſtances being laid down on the ſpot as faſt as they are taken.

But in working with the theodolite, ſemicircle, or circumferentor, the angles are taken in degrees; and the diſtances in chains and links. So that there remains a ſubſequent operation, to reduce thoſe numbers into lines; and ſo to form a draught, plan, or map. The operation is called *plotting*.

Plotting, then, is performed by means of two inſtruments, the protractor and plotting-ſcale. By the firſt, the ſeveral angles obſerved in the field with a theodolite, or the like, and entered down in degrees in the field-book, are protracted on paper in their juſt quantity.

By the latter, the ſeveral diſtances meaſured with the chain, and entered down, in like manner, in the field-book, are laid down in their juſt proportion.

Under the articles PROTRACTOR and PLOTTING-*ſcale*, is found, ſeverally, the uſe of thoſe reſpective inſtruments in the laying down of angles and diſtances; we ſhall here give their uſe conjointly, in the plotting of a field, ſurveyed either with the circumferentor, or theodolite.

PLOTTING, *Method of, from the circumferentor.* Suppoſe an incloſure, *e. gr.* A B C D E F G H K (*Plate* VI. *Surveying*, *fig.* 10.) to have been ſurveyed: and the ſeveral angles, as taken by a circumferentor in going round the field, and the diſtances, as meaſured by a chain, to be found entered in the field-book, as in the following table.

	Deg.	Min.	Cha.	Link.
A	191	00	10	75
B	297	00	6	83
C	216	30	7	82
D	325	00	6	96
E	12	24	9	71
F	324	30	7	54
G	98	30	7	54
H	71	00	7	78
K	161	30	8	22

1. On a paper of the proper dimenſions, as L M N O (*Plate* VI. *Surveying*, *fig.* 11.) draw a number of parallel and equidiſtant lines, repreſenting meridians, expreſſed in dotted lines. Their uſe is, to direct the poſition of the protractor; the diameter of which muſt always be laid either upon one of them, or parallel thereto; the ſemicircular limb downwards for angles greater than 180, and upwards for thoſe leſs than 180°.

The paper being thus prepared, aſſume a point on ſome meridian, as A, whereon lay the centre of the protractor, and the diameter along the line. Conſult the field-book for the firſt angle, *i. e.* for the degree cut by the needle at A, which the table gives you 191°.

Now ſince 191° is more than a ſemicircle or 180°, the ſemicircle of the protractor is to be laid downwards; where, keeping it to the point with the protracting pin, make a mark againſt 191°; through which mark, from A, draw an indefinite line A *b*.

The firſt angle thus protracted, again conſult the book for the length of the firſt line A B. This you find ten chains 75 links. From a convenient ſcale therefore, on the plotting-ſcale, take the extent of 10 chains 75 links between the compaſſes; and ſetting one point in A, mark where the other falls in the line A *b*, which ſuppoſe in B: draw, therefore, the full line A B for the firſt ſide of the incloſure.

Proceed then to the ſecond angle; and laying the centre of the protractor on the point B, with the diameter as before directed, make a mark, as *c*, againſt 297°, the degrees cut at B; and draw the indefinite line B *c*. On this line, from the plotting-ſcale, as before, ſet off the length of your ſecond line, *viz.* 6 chains 83 links; which extending from B to the point C, draw the line B C for the ſecond ſide.

Proceed now to the third angle or ſtation: lay then the centre of the protractor, as before, on the point C; make a mark, as *d*, againſt the number of degrees, cut at C, *viz.* 216° 30′: draw the indefinite line C *d*, and thereon ſet off the third diſtance, *viz.* 7 chains 82 links; which terminating, *e. gr.* at D, draw the full line C D for the third ſide.

Proceed now to the fourth angle D: and, laying the centre of the protractor over the point D, againſt 325°, the degree cut by the needle, make a mark *e*; draw the occult line D *e*, and thereon ſet off the diſtance 6 chains 96 links; which terminating E, draw D E for the fourth line: and proceed to the fifth angle, *viz.* E.

Here the degrees, cut by the needle, being 12° 24′ (which is leſs than a ſemicircle), the centre of the protractor muſt be laid on the point E, and the diameter on the meridian, with the ſemicircular limb turned upwards. In this ſituation make a mark, as before, againſt the number of degrees, *viz.* 12° 24′, cut by the needle at E; draw the line E *f*, on which ſet off the fifth diſtance, *viz.* 9 chains 71 links; which extending from E to F, draw the line E F for the fifth ſide of the incloſure.

After the ſame manner proceed orderly to the angles F, G, H, and K; then placing the protractor, making marks againſt the reſpective degrees, drawing indefinite lines, and ſetting off the reſpective diſtances, as above, you will have the plot of the whole incloſure, A B C, &c. Such is the general method of plotting from this inſtrument; but it muſt be obſerved, that in this proceſs, the ſtationary lines, *i. e.* the lines in which the circumferentor is placed to take the angles, and in which the chain is run to meaſure the diſtances, are, properly, the lines here plotted. When, therefore, in ſurveying, the ſtationary lines are at any diſtance from the fence or boundaries of the field, &c. off-ſets are taken, *i. e.* the diſtance of the fence from the ſtationary line is meaſured at each ſtation; and even at intermediate places, if there prove any conſiderable bends in the fence.

In plotting, therefore, the ſtationary lines being laid down, as above, the off-ſets muſt be laid down from them; *i. e.* perpendiculars of the proper lengths muſt be let fall at the proper places from the ſtationary lines. The extremes of which perpendiculars, being connected by lines, give the plot deſired.

If, inſtead of going round the field, the angles and diſtances have been all taken from one ſtation, the proceſs of plotting is obvious, from the example above; all here required, being to protract, after the manner already deſcribed, the ſeveral angles and diſtances, taken from the ſame ſtationary point in the field; from the ſame point or centre on the paper. The extremities of the lines thus determined, being then connected by lines, will give the plot required.

If the field has been ſurveyed from two ſtations, the ſtationary lines are to be firſt plotted, as above; then the angles and diſtances taken from each to be laid down from each reſpectively.

Plotting, *Method of, where the angles are taken by the theodolite*, i. e. *by back-ſight and fore-ſight* (as it is called) is ſomewhat different. To prepare the angles for plotting, the quantity of each muſt firſt be found, by ſubtracting the degrees of the fore-ſight and back-ſight from each other: the remainder is then the angle to be protracted. The uſe of parallel lines is here excluded; and inſtead of laying the protractor conſtantly on, or parallel to meridians, its direction is varied at every angle. The practice is thus:

Suppoſe the former incloſure to have been ſurveyed with the theodolite, after the manner of back-ſight and fore-ſight; and ſuppoſe the quantity of each angle to be found by ſubtraction.

An indefinite line is drawn at random, as A K, (*fig.* 11.) and on this the meaſured diſtance, *e. gr.* 8 chains 22 links, is ſet off, as in the former example: if now the quantity of the angle A have been found 140°, the diameter of the protractor is to be laid on the line A K, with the centre over A; and againſt the number of degrees, *viz.* 140, a mark made, an indeterminate line drawn through it, and the diſtance of the line A B laid down from the ſcale upon it.

Thus we gain the point B; upon which laying the centre of the protractor, the diameter along the line A B, the angle B is protracted, by making a mark againſt its number of degrees, drawing an occult line, and ſetting off the diſtance B C, as before.

Then proceed to C, laying the diameter of the protractor on B C, the centre on C protracts the angle C, and draw the line C D: thus, proceeding orderly to all the angles and ſides, you will have the plot of the whole incloſure A B C, &c. as before.

Plotting-*Scale*, a mathematical inſtrument uſually of box-wood, ſometimes of braſs, ivory, or ſilver, and either a foot, or half a foot long, and about an inch and a half broad.

It is denominated from its uſe in plotting of grounds, &c.

On one ſide of the inſtrument (repreſented *Plate* VI. *Surveying*, *fig.* 12.) are ſeven ſeveral ſcales or lines, divided into equal parts. The firſt diviſion of the firſt ſcale is ſubdivided into ten equal parts, to which is prefixed the number 10, ſignifying that ten of thoſe ſubdiviſions make an inch; or that the diviſions of that ſcale are decimals of inches.

The firſt diviſion of the ſecond ſcale is likewiſe ſubdivided into 10, to which is prefixed the number 16, denoting that ſixteen of thoſe ſubdiviſions make an inch. The firſt diviſion of the third ſcale is ſubdivided in like manner into 10, to which is prefixed the number 20. To that of the fourth ſcale is prefixed the number 24; to that of the fifth, 30; that of the ſixth, 40; and that of the ſeventh, 48; denoting the number of ſubdiviſions equal to an inch, in each, reſpectively.

The two laſt ſcales are broken off before the end, to give room for two lines of chords, marked by the letters C C.

On the back-ſide of the inſtrument is a diagonal ſcale, the firſt of whoſe diviſions, which is an inch long, if the ſcale be a foot, and half an inch, if half a foot, is ſubdivided, diagonally, into 100 equal parts; and at the other end of the ſcale is another diagonal ſubdiviſion, of half the length of the former, into the ſame number of parts, *viz.* 100

Next the ſcales, is a line divided into hundredth parts of a foot, numbered 10, 20, 30, &c. and a line of inches ſubdivided into tenths, marked 1, 2, 3, &c.

Plotting-*Scale, Uſe of the.* 1. *Any diſtance being meaſured by the chain, to lay it down on the paper.*—Suppoſe the diſtance to be 6 chains 50 links. Draw an indefinite line; ſet one foot of the compaſſes at figure 6 on the ſcale, *e. gr.* the ſcale of 20 in an inch, and extend the other to five of the ſubdiviſions, for the 50 links: this diſtance being transferred to the line, will exhibit the 6 chains 50 links, required.

If it be deſired to have 6 chains 50 links, take up more or leſs ſpace, take them off from a greater or leſſer ſcale, *i. e.* from a ſcale that has more or fewer diviſions in an inch.

To find the chains and links contained in a right line, as that juſt drawn, according to any ſcale, e. gr. that of 20 in an inch. Take the length of the line in the compaſſes, and applying it to the given ſcale, you will find it extend from the number 6 of the great diviſions to five of the ſmall ones; hence the given line contains 6 chains 50 links.

Plotting-*Table*, in *Surveying*, is uſed for a plain table, as improved by Mr. Beighton, who has obviated a good many inconveniences attending the uſe of the common plain table. See Phil. Tranſ. N° 461. ſect. 1.

PLOTTNITZ, in *Geography*, a lake of Sileſia, in the principality of Oels; four miles E. of Militſch.—Alſo, a town of Sileſia, in the principality of Neiſſe; three miles W. of Patſchkau.

PLOTUS, *the Darter*, in *Ornithology*, a genus of birds of the order Anſeres. The generic character is, bill ſtraight, pointed, toothed; the noſtrils have a ſlit near the baſe; face and chin naked; legs ſhort; all the toes are connected. The birds of this genus, of which there are three ſpecies, have a ſmall head, and long ſlender neck; they are chiefly ſeen in ſouthern climates; they live chiefly on fiſh, which they take by darting forwards the head while the neck is contracted like the body of a ſerpent.

Species.

Anhinga; White-bellied Darter. The head is ſmooth, and the belly white. It inhabits Braſil, and is about 34 inches long. It builds on trees, and is hardly ever ſeen on the ground; when at reſt it ſits with the neck drawn in between the ſhoulders. The fleſh, though ſometimes eaten, is reckoned rancid and oily. The bill is cinereous, yellowiſh at the baſe; irids golden; head, neck, and breaſt reddiſh-grey; body above black, the ſcapular feathers with a white ſpot in the middle; it has 12 tail-feathers, which are broad and long; its legs are of a yellowiſh aſh colour.

Melanogaster; Black-bellied Darter. Head ſmooth; belly black. It is about three feet long, and found in Ceylon and Java. There are three varieties of this ſpecies. 1. Above brown, beneath black; ſtreaks on the ſcapulars and oval ſpots on the wing-coverts white. Between the breaſt and belly is a rufous band. It is a native of Cayenne. 2. Black; back and ſcapulars ſpotted with white; wing-coverts yellowiſh-white; tail rufous at the tip. 3. Black; head, neck, and wing-coverts ſtreaked with rufous and brown. It is found at Senegal.

Surinamensis; Surinam Darter. Head creſted; belly white. Found, as its name imports, in Surinam; is about 13 inches long, and is domeſticated. It feeds on fiſh and inſects, eſpecially flies, which it catches with great dexterity.

PLOTZKAU, in *Geography*, a town of Germany, in the duchy of Anhalt-Bernburg; five miles S.S.W. of Bernburg.

PLOUAGAT, a town of France, in the department of the North Coaſts, and chief place of a canton, in the diſtrict of Guingamp. The place contains 2034, and the canton 7239 inhabitants, on a territory of 172½ kiliometres, in ſeven communes.

PLOUARET, a town of France, in the department of the North Coaſts, and chief place of a canton, in the diſtrict of Lannion. The place contains 4276, and the canton 14,092 inhabitants, on a territory of 260 kiliometres, in eight communes.

PLOUAY, a town of France, in the department of the Morbihan, and chief place of a canton, in the diſtrict of L'Orient; ſeven miles N. of Hennebon. The place contains 3586, and the canton 12,304 inhabitants, on a territory of 215 kiliometres, in ſeven communes.

PLOUBALAY, a town of France, in the department of the North Coaſts, and chief place of a canton, in the diſtrict of Dinan; nine miles N. of Dinan. The place contains 1385, and the canton 6008 inhabitants, on a territory of 92½ kiliometres, in eight communes.

PLOUDALMAZEAU, a town of France, in the department of the Finiſterre, and chief place of a canton, in the diſtrict of Breſt; 10 miles N.N.W. of Breſt. The place contains 2899, and the canton 14,588 inhabitants, on a territory of 177½ kiliometres, in 12 communes.

PLOUDERY, a town of France, in the department of the Finiſterre, and chief place of a canton, in the diſtrict of Breſt; five miles E.N.E. of Landerneau.

PLOVER, Asiatic, in *Ornithology*. See Charadrius *Aſiaticus*.

Plover, *Baſtard*. See Tringa *Vanellus*, and Lapwing.

Plover, *Black-crowned*. See Charadrius *Atricapillus*.

Plover, *Black-headed*. See Charadrius *Melanocephalus*.

Plover, *Coromandel*. See Charadrius *Coromandelicus*.

Plover, *Cream-coloured*. See Charadrius *Gallicus*.

Plover, *Duſky*. See Charadrius *Obſcurus*.

Plover, *Fulvous*. See Charadrius *Fulvus*.

Plover, *Golden*, or *Green*, *pluvialis*, the *charadrius pluvialis* of Linnæus: an elegant ſpecies, which is often found on our moors and heaths, in the winter time, in ſmall flocks.

Plover, *Gregarious*. See Charadrius *Gregarius*.

Plover, *Grey*. See Tringa *Squatarola*.

Plover, *Hooded*. See Charadrius *Pileatus*.

Plover, *Leſſer*, or *Dotterel*. See Charadrius *Morinellus*.

Plover, *Long-legged*. See Charadrius.

Plover, *Mongolian*. See Charadrius *Mongolus*.

Plover, *Noiſy*, or *Chattering*. See Charadrius *Vociferus*.

Plover, *Norfolk*, or *Greater*, or *Stone curlew*. See Charadrius.

Plover, *Red-necked*. See Charadrius *Rubricollis*.

Plover, *Ringed*, or *Sea-lark*. See Charadrius *Hiaticula*.

Plover, *Ruddy*. See Charadrius *Rubidus*.

Plover, *Spotted*, or *Alwargrim*. See Charadrius *Apricarius*.

Plover, *Spur-winged*. See Charadrius *Spinoſus*.

Plover-*Stone*, a name uſed in ſome parts of England for the *godwit*, or *ægocephalus* of authors.

Plover, *Wattled*. See Charadrius *Bilobus*.

Plover, *White-bellied*. See Charadrius *Leucogaſter*.

Plover, *Wreathed*. See Charadrius *Coronatus*.

Plover, *New Zealand*. See Charadrius *Novæ Seelandiæ*.

PLOUESCAT, in *Geography*, a town of France, in the department of the Finiſterre, and chief place of a canton, in the diſtrict of Morlaix. The place contains 2138, and the canton 9648 inhabitants, on a territory of 125 kiliometres, in five communes.

PLOUGH, in *Agriculture*, a well-known implement for breaking up the ground for tillage crops. It was invented at a very early period, being, perhaps, nearly coeval with the cultivation of the ſoil itſelf, as, without ſome kind of a plough, no produce of any conſequence could poſſibly have been derived from the ground. It is an implement which was well known to the Egyptians, the Greeks, and the Romans, and which has prevailed in moſt of the Eaſtern countries for a vaſt number of ages.

Theſe tools are conſtructed in different ways, according to the particular uſes to which they are to be applied, and the nature of the land on which they are to be employed; as it is obvious that no one ſort of plough can be made uſe of in all caſes with equal ſucceſs: differences in the nature of the ſoils, ſituations, and methods of performing the work, muſt neceſſarily require a diverſity in their forms and modes of conſtruction. Some of the more common and leſs complex kinds may, however, be very generally applied in the cultivation of land, and, of courſe, are the moſt uſeful on moſt ſorts of arable farms. It is remarked in the Eſſex corrected report on agriculture, that "there is ſcarcely a circumſtance in the agriculture of the kingdom more ſurpriſing, after ſo general attention has been paid to it, than the extreme uncertainty in which the true ſtructure of the plough yet remains. That variations for different ſoils and circumſtances muſt and ought to occur, is admitted; but one plough for one ſpecific object might have been produced, its ſuperiority to others aſcertained, and the principles in its conſtruction, on which ſuch merit depended, fully developed, and laid down in accurate drawings; yet this has not been done; and the only approximation to it is, it is contended, in a paper by the late Mr. Arbuthnot, which the writer publiſhed near forty years ago in his 'Eaſtern Tour.' Farming mechanics, it is ſuppoſed, look to the Board of Agriculture for ſupplying this great deficiency, which can be ſupplied only by a ſeries of experiments, demanding a conſiderable expence, and more attention."

Ploughs may, with propriety, be divided into the *ſwing* and *wheel* kinds, the former being ſuch as are wholly deſtitute of any ſort of machinery that can produce reſiſtance in the way of friction about the end of the beam. Thoſe are of courſe the lighteſt of draught, but require the experience of a good ploughman in uſing them. But theſe ſorts of ploughs vary much in different parts of the kingdom. When well made they are, however, very effective, and capable of being generally employed in the ploughing of the lighter ſorts of land. And they have other advantages, which are thoſe of not being ſo readily put out of order, and of affording leſs fatigue to the teams employed in drawing them.

Thoſe of the latter ſort are ſuch as have the complex apparatus of wheels applied to them in ſome way or other, though they differ exceedingly in the manner in which this is done. From the ſteady manner in which theſe ploughs moſtly proceed in their work, they are evidently capable of being managed by much leſs experienced ploughmen. It is ſuggeſted in the Middleſex Report, that wheels ſeem to have been added to ploughs in conſequence of the want of expertneſs in the workmen; and that in all ſorts of land, but eſpecially in that of the ſtony and more ſtiff kind, they afford much aſſiſtance, by enabling them to execute the work with greater regularity in the depth, and more evenneſs in the ſurface. But from the nature of the machinery with which they are loaded, they are evidently more expenſive in their conſtruction, more liable to be put out of order, and from the friction that is thus produced require more ſtrength in the teams that are employed in drawing them. Beſides, they have the diſadvantage of being more apt to be put out of order in their courſe, by the occurrence of ſtones, clods, and other ſurface inequalities, than thoſe of the former kind. An inconvenience attending theſe ploughs is alſo noticed by lord Somerville in the Communications to the Board of Agriculture, which is, that with *wheel-ploughs* workmen are apt to ſet the points of their ſhares too low, ſo as by their inclined direction to occaſion a heavy preſſure on the wheel which muſt proceed horizontally. Of courſe he conceives the effect of this ſtruggle to be an increaſed weight of draught infinitely beyond what could be imagined, on which account he thinks that the wheel is to be conſidered as of no conſequence *in ſetting a plough for work;* but that paſſing lightly over the ſurface it will be of material uſe in breaking old lays, or lands where flints, rocks, or the roots of trees are preſent, and in correcting the depreſſion of the ſhare from any ſudden obſtruction, as alſo in bringing it quickly into work again, when thrown out towards the ſurface. It is however believed on the whole, by the writer of the report juſt mentioned, that in comparing two extenſive diſtricts, one of which is managed with wheel-ploughs, and the other with thoſe of the ſwing kind, taking every deſcription of ploughmen that are met with in them, the wheel-ploughs will be found to have the advantage in point of neatneſs of work.

But the great weight of the carriage parts for the wheels, and the time and trouble which they require in adjuſting and fixing them, are great objections to the uſe of this ſort of plough in moſt caſes, and particularly for the general purpoſes of huſbandry.

Therefore, in the forming of all ſorts of ploughs, the leſs they are encumbered with machinery of the wheel or other kinds, the more *uſeful they will probably be found.*

All around Kelvedon, in the county of Eſſex, it is ſtated in the agricultural ſurvey of that diſtrict, that they make uſe of both ſwing or foot, and wheel-ploughs, and that it is much diſputed which is preferable. In favour of the ſwing-plough, it is contended that it is better calculated for fallowing, as the ſoil can be broken up to a greater depth, and it does not riſe at the headlands, which is the caſe with the wheel-plough; the ends of the furrows being ſhallower, from the wheels, as ſoon as they get upon the headlands, throwing the ſhare up. The ſwing, or foot-plough, is eaſier of draught, the prime coſt is leſs, and it is kept in repair at a ſmaller expence.

The wheel-plough, on the other hand, keeps a more regular depth, and will turn a ſhallower furrow, when the fallows are put upon the ridge, or formed into ridges; the work can be done with more regularity, the wheels being put out to the exact width at which furrows are to be made; this is of material conſequence. And further, wheel-ploughs about the above place, can be worked when ſwing ones will choak on ſtubbles, and they are varied in *pitch* with more exactneſs, as well as go deeper than the others; but ſwing-ploughs are better, if the land be at all wet.

It may be noticed, however, that when the men are accuſtomed to ridge-ploughing, they will do it as well with the ſwing or foot-plough as with the wheel, but they cannot block up hard land in the ſummer ſo well with it.

And in reſpect to the depth of this ſort of work, ſome contend that very deep ploughing can hardly be effected without the aſſiſtance of wheels to the ploughs. Beſides, if the land is to be broken up for fallow late in the ſpring, and the ſoil comes up in large blocks, which is ſometimes the caſe in wet land and late fallowing, the ſwing, or foot-plough, is apt to be thrown out of the furrow, and does not perform its work ſo well as the wheel-plough.

It is found a matter of great importance in the conſtruction of the ſwing-plough, that the beam ſhould have the length of about ſix feet, or ſix feet and a half. The rule or reaſon for which, according to Mr. Arbuthnot, is that the line of traction from the tug at the horſe's ſhoulder to the centre of gravity and reſiſtance, is a little behind the point of the ſhare.

In the Rural Economy of Yorkſhire, after noticing the ſimilarity of the principles that are requiſite in the conſtruction of the ſhip and the plough, and conſidering the difficulty of fixing and reducing them to a regular theory, as nearly the ſame, it is obſerved, that the art of conſtruction in either caſe is principally attained by practice. In this diſtrict, ſays the writer, the ploughs of different makers paſs through the ſoil, with various degrees of facility and execution; nevertheleſs, though he has paid ſome attention to the different makes, he finds himſelf entirely incapable of laying down ſuch particular rules of conſtruction as would do his country any ſervice, or his work any credit. Even the general principles of conſtruction he muſt mention with diffidence.

The great difficulty in the conſtruction of a plough is that of adapting it to all ſoils, in all ſeaſons, and to all depths. If the ſoil break up in whole furrows, every inch of depth requires, in ſtrictneſs, a ſeparate plough, or a ſeparate regulation. Here reſts the main objection to the winding mould-board, which admits no regulation in reſpect of depth. If the ſemi-arch, or hollow of the hind part of the mould-board, be raiſed ſufficiently high to turn a thick furrow completely, it is of no uſe in turning a thin one. On the contrary, if it be brought down ſufficiently low to turn a ſhallow furrow properly, it is impoſſible to turn a deep one with it in a workman-like manner. There is not room for it within the hollow, or ſemi-archway of the mould-board. The inevitable effect of this is, either the furrow is forced away wholly by the upper edge of the mould-board, and ſet on edge; or the mould-board rides upon the furrow, raiſing the heel of the plough from the ground, the bad effects of which need not be explained. An upright ſtern, with a moveable heel-plate to turn the furrow at any given depth, is, in this point of view, much preferable to a hollow mould-board; and if its uſe in raiſing a creſt of mould, for the purpoſe of covering the ſeed, be added, its preference is ſtill more conſpicuous. But ſome of theſe inconveniencies have been obviated by the invention of moveable mould-plates, as will be ſeen afterwards.

Yet in the conſtruction of all ſorts of ploughs, there are, notwithſtanding, a few points or circumſtances that ought to be particularly, and in all caſes attended to; ſuch as the following: that part which perforates the ſoil, and breaks it up, and which is uſually termed the *throat* or *breaſt*, ſhould have that ſort of clean, tapering, ſharpened form, that is introduced with the greateſt readineſs, and which affords the ſmalleſt reſiſtance in its paſſage through the ground. According to ſome, this part ſhould be long and narrow, making an acute angle with the beam, as the length of the breaſt is ſuppoſed to have a tendency to preſerve the *flag* from being broken, on account of the ſurface for its ſupport being longer; which is a circumſtance of conſequence in the ploughing of old lays for wheat, peaſe, and other ſimilar crops; as, by ſuch means, the growth of weeds through the broken ground is prevented. And the reſiſtance of the earth againſt the breaſt is likewiſe leſſened, in proportion to the acute angularity of that part againſt the beam of the plough. The mould-board ſhould alſo have that ſort of curved, twiſted, or hollowed-out form, which is beſt calculated to leſſen reſiſtance, and at the ſame time give the furrow-ſlice the proper turn. And the beam and muzzle of theſe implements ſhould likewiſe have ſuch a conſtruction, as that the team or moving power may be attached in the beſt and moſt ſuitable *line of draught*, as this is a circumſtance of great importance, when ſeveral animals are made uſe of together, that the draught of the whole may coincide in the moſt perfect manner, and with the utmoſt exactneſs.

Likewiſe, in the conſtruction of every ſort of plough, much regard ſhould be paid to the weight, ſo that they may have ſufficient ſtrength for the purpoſe, without being unneceſſarily heavy. Much may be done in this intention, by leſſening the quantity of wood in thoſe parts where there is no particular ſtreſs, while it is retained ſo as to have full power in the others. This has been much leſs attended to in the making of ploughs than its importance would ſeem to demand.

It is noticed in the Agricultural Survey of the County of Eſſex, that the *throat* at the fore end or neb of the plate or breaſt in the Norfolk, and moſt other ploughs, with the exception of the Rotherham, riſes from the upper ſurface of the ſhare too perpendicularly, and too much at right angles to the line of friction, or preſſure of the earth the plate has conſtantly to act againſt: working thus abruptly in the ground, the ſlice or furrow is violently torn, or burſt from off the ground hand, broken and imperfectly turned over, inſtead of being gradually cut, raiſed whole, and whelmed over; as will always be the caſe, when the plough enters the ground obliquely, and at a proper angle; and that the plate or mould board is properly turned for raiſing up, and turning the ſlice completely over.

It is a clear poſition, proved by experiment, that a ſemiellipſis is the true form of throat which is neceſſary in ploughs, which is the part or ſpace from the ſhare point to the junction or approach of the breaſt to the beam: and that there is found a remarkable variation in the form of the *breaſts*, or mould-boards of the ploughs throughout the northern parts of the ſame diſtrict, and which is chiefly in the degree of concavity or convexity. Some wheel-wrights and farmers prefer a form rather concave, a flatneſs in the fore part, which joins the ſhare, and which gradually fills up as the ſweep recedes; others like it neither concave nor convex; and there are many ploughs in which the convexity is extremely great.

The great length of the breaſt, in ſome ploughs, is a circumſtance which gives ſteadineſs to the implements; but, at the ſame time, it is probably the means of increaſing the draught to the horſes in a great degree.

The ſhortneſs of the breaſt, if the curve or ſweep be in perfection, or wears equally every where, may leſſen friction, and certainly does, if the earth be looſe; but it probably may not have the ſame effect in the firſt earth, upon a ſtiff layer. It is, however, a pretty general opinion, that it leſſens it in all caſes.

A great variety of breaſts, of different forms and conſtructions, are repreſented in the plates upon ploughs, in the Agricultural Survey already referred to, which are well worth conſulting by the inquirer on this ſubject; and in the ploughs which are given here, there is alſo a very great diverſity in the ſhape of the ſame part, as will be ſeen by attending to the figures of the different plates.

Some cultivators in this diſtrict uſe a breaſt which is very convex, and contend that ſuch a degree of roundneſs and fullneſs in the boſom is neceſſary on heavy lands; alſo, that the ſoil ſticks adheſively to the plough, if it be not thus rounded all the way; as well as that it turns the furrow better.

On the great variety of the breaſts of ploughs, which appear in the plates of the above Survey, all of which are more or leſs diſtinct and different from each other, it is obſerved that they will all, on certain ſoils, and moments or times of tillage, make very good work; but it does not hence follow, that the form is a matter of indifference: ſuch a concluſion would be very erroneous. There is a conſiderable difference between a breaſt paſſing freely through the ſoil without loading, and driving the earth before it, or preſſing it after the furrow is turned, and another that has either of thoſe faults, not viſible perhaps in the work when finiſhed, but to the great fatigue of the horſes. In the conſtruction of the plough, as has been already ſeen, there is not a point of more importance.

One of the moſt extraordinary circumſtances in theſe breaſts is, that of their all, with the exception of one, having more or leſs convexity, and in many, as has been ſeen, to a very extraordinary degree, eſpecially in thoſe about Birchholt and South-End. But in that furniſhed by his excellency Mr. Jefferſon, the late preſident of the United States of America, and which was ſent to the Board of Agriculture, and firſt tried by C. C. Weſtern, eſq., at Felix Hall in this diſtrict, the formation was made on the idea, that as the bottom cut of the furrow is, or ought to be, perfectly *flat*, the breaſt, which comes in direct contact with it, ſhould be flat alſo; ſo that there ſhould be no diſpoſition in the mould to ſink into any depreſſion or concavity of the breaſt; nor any projection from a right line in the breaſt, to preſs or force into the furrow-ſlice, as it is turning. The idea is new and excellent: but what, on ſuch principles, can be ſaid to the convexity in ſome inſtances, the ſhape in the breaſts of which muſt conſtantly have a tendency to *groove* that furrow-ſlice, from preſſing in the centre. It ſhould ſeem as if this muſt, on every principle, be erroneous. The retaining of it, in the caſe of Mr. Ducket's plough, is ſuppoſed, more apparently than really, an exception, in conſequence of the ſoil he had to work on, as it was invented for a very looſe ſand only; and on ſuch a ſoil the ſtraight breaſt is much more admiſſible than on any other.. This plough was ſeen at work on his farm many years ago, and it made excellent work: the convex *addition* to the flat ſurface, on the lower part, was probably made to divide the weight of the moving ſand, and to keep enough of it in a due degree of elevation.

The objection to ſo much concavity or flatneſs in the fore part of the breaſt, as appears in that ſupplied by the American preſident, is that of the looſe earth of the furrow *loading* there, which in ſome caſes it is very apt to do.

Another point in which the ploughs here, as well as in other places, ſeem to be deficient, is in the height of the breaſt from the ground: they are, for the moſt part, too low behind; they ſhould be, therefore, ſomewhat raiſed in this reſpect. In turning over a furrow of looſe mould with rolling clods, the hind corner of the breaſt ſhould be high enough to ſweep them over, but without preſſure.

In the next place, that part which is called the plough-heel may be examined, which compriſes the poſition of the breaſt behind, and forms, together with the end of the *reſt*, that wedge which fills up the furrow. There are two principal queſtions, it is ſuppoſed in this diſtrict, in relation to the form of it:—What ought to be the breadth at bottom, or, more properly ſpeaking, the heel? and, what ſhould be the breadth at top? Some think the heel ſhould not be more than ſeven inches wide at bottom, which is the common width in ſome places. In examining the ploughs, in ſome caſes, it appears that the breaſt cloſes at the heel gradually, being a termination of that convexity of breaſt, of which ſo many farmers in this diſtrict are fond. Improvements have been made, in which this narrowneſs at the heel has been retained, without the convexity *before*, and but ſlightly behind. Some ploughs are found to be faulty at the top of the breaſt behind: it overhangs the furrow too much, and ſeems to the eye to be in a poſition to *preſs*.

In concluding the ſubject, it is remarked, that when the ploughs in a ſingle county can vary ſo much in the breaſt, or earth-board, and that in a diſtrict, too, not at all remarkable for diverſity of ſoil, which might call for conſiderable variations, it muſt afford a ſtrong proof how very undetermined the true mechaniſm of this moſt neceſſary of all tools ſtill continues to be. And this, it is contended, ought to excite the endeavours of every ſcientific farmer to multiply experiments, to reduce the conſtruction to plain and fixed principles.

In regard to the *pitch* of ploughs, it is noticed, that in the operation of working wheel-ploughs with improperly turned plates, or mould-boards, it will frequently happen, from the reſiſtance produced againſt the plough by ſtones, the tenacity or compreſſion of the earth, that they are obliged to be let down below the correſponding line of level, ſo materially neceſſary to the equal bearing between the pitch of the plough, and to the inclination which is thus given to the point of the ſhare downwards, and which ought always to be, as nearly as poſſible, in a line drawn parallel to that of the draught, and with the breaſt-work, which forms the fulcrum for the beam to reſt on. When a plough is ſo conſtructed, and ſet to work, that it bears unequally in theſe points, the end of the ſhare will be rooting or digging with its point downwards, kicking up and ſideways at the heel, and rendering it utterly impoſſible to plough the ground clean, or in anywiſe to lay the work uniform, or even in a tolerable manner; notwithſtanding an exceſſive and unneceſſary degree of labour is thereby produced to the ploughman and horſes. This deſcription is not ſo very clear, but there can be no doubt that not going cloſe at the heel is a very common fault in wheel-ploughs, and often ſeen in Norfolk, as well as in other counties, in caſes in the former, which have not the leaſt reference to the breaſt; and it is a juſt obſervation, that the horſes ſuffer much by it. The draught-chain in ſome ploughs, which draws by the hammer, between the coulter and the tuck, is not ſo parallel with the horizon as it would be, were it thrown more backward, which is the caſe in other tools of this kind, and forms a much better poſition.

In each of the above deſcriptions of ploughs there are ſeveral varieties in common uſe in different diſtricts of the kingdom; but it is only neceſſary here to deſcribe ſuch as have been found to anſwer in the moſt perfect manner in practice.

In the *ſwing* ſort, thoſe moſt in uſe are the *Rotherham* plough, which is a light uſeful plough for all the leſs heavy ſorts of ſoil, and which, probably from its neat ſimple conſtruction, is in more general uſe than any other, eſpecially in all the more northern diſtricts of the kingdom. It has certainly much ſuperiority where one plough is only required, and where the advantageous and economical method of performing the work with one man and two horſes without a driver is had recourſe to. It is in much eſtimation in all the Weſt Riding of Yorkſhire, and is ſaid in the Survey of that diſtrict to have been invented by Mr. Joſeph Foljambe, of Eaſtwood, about ſeventy years ago. As conſtructed in that part of the iſland, the dimenſions are as follow:

	Feet.	Inch.	
From the end of ſtilt on landſide to the point of the ſhare -	7	4	whole length.
From the end of beam where inſerted into it to ditto, of ditto	3	0	
Length of beam - -	6	0	
Width of the head in the wideſt upper part - - -	1	4	
Ditto of ditto at loweſt part -	0	9	bottom working ſurface.
Ditto of ſhare behind the wing -	0	$3\frac{1}{2}$	
Length of ſurface on which the plough touches the ground -	2	$10\frac{1}{2}$	
Height from ground to top of beam where coulter goes through - - -	1	8	
Width between ſtilts at the end	2	6	
Height of ditto from the ground	1	11	

Weight of wood and iron work, about $1\frac{3}{4}$ cwt.

And it has alſo a copſe rack, or hock with teeth, to admit of more land being given to the plough, or the contrary, which is particularly uſeful in many caſes.

It is noticed, that with a few trifling alterations it is made uſe of over the whole diſtrict, and from that being often called the *Dutch* plough, it is ſuppoſed to have been originally brought from Holland by the inventor.

But ſince its introduction it has received various improvements by different cultivators. In Mr. Bailey's attempts upon it, the mould-board, which is of caſt-iron, is ſo formed, that the ſod to be raiſed preſſes equally againſt it, in every part, from the ſock point to the place where it leaves it; and it varies from other mould-boards, in not beginning to take its riſe from the bottom of the heel, but at leaſt twelve inches farther forward towards the ſock, and in being cut away at the bottom oppoſite the heel, about three inches high, from the ſole, by which the turning of the ſod or furrow-ſlice is ſaid to be much facilitated. Thus improved, theſe ploughs have been found to anſwer perfectly in different trials, and have been allowed by thoſe who have ſeen them at work to go with more eaſe to the teams than thoſe of any other conſtruction.

And it has been ſuppoſed that the beam, from its crooked form, which is obvious in ſome of its improvements, by being fixed ſo low down in the part next to the handles, makes the plough require leſs force, and to go in a more ſliding manner. And that from the fore end of the beam being ſo much higher than the hinder part, the holder of the plough has more power, as the draught does not oppoſe ſo much reſiſtance to him; for if the beam were fixed to the handles much higher, as is uſually the caſe in other ploughs, this plough would be conſtantly rippling on the point, and in that way increaſe the weight of draught. And where it meets with any reſiſtance, ſuch as a ſtone, it is liable to riſe up, while in this form it proceeds in a ſliding manner, which affords a ſteadier motion, and renders it more eaſily held. Beſides, it is much ſtronger; as in the part where the left handle and the beam are joined, underneath the mortiſe where the tenor of the beam, by which the bearing of the ploughman on the handles does not in the leaſt affect that part, which in other ploughs is the weakeſt. In this improvement of the Rotherham plough, the mould-board is ſo conſtructed at the breaſt as to have a ſlight degree of convexity, inſtead of being concave, as is often the caſe, by which the furrow-ſlice is ſuppoſed to be prevented from ſlipping down ; and by the keeping the lower part from the ground, when it comes to the turn of the breaſt, it falls off ; conſequently, as the furrow-ſlice has reſted on or by the ſide of the breaſt, when the plough has advanced twelve inches the work is finiſhed. By this improvement it is ſuppoſed that the plough will turn a furrow of any extent, from four to eighteen inches, where requiſite, and the ſame in depth ; as the plough that will produce a wide furrow and turn it well, is capable of ploughing deep : the convexity of the breaſt alſo cauſes it to clean itſelf better, which is a deſirable property, as it is thereby rendered leſs heavy, and leſs reſiſtance afforded by one protion of earth being prevented from rubbing upon another, and at the ſame time the work performed in a more perfect manner. The coulter has likewiſe a poſition ſo as to cut in a ſlanting manner, which cauſes any reſiſtance to riſe up more expeditiouſly, and the land to be opened with more facility than where it has a more perpendicular direction.

It may be noticed, that where this improved plough is employed with more than two horſes abreaſt, the additional ones muſt be put before the pair, as it has not land enough to follow ſingle horſes.

Thus improved, it has the excellent property of being ſmall and light, while it is ſufficiently ſtrong to reſiſt any power that may be applied to it. It is capable of ploughing any ſort of land, and in larger proportion than any other except the Norfolk and Suffolk ploughs. The chief improvements which have been effected in the form of this plough, are ſtated to be in the breaſt, and in fixing the beam to the handles or ſtilts. There is alſo a cock, or a ſort of crank, fixed by a ſcrew and nut, ſo as to keep the ſhare in its proper ſituation when the plough is drawn backwards.

A repreſentation of an improved plough of this kind may be ſeen in *Plate* XXX. *Agriculture*, on *Swing-ploughs*, at *fig.* 1.

Wheels have ſometimes been added to theſe ploughs as a ſort of improvement for particular purpoſes ; and with either one or two fixed near the points of the beams, without any carriage parts, they have been found to paſs through the ſoil in a very light, eaſy, and ſteady manner, and where there are two wheels, to require no holder in many caſes, except in ſetting in turning out of the work at the ends of the ridges. As ſwing-ploughs, they are probably, however, capable of the moſt general application.

The *Northumberland* or *Cumberland* plough is an improved plough of this nature, which is held in very high eſtimation in moſt of the northern diſtricts, and which performs its work in a very excellent manner, being light, and of little draught. It ought to be much more generally employed than is at preſent the caſe on moſt kinds of ſoil.

Small's Chain plough is another plough of the ſwing kind, that is a very uſeful implement, and capable of very extenſive application. It has its name from that of the inventor, who conſtructed it about forty years ago. It is neatly formed, and very light in its appearance, but at the ſame time, from the addition of the chain, poſſeſſing great ſtrength. It is, therefore, capable of being employed in ſtrong rough ſorts of ſoil, where other ſorts of ploughs are liable to be deſtroyed, as when the ſhare, or even the coulter, in this implement, meets with any ſudden impediment or obſtructing cauſe, the ſtreſs is immediately thrown upon the chain inſtead of the beam. The ſock is alſo formed with a fin or feather, by which the firm earth in the bottom of the furrow is cut and moved more readily, and in a more complete manner than could be done by the ſock in the common plough. In this plough the mould-board is moſtly made of caſt-iron, having a gentle curve, by which the furrow-ſlice is thrown off with the leaſt poſſible reſiſtance. It is ſuppoſed by Mr. Donaldſon to be on the whole one of the beſt conſtructed ſwing-ploughs for all ſorts of ſoils, in a proper ſtate of cultivation, in common uſe in the iſland. It is capable of ploughing, with one man and two horſes yoked abreaſt without any driver, more than an acre a day with the greateſt eaſe. An improved plough of this ſort is ſhewn at *fig.* 2, in the ſame plate on ſwing-ploughs.

The *Somerville* plough is alſo an improved plough of the ſame ſort, in which the throat has a more clean ſharpened form, and the mould-board is rendered moveable in the manner that will be noticed in ſpeaking of the *Double Furrow* plough. It is capable of being made uſe of with advantage in breaking up deep ſtiff ſoils, as from the moveable nature of the extreme part of the mould-board the furrow-ſlice can be laid more or leſs flat, according to the particular circumſtances of the caſe. It is conſequently capable of a pretty general uſe in moſt ſorts of ſoils.

This ſort of improved plough is repreſented at *fig.* 3, in the ſame plate on different kinds of ſwing-ploughs.

The *Suffolk Iron Swing-plough* is another plough of this claſs, which is found uſeful in different caſes. It was, according to the author of the Agricultural Report of Suffolk, improved by an ingenious blackſmith in that diſtrict of the name of Brand, and made wholly of iron. It has been found to anſwer well in practice, in ſuch lands as are of a ſtrong heavy tenacious quality, and where much obſtruction is afforded by the roots and fibres of different ſorts of plants and vegetable productions. Its uſeful properties have been fully experienced in breaking up ſtrong heavy rooty lands on his majeſty's farm in the Great Park at Windſor, according to the author of the Agricultural Survey of Berkſhire, as it performs its work not only with more facility, but in a better manner than moſt of thoſe ploughs that are made uſe of in ſuch deſcriptions of land. The cops by which it is drawn are ſaid to have been conſtructed by Mr. Brand, and are extremely well contrived for the purpoſe.

An improved plough of this deſcription is ſeen at *fig.* 4, in the plate on ſwing-ploughs.

Ducket's Skim-coulter plough is another very uſeful implement of this ſort, which is capable of being employed with great advantage where the ſurface is coarſe or graſſy, in order to bury it to ſuch a depth as may prevent any inconvenience from its riſing to injure the crops that may be ſown upon ſuch lands. The principle upon which this plough operates is extremely ſimple, and of courſe of a very uſeful nature, being merely taken from that of trenching ground in the practice of gardening, or that of depoſiting the ſurface ſpit of earth in the bottom of the preceding furrow, and placing the ſecond, or that taken from below, upon it, by which means it is evident that that which was firſt turned down remains in a ſtate of decay, without any riſk being incurred of the graſſy material riſing ſo as to produce inconvenience in the operations that may be going on upon the ſurface. It is capable of performing its work to a conſiderable depth, where the ſoils are ſufficiently deep for the purpoſe.

And it has been remarked by lord Somerville, in a little tract on ploughs and oxen, that the ſkim requires a perpendicular direction, and that the coulter-hole ſhould be removed further from the throat and ſhare, as in the common poſition it would choak when in work.

By this ſort of plough the ground may be opened to any depth in ſeparate horizontal portions of earth ; and as the weeds or graſſy ſurface are turned down in the firſt operation, and covered by freſh earth or mould from beneath, a larger proportion of nouriſhment is ſuppoſed to be provided for the crop, while at the ſame time it is rendered more clean, and the inconvenience of the roots of the graſſes or other plants wholly got rid of. It requires a ſtrong team in the heavier ſorts of ſoil, but this is in ſome degree counterbalanced by the circumſtance of one ſuch ploughing being moſtly ſufficient for the crop. It is conſequently evident, conſidering the number of ploughings generally given in the ordinary way of preparing lands for a crop of barley or turnips, and under the following ſyſtem for wheat, and the labour and expence in the latter caſe, in raking, picking, and burning weeds, that the advantages of this plough are probably greater than are generally ſuppoſed. It has alſo advantages in another point of view, which are, that the ſoil is increaſed in depth, and the parts of it ſo looſened and broken down, that the fibrous roots of the crops ſtrike and extend themſelves more readily in it, and of courſe are better fed and ſupported. The noble writer juſt mentioned thinks, that in thin and ſandy ſoils it is more particularly uſeful, becauſe it cuts off all which is on the ſurface, at the depth of an inch, or an inch and a half, in order to its being laid in a ſtate of decay for a future crop, by which an increaſed depth of ſoil is given to every ſubſequent courſe of crops, and which aften acts as a pan or ſupport, to keep up manures in circulation, as their running through ſuch ſoils too quickly is conſidered a great misfortune and diſadvantage in ſuch ſoils.

A figure of this valuable implement is given in the plate on ſwing-ploughs, at *fig.* 5.

Beſides, it is alſo capable of being made uſe of without the ſkim-coulter as a common plough. When well made, it coſts from three to five pounds.

And there is a ſort of plough of this nature which has a double ſhare, the one being fixed directly over the other. It is made uſe of in ſome of the ſouthern diſtricts with advantage, in putting in one crop immediately after another, as by it a narrow ſhallow furrow is removed from the ſurface, and another from below placed upon it, to ſuch depth as may be thought moſt proper, it being capable of acting to ten inches or more. In this manner many ſorts of crops, ſuch as rye and other green crops that have much height of ſtem, may be turned down without any inconvenience of any of the parts ſticking out through the ſeams of the furrow-ſlices, by which the farmer has a clean ſurface of mould for the reception of the grain.

Another plough of this ſort, which differs much in the nature of its conſtruction, having a ſtrengthened coulter, and an application of lord Somerville's mould-board made to it, is not unfrequently made uſe of in ſome of the ſouthern diſtricts of the kingdom.

This very uſeful form of ſkim-coulter plough is indeed much had recourſe to in the neighbourhood of Ingateſtone, in the county of Eſſex. And a further variety of this kind of plough is made uſe of in ſome parts of Oxfordſhire. Mr. Kimber, of Little Tew in that county, both makes and employs this ſort of tool, and finds it to be extremely uſeful for certain purpoſes. The ſkim in this implement is fixed to a fore coulter, by which means it is found to do the work much better, than when attached to the common coulter, in which way ſome have found that it could not work well at all. Upon hollow land, it is, however, not at all approved of, as ſlicing the ſurface of ſuch ground is ſuppoſed by Mr. Kimber to be much worſe than turning it over in the uſual manner, and letting the ſurface-vegetables be laid into the diagonal poſition, with an edging of them ſticking, perhaps, out of the ſeams. But it is ſuppoſed by Mr. A. Young, that in this notion Mr. Kimber is in an error; as he contends that the vegetable growth upon the ſurface is to be rotted in ſome way, for it is ploughed in in every mode of tillage, and the only queſtion is, how to rot it in ſuch a manner as ſooneſt to convert it into the food of plants, ſo as they may be able to avail themſelves of that food. This ſurely is the means of leſſening, in the greateſt degree poſſible, that additional hollowneſs which muſt be cauſed in a meaſure, plough it in how you will. The furrow of common ploughing four, five, or ſix inches, is ſo ſhallow, that the warmth of the ſun, the moiſture of rain, and the influence of the atmoſpheric air, act to the bottom of it, and will convert vegetable ſubſtances into gaſeous matter ſooner than if expoſed to the immediate action of the ſun and air, which in all dry weather preſerve them, and muſt occaſion a greater hollowneſs than in the other caſe, in which they are ſooner conſumed. And further, the great ſucceſs which has attended the ſyſtem counter to that of Mr. Kimber, could not have taken place if his theory was juſt. Good farmers, when they ſkim-plough, or common plough hollow land, will adapt the operation to the ſoil the crop is to be put in, and the ſeaſon of tillage; and by theſe means provide a remedy for the expected evil: but this is as clearly applicable to a ſkim as to no ſkim at all.

This ſkim-coulter plough does not anſwer in ſome management, or where the ſoil is of a flinty nature, but ſtill many farmers in this diſtrict approve of it highly; and ſome think it excellent, eſpecially for ploughing turnip land for barley, when the weather and treading have made it a little ſtiff, alſo, if the fallow for turnips has become a little weedy; but do not uſe it on layers for wheat, as they plough their lays for that crop deep. Particular farmers, however, find that it makes neat and perfect work on clover lays for wheat crops, not going more than three or four inches deep, and yet ſkimming off ſufficient to bury every thing, and leaving the ſeams without any vegetable growth to be ſeen. Shallow ploughing clover land for wheat, is thought eſſential on theſe ſtone-braſh ſoils.

There are ſtill ſome other modes of conſtructing theſe kinds of ploughs, as may be ſeen in the Eſſex-corrected, and ſome other Reports of the Board of Agriculture.

There is alſo a very great difference in the conſtruction of the common ſwing-ploughs of this diſtrict. The *ſwing-plough* with an improved breaſt, which is employed by Mr. Weſtern, is of a very beneficial kind, and is held in much eſteem in ſeveral different places.

About South-End, in the ſame county, they have alſo a *ſwing-plough*, which is pretty generally in uſe, but which has an uncommon degree of convexity in the fore-part of the breaſt.

And a very good *ſwing-plough*, which has an extremely effective addition for the purpoſe of keeping the coulter fixed ſteadily in its place, has been long in uſe upon all the eſtates of the late lord Petre.

The *Miner* is an implement of the plough kind, that is very uſeful for the purpoſe of looſening the ſoil to a great depth without bringing it up to the ſurface, a mode of operation which is particularly uſeful for various ſorts of tap-rooted plants, as well as for extirpating the roots of ſuch weeds as ſtrike deep into the ground. For theſe purpoſes it may be employed in the bottom of the furrow after the common plough. It is conſtructed in a very ſtrong manner, having only a ſhare without any mould-board.

The *Beverſton* plough is another ſort of uſeful tool of this kind, which was invented by Mr. Tugwell, and has been employed in ſome diſtricts in the more heavy kinds of land. It has its principle of draught given it in a very effective manner by an ingenious contrivance of iron work, in which, according to lord Somerville, the point of draught is *perpendicularly* above the *point* of *action*, or the throat or breaſt where the ſhare fits on. A plough of this nature is ſhewn in *Plate* XXXI. *Agriculture*, on *Wheel-ploughs*, at *fig*. 1, in which its dimenſions are as follow:

		Ft.	In.
	From 1 to 3	6	0
	3 — 4	3	8
	3 — 5	4	3
	5 — 6	2	5
	7 — 6	2	8
	1 — 3	1	5
	1 — 8	2	10
	1 — 9	4	8
Heel to tuck-hole of ſhare -		2	6½
Tuck-holes to point of ſhare -		0	8½
	a — *b*	2	4
	d — *e*	2	5
	c — *d*	1	4
	d — *e*	2	5
Diameter of wheel - -		1	9
	d — *f*	0	11
	g — *h*	0	10½
	e — *i*	1	0¼
	k — *l*	0	9
Breadth at heel - -		0	9
Breadth of fin - - - -		0	7
Top of beam at heel to ground - -		0	8½
Mould-board projects at top more than breadth at heel - -	-	0	6

The *Double Furrow* plough is a kind of implement of this ſort, which has, at leaſt in its improved form, been found highly uſeful and advantageous. Ploughs of this ſort have been conſtructed in various ways, as with a double beam, and with a ſingle beam only, which is the manner in which they are uſually made at preſent. But the moſt improved plough of this nature is that conſtructed by lord Somerville, and for which he has taken out a patent. It is advantageous in performing more labour in a given time with a certain ſtrength of team, than other ſorts of ploughs, as producing two furrows at a time. It has been found uſeful on the lighter ſorts of land where the ridges are ſtraight and wide, though ſome think it more confined in its work than thoſe of the ſingle kind. A principal advantage in which it excels other ſorts of ploughs, is in the ſaving of the labour of one perſon, and in doing nearly double the work with but little more ſtrength in the team, in the ſame time. It is remarked by his lordſhip, in ſpeaking of this ſort of plough, in the ſecond volume of Communications to the Board of Agriculture, that the clean and ſharpened conſtruction of the breaſt and throat will warrant their breaking deep ſtiff land with infinite ſucceſs; in this caſe the coulters ſhould be ſet nearly ſtraight with the throat and ſhares: in croſs ploughing, or ſtirring, they may be ſet three-quarters of an inch towards the land, by which greater diſpatch will be obtained in ſeed time. Should they carry too deep a furrow, the correction of their ſhares is obvious; ſhould they hug too much to the land, or go unſteady to the ploughman, it muſt abſolutely proceed from a want of ſetting them true, relatively to each other, and from an undue regulation of the cops; here a nice attention is required: their power alſo of cutting a furrow level at the bottom ſhould afterwards be proved on a level floor. The want of this practice in the maſter has condemned many a good plough, when the fault was in the ploughman only. It may ſuggeſt itſelf, that two-furrow ploughs are unfit for hilly ground, but the very reverſe is the caſe. The effect of ploughing acroſs the inclined plane, or hill, is that of carrying the ſoil in time to the bottom of the field, which muſt be carted bodily up again at a great expence: let ſuch land be worked from the top to the bottom; let one furrow be carried with the hindmoſt or land ſhare up the hill, and two down, ſo will the power be apportionate to the weight with which it has to contend, and needleſs toil to the team will be ſaved. That power which was required to carry two furrows up would be ſuperfluous in carrying the ſame down the hill, and the effect will be as 3 to 4, that is, an acre and a half, inſtead of two acres *per* day.

A plough of this improved conſtruction may be ſeen in the plates on ſwing-ploughs, at *fig*. 6.

In regard to the improvement of theſe ploughs, his lordſhip obſerves, in his tract juſt noticed, that from the deſign, which repreſents a ſide view, it may be obſerved that, beſides the moveable plates, there are coulters, ſtays, &c. and how firmly the plough is put together, and how little waſte there is of timber and iron work. And after noticing its conſtruction in the breaſt ſo as to leſſen reſiſtance, it is added, that the double-edged coulter is formed alſo to produce this effect; in ſtrength and ſubſtance it is equal to the common or narrow coulter, and being leſs broad, preſents ſo much leſs for reſiſtance: when in work, the ſtay gives a ſteadineſs to it, the coulter being ſubject to frequent derangement, to correct which muſt occaſion frequent ſtops, alteration of the wedges, and loſs of time. And it is afterwards ſtated, that an economical and ſpirited ſyſtem of farming labour already prevails in ſome diſtricts; in none more eminently, with reſpect to ploughing, than in Eſſex, on both banks of the Tweed, in Suffolk, Yorkſhire, and Norfolk. Here it would be no object to invade the ſyſtem already eſtabliſhed, for innovation is not palatable to farmers; nor ſhould the firſt deep ploughing in Kent give way to any novel ſyſtem; there can be no better huſbandry: but, except for beans and tap-rooted plants, ſubſequent deep ploughings are injurious, both as to expence and effect. Dr. Hunter, in his Eſſay on the Roots of Wheat, points out the depth needful for the ſupply of ſeminal roots in wheat and wheat corn in general; that which is turned down then, in the firſt deep ploughing, ſhould be rotting for the ſucceeding crop. Let not the bottom know what the ſurface is doing! Here two-furrow ploughs, even admitting them incapable of carrying a deep furrow, which is far from true, muſt come into admirable effect, for a twofold advantage can be taken,—of the ſeaſon in ſowing, and the work being done at half the expence. But where men are chained down by long uſage, and perhaps, for the convenience of conſtant road work, to teams of heavy corn-eating cart-horſes, two-furrow ploughs become, he ſuppoſes, objects of extreme importance, becauſe their horſes will not feel the difference between their own ſingle furrow, working one acre, and the well conſtructed two-furrow plough, with two acres *per* day: here is no ſyſtem deranged, and double work done.

The counties of Leiceſter and Stafford have profited much by their uſe under theſe circumſtances, although their two-furrow ploughs, in other reſpects good, have never been ſo conſtructed in the throat and breaſt as to deſtroy the means of reſiſtance. Without doubt, obtuſity in theſe particulars muſt add incalculably to the weight, muſt break the furrow, and ſo ſpoil the work; moreover, let it not be forgotten, that removing reſiſtance not only diminiſhes the labour of the cattle, but is alſo of equal advantage in increaſing the ſtrength of the implement;—the reſiſtances with a well conſtructed, and with an ill conſtructed plough, in performing the ſame work, are as different as the reſiſtance of a well conſtructed king's cutter, and of a floundering Dutch merchantman, ſailing with equal velocity.

And the noble inventor adds, that in his own county theſe ploughs have met with a reception more favourable than could be expected in ſo ſhort a period. On the 16th of October, 1798, two-furrow ploughs were not thought capable of breaking up ley-ground, although in conſtant uſe for fallowing, but from their conſtruction requiring ſix oxen. On the 16th of October, 1799, a very large and reſpectable farming ſociety gave a premium for two-furrow ploughs, working ley-ground only. On the day following, in the preſence of many members of this ſociety, one acre and a half of ley-ground was broken up by four oxen, with infinite eaſe to themſelves, in three hours and fifty-five minutes, they having, as part of a conſtant courſe of work, ploughed ſeventeen perches ſhort of an acre of ley-ground the ſame morning: this was done to *prove* the *effect* of *moveable plates* at the extremities of the *mould-board*, that the furrows might be laid more or leſs flat; for mould-boards, formed to lay furrows in ley, ſo as to give the moiſt ſoil to harrows, cannot be of that form beſt calculated to make good work in ſtirring earths, more eſpecially the laſt, which ought to be thrown up in ſmall ſeams, as it were, that the ſeed may be duly buried. It has hitherto been held neceſſary to rip off the plate for this purpoſe, and drive in wedges, by which the mould-plate muſt be injured. From the trouble attending this operation, it has for ever been omitted, and the land, of courſe, imperfectly worked. But this inconvenience may be remedied, and the mould-board be adjuſted with great facility and expedition, by the following means: when the mould-board is formed, and its plate fitted as uſual, let the parts marked *a*, *a*, be cut off, and again connected with the fixed part of the mould-board by means of flat hinges, or of thin flexible plates of tempered ſteel, or of hard hammered iron, ſo as to admit of thoſe parts being ſet to have different inclinations with the fixed part of the mould-board: by means of two ſcrews paſſing from the inſide through the lower parts of the handle of the plough, oppoſite the backs of theſe moveable pieces *a*, *a*; thoſe ſcrews may be made to keep them at any deſired degree of inclination, according to the nature of the work to be performed. It is ſtated farther, that ley-grounds cannot be laid too flat, or ſeed-earths too much on an edge; and by this improvement of the mould-board the plough may be inſtantly adjuſted for either purpoſe: when theſe moveable parts are ſcrewed outwards, it will cauſe a proportionate convexity in the baſe of the furrow, and ſo give more earth to cover the ſeed. That plough which can give moſt mould to the harrow is the beſt for a ley crop. That part of the mould-plate that is marked with the dotted line *c c* being found moſt liable to wear, ſhould be made of a double thickneſs, that is, twice the thickneſs of a new crown-piece; it will then laſt nearly as long as the plough. The increaſed weight of draught, when theſe moveable plates were extended, did not appear, in a two-furrowed plough, to be by the cops more than twelve pounds, in ley-ground, at ſix inches depth. It is needleſs to ſtate the ſucceſs of theſe alterations; the friction in furrows required to be laid flat was leſs than could be ſuppoſed, probably not more in both furrows than from twelve to ſix pounds.

With regard to the moveable mould-plate, and its operation on the furrow. If the breaſt of a plough be obtuſe, the whole ſtruggle lies there,—there is the furrow turned, and the hindermoſt part of the mould-plate has little or nothing to do: the furrow may be well laid for one particular ſort of work, but the breaſt of the common plate can only be of one form, therefore can only turn one deſcription of furrow; and this muſt be done at an increaſed weight of draught: this is beyond all contradiction. In theſe moveable plates, the furrow is not turned until it reaches the remoteſt point of action, at a diſtance of two feet from the point where the furrow is cut off from the land. By the gentle and progreſſive turn of the mould-plate, the earth hangs balancing, as it were, in the air, and the ſlighteſt preſſure of the moveable plate lays it over. The principle of this plate is, as has been ſeen, to depoſit the furrow at any angle required, and to qualify it thereby for the different purpoſes of huſbandry. There is another principle in ploughing equally well eſtabliſhed; namely, that the baſe or bottom of the furrow muſt be cut level and true, or the ſurface of the work will be untrue, and the crop derive otherwiſe material injury. To effect this, the plough muſt go cloſe at heel, and upright in its work, therefore the furrow muſt aſſume one form only. A third principle equally certain is, that in ploughing ley-ground, or for ſowing on one earth, the furrow ſhould be laid far more flat than is adviſable in the laſt ſtirring or ſeed earth. As for barley, &c. hitherto, we have obtained one of theſe objects at the expence of the other. No two-furrow plough could, for an inſtant, make work, except in an upright direction; for if it did, the land or left ſhare would be buried too deep, and the furrow, or right ſhare, would be thrown out of work. But ſtill further the writer will be bold to ſay, that no ſingle-furrow plough, whether conſtructed in China, in France, or in England, has ever yet, or ever will be able to anſwer all theſe purpoſes, without the aid of a moveable plate; and therefore, however good for a limited purpoſe it may be, it cannot be called a perfect implement; it is incapable of doing all that is for ever required of it to do. It would be the height of folly and extravagance to conſtruct two implements where one would do. He therefore ſits contentedly in the conviction, that theſe plates muſt be reſorted to. And in many caſes, the moveable plate will probably ſuperſede the uſe of the turn-wriſt plough.

His lordſhip adds, that it cannot be deemed irrelevant to the ſubject, here to ſtate the reſult of a challenge given to the owner of theſe ploughs, to plough 24 days work ſucceſſively, on his majeſty's farm, either at Kew or Windſor, on the 10th of March. The challenge was accepted, and it is a matter of regret that this challenger did not venture to appear, although repeatedly urged to do ſo: becauſe a trial for ſuch a length of time, and between two breeds of cattle ſo diſtinguiſhed for their powers in labour, muſt, his lordſhip ſuppoſes, have thrown great light on a ſubject of ſuch importance to the farming world. That ſomething, however little, might be proved, his majeſty was pleaſed to allot the only piece of land then unſtirred, 17½ acres, ſtatute meaſure, which was ploughed by a two-furrow plough, four Devonſhire oxen, ſix years old, a man and a boy driver, in ſix days and a few hours: the oxen were in good order at the commencement of their work, and finiſhed it in higher order, as well as in fleſh, than when they began. This is a ſtrong fact; but numbers in the vicinity of London know it, and are ready to prove the fact. Theſe oxen, as is the cuſtom in their county, never taſted corn.

Mr. Perrott of Eveſham, ſpeaks of theſe ploughs as doing their work well, and as being on the beſt conſtruction he ever ſaw. And Mr. Weſtphaling of Radvale, near Roſs, in Herefordſhire, obſerves, that this plough certainly makes exceeding good work, and turns the furrows remarkably well. The time of its arrival was not the moſt favourable, as their ſoil, in general light and eaſy, is now, by the wet and ſun, caked, and works with great difficulty; notwithſtanding which, not one farmer but ſays it will be of great uſe in many inſtances. It is lucky for him that his ploughman likes it double, and is inclined to uſe it on all occaſions. Mr. Dougall alſo obſerves, that Mr. Shirely from Warwickſhire gives a good account of the double-plough; and ſees no difference between the draught of four horſes in the double, and his own ſingle-furrow plough; a circumſtance which has been noticed by others in ſome caſes.

With regard to the advantage of theſe ploughs, his lordſhip offers the teſtimony of another perſon, perſonally a ſtranger to him; his partiality, therefore, is to the plough itſelf; not to the inventor. He is not diſpoſed to draw abſolute concluſions from ploughing-matches, becauſe much may depend on accident; beſides that, exertions might be made for three hours, without much apparent diſtreſs, which nevertheleſs could not be maintained for three weeks, and ſo the public become miſled. Yet, as this match was much talked of, and many queſtions on the ſubject put to him, he wrote to Mr. Tweed to know the particulars: his tale is plain and unvarniſhed.

Mr. Tweed's land is ſtrong and ſtiff in quality, and not a turnip has been ſown there for more than twenty years paſt: it is what we term bean and wheat land. The practice of that country has been to allot 100 acres of land in tilth to four horſes; therefore let it be remembered, that the ſaving of expence obtained by the uſe of the two-furrow plough does not ariſe from a compariſon on lands, expenſively cultivated with four or five horſes, incurring a charge of twelve, ſixteen, or twenty ſhillings *per* acre; but in the county of Eſſex, and in the vicinity of Chelmsford, where it has long been a ſyſtem to work theſe ſtrong ſoils with two horſes and no driver: and where this art is allowed to be as well underſtood, and practiſed with as much ſkill and economy as in any part of Europe, Flanders not excepted. Mr. Tweed's account of the buſineſs in a letter to his lordſhip, is this: "In anſwer to the letter I have juſt had the honour to receive, I take the liberty of ſtating the experiments I have made with your two-furrow plough upon ſtrong land, as well as the reſult of the only match I have yet been engaged in. I put my firſt plough to work with three horſes and one man, againſt two of my own, and four horſes, held by two remarkable good ploughmen, who are very much averſe to any new implements: after exerting themſelves to the utmoſt every day for a month, upon clover lays, bean and pea etches, for wheat, they allowed, very much againſt their inclinations, that it performed the work beſt, which is entirely owing to the ſuperior form of the breaſt, and the great advantage derived from the moveable plates. This trial having perfectly convinced me that there is an abſolute ſaving of five ſhillings a day every day they are uſed, I ordered a ſecond, and ſoon after a third, and have ever ſince had all my work done with them, nine horſes, and three men, which before employed ſix ploughs, twelve horſes, and ſix men, cauſing a reduction of one-fourth the horſes, and one-third of the men, and is, in my opinion, one of the greateſt improvements that ever was made in agriculture, for which I conceive the public and myſelf highly indebted to your lordſhip. Being at Mr. Lovibond's rent dinner (the gentleman I live under), I made a propoſal to the company, who were all farmers, to plough, for a wager, two acres of any land with the two-furrow plough and three horſes, as well, and in the ſame time, as one acre could be ploughed by a ſingle one and two horſes. This was accepted by Mr. Gibling of Hatfield, and a field of his fixed upon that had been ſown with rye directly after harveſt, (ſtubble) upon a wheat etch, and being fed by bullocks and ſheep in wet weather, poached a great deal; and when the ploughing took place, was extremely dry and bound. A great number of ſpectators attended; at ſtarting, the odds were three and four to one againſt the two-furrow plough, as it was ſuppoſed not able to break up and turn hard work; after a fair conteſt, five farmers were appointed umpires, who were unanimous in their deciſion, that the two-furrow plough, having executed the work ſoundeſt and beſt, and in the leaſt time, was entitled to the wager.

Sandon, 1802. I remain, &c.

"In a ſecond trial, the ſweepſtakes were adjudged by the umpires to the double-furrowed plough of Mr. Thomas Little Tweed, of Sandon. A double-furrowed plough was allowed, by the articles, to have four horſes; but Mr. Tweed's was worked with only three, and ploughed two roods, not only in the beſt agricultural manner, but within conſiderably ſhorter time than the other common plough did their one rood." The noble writer adds, that in addition to this teſtimony he has only to ſay, that it has not been his ill-fortune to verify the old adage, which ſays, "a prophet is no prophet at home;" for theſe ploughs are ſpreading, with unexampled rapidity, over the county in which they originated: and at a very large meeting of farmers, held there lately, no ploughs of any other deſcription appeared, and the prize given by ſubſcription was contended for by theſe ploughs only.

It has been argued, that a two-furrow plough, with the double mortiſed beam, has an advantage over that of the curved ſingle beam, inaſmuch as, by a ſcrew, the beams can be brought nearer, or ſet more apart, for the purpoſe of cutting a wider or narrower furrow. In common ploughing, no great benefit was contended to reſult from this power, but in ſowing under furrow, great things were to be expected. Now let us look round, and ſee where the tillage huſbandry is reputed to be good, and ſingle-furrow ploughs in uſe, conſequently, the ſize of the furrow is optional; let us ſee whether the wide or the narrow furrow is preferred. We can in a moment inſtance the uſage of the country round Weſtham, in Eſſex, and Peterſham in Moulſey, in Surrey. In both inſtances the land is level and good, and the broadcaſt huſbandry very high in reputation, as their crops, on an average of years, are ready to teſtify. Here the ſeed is ploughed in at a ten or ſometimes at an eleven inch furrow. We are not, however, to eſtabliſh a general ſyſtem on two or three inſtances—twenty or thirty might, perhaps, be adduced; but they are worth, at leaſt, one aſſertion. It has been his determination to avoid, as much as poſſible, any compariſon of other implements with his own; but he may ſay, that he learns from one, who is as good a judge of huſbandry as any among us, and has compared the double-beam two-furrow with that of the curved ſingle beam in mortiſing and iron-work, and conſequent tendency to derangement, there is an abſolute difference of one horſe in four in favour of the patent plough.

And if land is inclined to be wet and ſtiff, the leſs trod it is, the better. Here Mr. Tweed's mode is to work three horſes, one on the land, and two in the furrow, one before the other, inſtead of three abreaſt; and it appeared by the regulation of the *cops*, that is, an iron ſcrew, acting through the end of the beam to regulate the depth of work, how little he has added to the weight of draught. It is almoſt needleſs to ſay, that the true point of draught ſhould be exactly in the centre notch of the cops; any deviation to the right or left can only be for the purpoſe of counteracting a falſe friction or preſſure, which muſt have added to the weight. The ſize of a furrow, provided it be of juſt proportions, is optional; that which he has preferred is nine inches and a quarter, and for every purpoſe of huſbandry he knows of none better. It will give as much mould, or 'crumb,' (as we term it, provincially) to the harrow, as any other furrow whatever: this is the beſt object in ploughing for a ley crop. If ley peas are to be ſown, every other furrow, at nine inches and a quarter each, there will be an interval of eighteen inches and a half between the rows; a diſtance as much approved of as any we know. At every third furrow for beans, the interval will be twenty-ſeven inches three quarters; at every fourth furrow, thirty-ſeven inches; and it muſt be allowed, that if any implement be attached to a plough for the delivery of pulſe, or white grain in drills, the upright poſition neceſſarily belonging to the two-furrow plough, when in work, will qualify it admirably for the purpoſe.

Upon the whole, theſe obſervations place the utility of double ploughs in a point of view, that ſeems to deſerve the notice of the practical farmer in a much greater degree than has hitherto been any where done.

Norfolk Plough.—This is a kind of plough, that is held in much eſteem in that, as well as ſome other light diſtricts, as performing the work in an eaſy and expeditious manner without any great ſtrength of draught. The carriage and wheels in all ploughs of this nature, however, form objections to them, and at the ſame time render them awkward, clumſy implements. An improved plough of this ſort is ſhewn in the plate on wheel-ploughs, at *fig.* 3.

The head and beam are ſhort; while the carriage part and wheels ſtand very high in this ſort of ploughs, of courſe the fore end of the beam is much elevated, by which, advantage is gained in driving the horſes or team, as it is uſually drawn by two horſes yoked abreaſt, the ploughman directing them by reins, by which there is a ſaving of one perſon in the buſineſs.

In the county of Eſſex, Mr. Rogers prefers the Norfolk plough, in two circumſtances, to the common wheel-plough of that diſtrict: the point of the ſhare is nearer to the points in the wheels, where they touch the earth, a ſhortneſs which, in his opinion, eaſes the draught; and the mould-iron or plate, as it is called in Norfolk, turns the furrow better.

The common Eſſex *wheel-plough* is ſaid, however, to be a very good tool of this ſort, and which is uſed extenſively all around the town of Kelvedon. It has the carriage part for the wheels ſomewhat in the form, and the beam raiſed up at the point much in a ſimilar manner to that in the Norfolk plough.

Kentiſh Turn-wriſt Plough.—This is another ſort of ſtrong plough, much uſed in the ſtrong heavy, flinty or rocky ſoils in that diſtrict. It is a very powerful implement in ſuch ſorts of land, but extremely clumſy, heavy, and awkward. The expence of it, when complete, is moſtly about five or ſix guineas. A repreſentation of it is given in the plates on wheel-ploughs, at *fig.* 4.

In the ſurvey of that county, it is deſcribed as conſiſting of a beam of oak ten feet long, five inches deep, and four broad, behind which is a foot five inches by three and a half, and three feet and a half long, on the top of which the handles are placed; the foot is tenoned to the end of the beam, and mortiſed at the bottom to the end of the chep. Through the beam, at two feet five inches diſtance from the foot, is a ſheath of oak ſeven inches wide, and one and a half thick, which is mortiſed into the chep in an oblique direction, ſo that the point of the ſhare is twenty-two inches diſtant from the beam. The chep to which the ſhare is fixed is five feet long, four inches wide, and five inches deep. The ſhare is of hammered iron, weighs about thirty-two pounds, is twenty inches long, and from four inches and a half to ſeven inches wide at the point. The upper end of the beam reſts on a carriage with two wheels, three feet two inches high. On the axle-tree is a gallows, on which is a ſliding bolſter to let up and down. Through the centre of the axle is a claſp iron, to which is fixed a ſtrong chain called a tow, that comes over the beam, ſo fixed, as by means of notches (or a pin called a check) to let the whole plough out a greater length from the axle, thereby letting it down to a greater depth.

A different kind of *turn-wriſt* or *revolving* plough has been lately invented by Mr. Lumbert, in which there are two ſhares, one of which at the end of each furrow, or every length of the field, turns round, and lays another flag by the ſide of the laſt, diſpoſing it all the ſame way, in a ſomewhat ſimilar manner to that which has been deſcribed above. Figures of this implement may be ſeen in the Corrected Report of Oxfordſhire.

And beſides theſe different ſorts of ploughs, there are various other kinds in uſe in different diſtricts, as the *Single* and *Two-wheel Plough*, both of which are good ploughs for particular purpoſes; but any of the light ſwing-ploughs, may be readily converted into wheel-ploughs ſimply by the addition of that apparatus.

Alſo the *Hampſhire Patent Iron Plough* is a very uſeful plough in ſome caſes. It is ſeen at *fig.* 2. in the plate on wheel-ploughs.

A plough has likewiſe lately been invented, in Berkſhire, by Mr. Berriman of Speen, which is denominated a *Preſſing Plough*, and which is held in much eſteem by many perſons, who have given it a ſufficient trial, eſpecially upon clover lays. It is conſtructed under a patent, and coſts about twelve guineas. It is ſtated by the inventor and patentee, that it "is intended to be drawn over the land recently ploughed, in order to preſs in the grips or channels made by the common ploughs, that no hollow places may remain for the ſeed to be buried too deep, and that every kind of graſs, ſtubble, or any thing elſe, may be preſſed into the ground. After the field has been preſſed, almoſt any kind of ſeed may be ſown by broad-caſt; and it will, by rolling into the channels of the preſſing wheels, be evenly and equally buried at a proper depth, after being harrowed, and conſequently be kept out of the way of birds, and will come up more regularly. It is evident, therefore, that there is no neceſſity for ſowing ſo much ſeed to an acre, as in the common broad-caſt huſbandry; thus combining the advantages of the drill and the broad-caſt ſyſtems. This machine is alſo of ſuch a conſtruction, that in the moſt uneven ground, every wheel acts as fully and amply as if it were drawn over a level ſurface. One of the preſſing wheels, with or without the line before it, may be put before a common hand drill, and drawn by one horſe, by which means any ground, however foul, may be drilled; or a drill may be added to the preſſing machine, which has been deſcribed, with three wheels, ſo as to throw the corn into the channels."

Tools of the plough kind have likewiſe been contrived with more than one coulter, in order to reduce the ſurface more effectually; but theſe have in modern practice given way to implements of the harrow kind, ſuch as cultivators, ſcarifiers, ſcufflers, &c.

Double Mould-boarded Plough.—This is a kind of plough often uſed with advantage in making the furrows in ſetting potatoes, cabbage, and other ſimilar crops, and earthing up ſuch as are planted in wide rows. Thoſe whoſe mould-boards move on hinges, and may be ſet wider or narrower at pleaſure, are the moſt convenient.

Single-Hoe Plough.—This is alſo often uſeful in ſtirring the mould in the intervals of different ſorts of crops, and laying it to the roots of the plants, and thereby preventing the growth of weeds. The mould-board in this plough is ſo conſtructed, that it can be raiſed or depreſſed at pleaſure according to the nature of the crop, and the intention with which it is uſed.

The *Single-Horſe Plough*, too, is extremely uſeful for ſeveral purpoſes in tillage huſbandry. This ſort of tool is very common on the farms in the county of Norfolk, but they are made upon a very different and much inferior conſtruction to this, which is in uſe upon the eſtate of Mr. Weſtern in Eſſex, and found to work extremely well, but without a wheel. The different parts have the following proportions in his ploughs of this kind.

	Feet.	Inches.
From 1 to 2	6	2
1 — 3	2	6
5 — 4	3	2
2 — 6	1	1
3 — 13	0	6
13 — 4	1	4
8 — 9	1	10
8 — 14	1	2
4 — 12	0	11
15 — 16	0	9
a — *b*	1	0
c — *d*	0	6

Ploughs have likewiſe been invented and conſtructed entirely without coulters: of this kind is the *Argyleſhire* plough, contrived by the Rev. A. Campbell, on which it is obſerved, that as the common plough is very liable to be choaked by an accumulation of ſtubble, &c. in the narrow angle under the beam before the coulter, and, not unfrequently, is thrown out of the ground, by catching ſmall ſtones or ſhells between the points of the coulter and ſock, both theſe inconveniencies have therefore been attempted to be obviated by throwing aſide the coulter altogether, and ſupplying its place by an upright feather attached to the *land* ſide of the ſock, and which ſerves the purpoſe of ſlicing off the furrow in the ſame manner as a coulter; for, being laid off on the ſame angle, it is found, in practice, to ſucceed to admiration. Small ploughs of this ſort employed in horſe-hoeing turnips, beans, cabbages, &c. of which the weight of the wooden part is about forty pounds, and of the iron-work about thirty-ſix, and coſt about two pounds ten ſhillings each, are made in a very accurate manner, by Meſſrs. Brown and Co., coach-makers, Abbeyhill, Edinburgh, who have made ſeveral, and can ſupply any number of them on demand. This plough is found to anſwer extremely well, more eſpecially in taking the earth away from the ſides of a drill crop; for which purpoſe it is conceived to have attained abſolute perfection; as its broad upright feather, which operates as a coulter, completely ſhields the plants from all riſk of earth falling on them from the left ſide of the plough, while, at the ſame time, the ploughman correctly aſcertains, that the part of the plough below ground, approaches no nearer to the roots of the plants, than the upper part does to their leaves; ſo that he can bring the plough to ſlice off the earth cloſe in upon their ſides, where neceſſary.

In point of draught, it is preciſely the ſame as the common plough. It obtained the premium from the Highland Society.

And the ſame gentleman has invented a very curious and uſeful muzzle or copſe for ploughs, which, by a ſingle twiſt of a ſcrew, gives both *earth* and *land* or depth and breadth at the ſame time, or either, as may be requiſite, even in the moſt minute degree. It weighs from ten to thirteen pounds according to the ſize of the plough it may be uſed for, and coſts from nine to thirteen ſhillings. It is ſtrong and durable, and may be had at the above manufactory.

There are ſtill a few other kinds of ploughs, which are contrived and conſtructed for the purpoſe of accompliſhing different views and intentions in huſbandry, ſuch as thoſe for paring or taking off the ſurface or ſward of the land, in different circumſtances; for the removing of the wetneſs with which it may be impregnated or ſaturated in its more ſuperficial parts, and for the forming and improving of roads in different caſes, &c., as may be ſeen under their ſeveral proper heads.

In the firſt of theſe intentions, the *common paring plough*, and the *improved paring plough*, which is in uſe in the county of Cheſter, are extremely good tools, eſpecially the latter, which is very much employed in different parts. See Paring *and Burning*, and Paring-*Plough*.

In the ſecond view, there are different ſorts of ploughs made uſe of in different places, and according to the different circumſtances and ſoils in which they may be employed. The *common draining plough* is had recourſe to in ſome of the midland diſtricts of the kingdom for the more general purpoſes with great ſucceſs, for which it is ſaid to be a good, and not very expenſive tool. The *drain* or *gutter* plough, which has been recommended by the duke of Bridgewater, is alſo an uſeful plough of this kind. It has been found beneficial in forming at once gutter drains on graſs lands, which are retentive of moiſture, but it requires a great ſtrength of draught in all caſes. The *common mole plough*, and the *improved mole ploughs*, by Lumbert and others, are likewiſe very good implements in many caſes eſpecially thoſe of the latter kinds. There are alſo ſome others, which anſwer different purpoſes of the draining kind in a very effectual manner. See Mole-*Plough*.

In the laſt intention, a very uſeful plough has been invented by a blackſmith of the name of Brand, which will be deſcribed under the head of roads. See Road.

Plough, among *Book-binders*, is a tool with which they cut the leaves of books ſmooth. See Book-binding.

Plough, or *Plow*, in *Navigation*, an ancient mathematical inſtrument made of box or pear-tree, and uſed to take the height of the ſun, or ſtars, in order to find the latitude.

It admits of the degrees to be very large, and has been much eſteemed by many artiſts; though now generally diſuſed amongſt us.

Plough-*Alms*, a duty anciently of a penny, paid to the church for every plough-land, or hide of land.

"De qualibet carucata juncta inter Paſcha & Pentecoſten unum denarium, qui dicitur plou-almes." Monaſt. Ang.

Plough-*Bote*, in our *Old Writers*, a right of tenants to take wood to repair ploughs, carts, and harrows, and for making rakes, forks, &c.

Plough, *Gallows of a*. See Gallows.

Plough, *Handles of a*, the name given by farmers to the two pieces of the plough faſtened to the earth-board, and to the ſheat, and ſerving the ploughman to reſt his force upon in the guiding of the plough. When they are conſiderably long, the plough is always guided the better, and the land is better tilled; but the lazy ploughmen are apt to cut them off ſhorter, that by bearing their whole weight upon them, they may, in a manner, ride, inſtead of walking. If they ſhould ride, in this manner, on the long handles, they would tilt up the end of the beam, and raiſe the plough out of the ground.

Plough-*Head*, a name given by the farmers to the foremoſt

moſt half of the plough, or that part containing the two wheels and their ſpindle, the box, the crow-ſtaves, the pillow, the wilds, the tow-chain, and bridle-chain, and the ſtake. See PLOUGH.

PLOUGH-*Land*, *carucata terræ*, in our *Ancient Cuſtoms*. See CARRUCATE.

PLOUGH-*Monday*, the next Monday after Twelfth-day. The ploughmen, in the north-country, on this day, draw a plough from door to door, and beg plough money for drink.

PLOUGH-*Tail*, a name given by the farmers to that part of a plough which contains the beam, the coulter, or coulters, the ſhare, the ſheat and under-ſheat, the earth-board and handles, as alſo the drock, the ground-wriſts, and the retches. See PLOUGH.

PLOUGH-*Jogger*, a term provincially applied to a ploughman of the more ordinary kind: a ſort of bungler in the work of ploughing.

PLOUGH-*Wright*, a term applied to a perſon whoſe buſineſs it is to make ploughs, and other implements of huſbandry. Workmen of this ſort are moſtly very common in all country ſituations.

PLOUGHING, the act of breaking up, and looſening the ſoil by means of a plough and proper teams. This or ſome other mode of looſening and turning up the upper parts of ſoils, is in all caſes neceſſary to render them more ſuitable for the reception of the ſeed and the growth of the crops, and they have been conſtantly in practice ſince the very infancy of the art. As it is only by ſome ſuch method that a proper bed for the roots of the young plants can be prepared, and a proper condition of the land for ſupplying them with nouriſhment be provided; in performing the operation it is a matter of great utility for the farmer to have particular attention not only to the ſtate and nature of the ground, but alſo the ſeaſon of the year, and kind of crop that is to be cultivated, as in this way the preparation of his lands may be rendered more perfect and ſuitable, and at the ſame time ſome of the natural defects under which they labour be removed. In almoſt every ſort of ſoil it has been obſerved, that ploughing them up before the latter end of the autumnal or beginning of the ſpring ſeaſon commences, renders them capable of imbibing and retaining a large portion of moiſture for the ſucceeding ſummer; while the turning them up during the ſpring and ſummer, cauſes much waſte and diſcharge of moiſture by evaporation and other means.

In caſes where the ſoil in its natural ſtate is too dry, and poſſeſſes too little tenacity for the growth and ſupport of ſuch crops as are neceſſary to be put into the earth in the ſpring months, the land, by being fully brought into a ſtate of preparation for the crop in the autumn, and the ſeed introduced without any additional ploughing in the ſpring ſeaſon, may be preſerved in a more moiſt and adheſive condition, conſequently in a more proper ſtate for the growth of ſuch crops; but where the ſoil is naturally moiſt, and the crops that are to be cultivated require that it ſhould be dry and mellow, when they are put into the ground, the ploughing, by being deferred for the winter, and performed as late as poſſible in the ſpring months, when it is become a good deal dried, will be the more advantageous for the crops that are to be grown upon it. But there are other circumſtances that conſtantly demand attention in the proceſs of ploughing land. In all the ſtiff, heavy, and more adheſive kinds of ſoils, that are much diſpoſed to the retention of moiſture, whether they be perfectly clayey or have more of a loamy quality, it ſhould be a common rule never to plough or turn them up when wet in any degree, except where the nature of the crop requires it: as when ſuch ſorts of lands are ploughed under ſuch a condition, the parts of which they are compoſed are very apt to cake and run together into hard lumps, that require much trouble and difficulty to be afterwards reduced into a fine ſtate. And further, great injury is produced by the treading of the team, as well as a much greater power neceſſary in performing the operation. They ſhould not, however, be ſuffered to become in ſuch a ſtate of dryneſs as to oppoſe too much reſiſtance before the work is undertaken. It, however, has been ſuggeſted, that in all ſuch lands where the clayey material is the moſt predominant, the ploughing may be performed when the ground is wet without injury, where the work is executed before the commencement of the froſts in the winter, while in the ſpring the team ſhould not be ſuffered upon the ground until it be in a properly dry condition. Communications to the Board, vol. iii.

But in all thoſe ſorts of land where there is a conſiderable depth of vegetable earthy matter, as thoſe of the moſs, moor, peat, and fen kinds, the ploughing of them, when under the ſtate of tillage, ſhould be executed when they are in a favourable condition in reſpect of dryneſs, as under the contrary circumſtances they can rarely be ploughed with benefit, and in many caſes not at all.

However, in moſt of the more light dry ſandy or gravelly ſorts of land, and perhaps in ſome of the more mellow deſcriptions of the loamy kinds, the work of ploughing may be had recourſe to, eſpecially in putting in the crops, when they are in a conſiderable degree impregnated with moiſture, without any diſadvantage being ſuſtained, and ſometimes even with benefit, as they are liable to part with their moiſture in too quick a manner. This circumſtance ſhould indeed direct the farmer in ſuch ſandy ſorts of land, to ſtir them as little as poſſible when the ſeaſon is hot and dry, ſo as merely to keep down the weeds, as much miſchief may otherwiſe be done by the exhalation of moiſture that may be cauſed. Theſe ſorts of lands are of courſe managed with much leſs trouble and expence of teams, as well as with leſs difficulty in reſpect to the ſtate of the weather, than moſt other ſorts.

The depth to which lands ſhould be ploughed, ſhould in ſome degree vary according to the nature of the ſoil, and the crops that are to be grown. It would likewiſe ſeem proper that the ſeed furrows ſhould have leſs depth than thoſe ploughings that may have preceded it; and perhaps, in general, deep ploughing is not ſo neceſſary as has been ſuppoſed, except in the caſes of tap-rooted plants. It has, indeed, been well remarked by Mr. Kent, in his Hints to Gentlemen and Farmers, that though deep ploughing has been much adviſed by different writers lately, on ſuch ſorts of land where the bottom and ſurface are of oppoſite qualities, and neither of them good; a mixture may in ſuch caſes be advantageous, and may be effected by their going below the uſual depth; but where the top and bottom, to the extent of eighteen or twenty inches, are ſimilar, he does not think it ever proper to exchange the ſurface part, which has been gradually for a great length of time increaſing in fertility, for the under part, which has only the property of being more freſh. He has ſtated that ploughing deep, except for certain ſorts of crops as above, is never requiſite or adviſeable. The growth of the common crops of corn or of graſs does not require any great depth. He likewiſe remarks, that where ground is ploughed to a great depth, the roots of weeds are only turned over, without being removed or thown upon the ſurface to decay, while clean light or ſhallow ploughing diſlodges them in a perfect and effectual manner. In ſome diſtricts, as that of Cornwall, where the ſoil is extremely ſhallow, a large produce is afforded; and in ſeveral other counties the land is found to be injured by deep ploughing, or going below the uſual depth, to which the lands have been ploughed. It is added, that hand-hoeing is known to every one to be more effectual in cleaning land than a ploughing; and the proceſs of paring and burning renders land perfectly clean, though it be only two inches in depth. All theſe tend to ſhew that ploughing to a great depth is by no means neceſſary in the cleaning of land; and it cannot but be generally admitted, that the longer the manure is kept within three or four inches of the ſurface the better, eſpecially on light ſoils, through which it is apt to ſink and eſcape too quickly.

It is, however, ſtated in the Calendar of Huſbandry, that in ſome of our well cultivated counties, the ſhallowneſs of the ploughing is remarkable; when almoſt every other point of management is very ſpirited and complete, a deficiency in this may not be at once perceived in the crops; but no doubt failures are often cauſed by it, though attributed to other circumſtances. Therefore the following hints are thrown out: 1. An additional depth ſhould firſt be gained in autumn, that a ſucceſſive change of ſeaſons may take effect in atmoſpheric influences before any ſeed is ventured in the raw ſtratum brought up. 2. The quality of that ſtratum ſhould be examined; it is ſometimes ſteril by reaſon of an acid, diſcoverable by boiling in water, and putting that water to the teſt of blue infuſions. 3. Animal and vegetable manures cannot be *buried:* at whatever depth they are depoſited, their conſtant tendency is to riſe to the atmoſphere. 4. Foſſile manures are extremely liable to be buried, having a conſtant tendency downwards. Chalk marle and clay are ſufficiently ſoluble, or ſo miſcible with water, as to ſink in a regular maſs; and are ſometimes found much below the path of the plough. 5. In ſoils of a poor *hungry* quality, there ſhould be ſome proportion obſerved between the depth of ploughing and the quantity of manure uſually ſpread; but this does not hold good on better ſoils. 6. Soils are rarely found that ought not to be ploughed, in common, ſix inches deep; many ought to be ſtirred eight inches, and ſome ten. 7. One deep ploughing (to the full depth) ſhould, it is conceived, be given once in twelve, eighteen, or twenty-four months; if this be ſecured, ſhallow tillage by ſcaling, ſcarifying, ſcuffling, ſkimming, or broad-ſharing, is in many caſes preferable to deep working oftener, and eſpecially for wheat, which loves a firm bottom.

But with regard to the depth of breaking up graſs-land, it ſhould be conſidered according to the manner of performing the buſineſs, as by the proceſs of paring and burning, and by that of merely ploughing. In regard to the firſt, it is nearly a general opinion in almoſt every part of the kingdom, that the firſt ploughing after the operation ſhould be ſhallow. It cannot, however, be admitted, that though the notion be far ſpread, it is therefore juſt, as the ſame thing prevails every where with reſpect to dung and the ſheep-fold; in which caſes there is great reaſon to think it erroneous. Manures that purify, and of courſe become volatile, cannot be buried, as have been ſeen above: plough as deep as you pleaſe, they all riſe ſooner or later into the atmoſphere; but with foſſile bodies, and probably with the aſhes of paring and burning, the caſe may in a great meaſure be different, and the good ſucceſs of the uſual management affords reaſon to juſtify the principle on which it proceeds. It may, therefore, be deemed a ſafe maxim not to plough after this operation for the firſt time, more than three, or at moſt four inches in depth. In the other mode of breaking up graſs-land after much experience, the writer has not found much difference either in the produce or effects on gravelly, clayey, or ſandy loams when executed in either way. In diſtricts where they uſually plough as deep as ſix or eight inches, he has obſerved (and it has been his own practice) that they plough up old graſs-land ſhallower, that is not above four inches deep, or at moſt five; the crop being every where put in upon this earth, except in the caſe of ſummer-fallowing peaty or moory lands. By not ploughing deep, the atmoſphere has a more direct influence in aſſiſting the putrefaction of the ſod covered, as it is with the crop which is probably one of the ſmothering kind.

But that two circumſtances are here to be attended to, which are the uſe of the ſkim-coulter plough, and that of ſowing on a ſtale furrow.

This plough he conſiders as one of the moſt effectual and applicable implements for breaking up this ſort of land. It is well known that when this is done by a common plough, there is a ſeam between every furrow-ſlice of graſs and weeds that grow through the ſummer to the injury of the crop; but which is wholly prevented by this plough, which is applicable in all caſes, except where there are roots or ſtones.

In regard to ſowing on a ſtale furrow, it is a good practice in breaking up old ley, when done in ſoils that are not ticklіſh to get upon. On wet clays and loams, where not well drained, the buſineſs of ſowing is often obliged to be delayed too late in the ſpring, if ploughed in the winter, in which caſes it is ſafer to plough and dibble at once; but on other ſorts dry enough, ſuch as dry loams, ſands and chalk, it is better to plough in autumn and plant early in the ſpring: the froſts and ſucceſſive variations of weather, ſweeten the freſhly turned up ſoil, and crumble the ſurface enough to give a little mould, and not ſo much as to impede the perſon employed in dibbling.

But in all the heavy ſtrong ſorts of land a great improvement has been effected by ploughing the lands in the early autumn, ſo as to avoid as much as poſſible all ſpring tillage. In this way the ſummer fallows intended for barley and oat crops; the pea, bean, and tare ſtubbles which are to receive the ſame ſorts of crops, as well as the white corn ſtubbles which are deſigned for any ſort of ſpring crops, ſhould at this ſeaſon be ploughed in a careful manner in the proper form, ſo as to be the future ſeed earth, no further ploughings being admiſſible on any account. In this method, it is ſtated, in the Calendar of Huſbandry juſt noticed, that the crops are much larger and the expence conſiderably leſſened. The leading principle is this; if the land is ſo laid in autumn, on to ridges of that exact breadth which ſuits the tools, (whatever they may be, whether harrows, ſcarifiers, ſcufflers, or drills,) ſo that the horſes which draw them may walk only in the furrows, the froſts will have left ſo fine and friable a ſurface, that any of theſe operations may be performed long before the land in the common ſyſtem would be ploughed. The ſeed is uſually in the ground before the old faſhioned farmer thinks of moving. If he ploughs, he turns down a dry crumbling ſurface, and brings up the ſtiff wet *chung* bottom; if rain comes, then he is in the mire, and muſt wait for a ſeaſon; if a drying ſharp north-eaſt wind comes, his furrows are converted to oblong ſtripes of a ſtony hardneſs. In one caſe he is plagued with mud, in the other with impenetrable clods; he was poſſeſſed of juſt the ſurface he wanted, and which, once loſt, is not often regained. This ſurface may be ſcuffled, and immediately drilled ſecurely. In this practice the lands or ridges ſhould be laid out with great exactneſs and attention.

There are alſo other points that require attention in the ploughing of land; the furrow-ſlices ſhould be diſpoſed in a different manner, according to the nature of the grounds;

the views of the farmer and the crops to be grown upon them, circumſtances which have been already noticed in ſpeaking of *ploughs*. The ſeed furrows, and thoſe where advantage is to be derived from the effects of the atmoſphere, ſhould be laid much leſs flat than in other caſes. The breadth of the furrow muſt likewiſe be regulated by ſimilar circumſtances. And there is another point that has been noticed by Mr. Kent, which is, that, on all the lighter ſorts of ſoils, it is eſſential to preſerve at the depth of from ſix to eight inches below the ſurface of the land, what in the language of farmers is denominated a *pan*, which is an unbroken bottom at ſuch depth; in conſequence of which, it is ſuppoſed, that manure may be kept longer in the top part; and that in ſuch ſeaſons as are very dry, the leſs deep this pan is, the leſs liable the grain will be to burn, eſpecially where it conſiſts of earth and not of rock, as the roots of the grain will find more moiſture by ſtriking againſt a body of compact earth, than in a greater depth of hollow earth, as the former obviouſly preſerves more moiſture in ſuch dry ſeaſons. There is alſo another advantage in this pan, which is, the having a leſs proportion of mould to work and keep in a ſtate of fertility. In ſuch caſes, where deep ploughing is had recourſe to, this compact bottom or pan muſt be broken and deſtroyed, for which a great deal more manure will become requiſite to keep the land in proper condition for the ſupporting of crops. On theſe accounts, care ſhould be taken in ſuch caſes, not to go ſo deep with the plough as to injure this firm earthy cruſt, and increaſe the difficulty of cultivating ſuch ſoils. See PAN.

In regard to the frequency of ploughing lands, it muſt, in a great meaſure, be directed by the ſtate or condition in which they are, and the nature of the crops which are to be grown upon them. It has been obſerved, in a late Syſtem of Practical Huſbandry, that the ſtiff, clayey, loamy, and even chalky ſoils will, in general, ſtand in need of more frequent ſtirring, either by means of the plough, harrow, or ſome other implement, in order to ſeparate and break down their tenacious particles, than thoſe of the ſandy or gravelly, and more light kinds, in which there is much leſs adheſion. Beſides, where lands have been in a courſe of tillage for ſome length of time, whether they are of a clayey, loamy, or even ſandy quality, they may require leſs frequent ſtirring than where the contrary is the caſe. And where the method of putting the ſeed into the ground by means of drill machines is to be had recourſe to, a fine ſtate of tilth will, in general, be indiſpenſably neceſſary. But, the nature of the crop that is to be cultivated muſt, in moſt caſes, direct the number of ploughings that may be neceſſary, as ſome demand a much finer ſtate of tillage than others; though in moſt caſes a well reduced earth is favourable. It has, indeed, been aſſerted by Mr. Tull, in his Horſe-hoeing Huſbandry, that the finer land of any kind is made by tillage, the richer, and more capable of ſupporting plants it becomes. A proof of which may often be met with in lands where a part has, from accident or other cauſes, been better tilled than the reſt, as, though they be afterwards conſtantly managed in preciſely the ſame manner, the part ſo treated always affords better crops than thoſe which have not had the advantage of ſuch tillage.

And where the nature of the crop is ſuch as to be greatly retarded and injured in its growth, by the occurrence of other plants, as in wheat and barley, the land will conſtantly require to be rendered fine and mellow, either by frequent ſtirring by the plough, or the growing of ſuch preparatory crops as have a tendency to bring it into a friable and clean ſtate, by the ſhade which they produce, and the repeated tillage and culture which they receive while growing. Alſo, where ſuch plants as produce large, knobby, or tap roots, in or upon the ſoil, are to be grown, it will be neceſſary to have the land well broken down, and rendered mellow by repeated turning over, in order that they may more readily puſh down, or extend themſelves in other directions. It has likewiſe been found, that a fine ſtate of tilth is always the moſt favourable for affording the nouriſhment and ſupport of crops in a free and equal manner, both on account of its admitting the fibrous roots of the plants to ſpread and extend themſelves with more facility, and the manures to become more minutely divided, and more intimately blended with the ſoils; as well as from the ſubſtances that conſtitute the food of the plants being more readily and more copiouſly formed by the chemical combinations and decompoſitions that take place under ſuch circumſtances. And further, by means of ſuch degrees of pulveriſation and mellowneſs, the ſeed, eſpecially when it is of the ſmaller kind, is not only more equally and more perfectly covered, but its vegetation more quick, from its becoming more fully in contact with the mould, and from the moiſture being more minutely diffuſed and retained in the ground, which is an advantage of much importance in the cultivation of many ſorts of crops.

The work of ploughing may, in moſt caſes, be well performed with any of the light well formed ploughs that have been deſcribed, with two horſes without a driver, being managed by reins by the ploughman; and where double ploughs are employed, three horſes may moſtly be ſufficient for effecting the purpoſe, being directed in the ſame manner; though in the uſual method of performing the work, with the common awkward ill-formed ploughs, in practice in many places, three, four, or more horſes are in general made uſe of, and the buſineſs executed with more difficulty and leſs diſpatch. The advantage of having recourſe to the improved ſorts of ploughs in this expenſive ſort of work, muſt, of courſe, be extremely obvious. It has been ſtated, in the third volume of Communications to the Board of Agriculture, that it has been lately found in Lancaſhire, that in a light loamy ſort of ſoil, Small's plough with two horſes abreaſt, and the ploughman driving them by means of reins, is capable of executing its work with equal expedition, and to a better depth when neceſſary, than the common ploughs of the diſtrict with four horſes, a ploughman, and a boy as driver. This great advantage is conſidered as depending upon the excellence of its conſtruction, and the team poſſeſſing the greateſt purchaſe in the draught, by being placed ſo near the plough; the leaſt variation in the formation or proportional diſtances of the different parts being, however, capable of deſtroying the effect. The Northumberland or Cumberland, and the Rotherham ploughs are alſo found equally valuable.

Having taken this view of the nature of performing this important operation in the cultivation of land, it may be uſeful to ſtate the facts as they have been collected in the beſt arable diſtricts of the kingdom, by the ſurveyors employed by the Board of Agriculture. In Weſt Norfolk, as ſtated by the ſecretary to the Board, there is much difference in performing the work. On ſome farms he has remarked, the furrow to be cut flat and clean; but, on others, *wriſt-baulked*, by tilting the plough to the left, which, raiſing the ſhare-fin makes that inequality, and is partly the occaſion of his having found ſo many ploughs at work, which would not go a ſingle minute without holding. In Eaſt Norfolk, Mr. Marſhall has obſerved, that the ploughman, to prevent the ſoil when moiſt from turning in whole gloſſy furrows, which they term "ſcoring," ties a piece of ſtrong rope yarn round the plate or mould-board, which by theſe means is prevented from acting as a trowel upon the ſoil. And Mr. Young found this the practice at preſent; but was informed, that it was not ſo generally wanted as formerly, which they attributed to better conſtructed *plates* or mouldboards.

And in relation to the depths of ploughing, he ſtates, that Mr. Thurtell, at Gorlſtone near Yarmouth, has a great opinion of deep ploughing. Three or four inches are a common depth about him, but when land is clean he always ploughs five, and ſometimes ſix or ſeven; he is careful, however, not to do this on foul land; he has no apprehenſion of breaking the pan, having many times gone deep enough for that without any inconvenience, and as to bringing up a dead ſoil he has not ſeen any ill effects from it. The land on which this practice has been purſued, is a good ſandy loam on a clay marle or gravel bottom. But Mr. Everitt, of Caiſtor, is of a different opinion; he is not fond of deep ploughing; he thinks four inches deep enough: his ideas on this ſubject, however, ſeem, Mr. Young ſays, to have been chiefly the reſult of a trial made by his father, who broke the *pan* by trench-ploughing a piece of land, which has ever ſince been full of charlock, &c. The difference of their ſoils will not, he thinks, account for this oppoſition of ſentiment. Gorlſtone is a very good ſandy loam at 20*s*. or 25*s*. an acre, though certainly inferior in depth and goodneſs to the land at Caiſtor. In diſcourſe with theſe two gentlemen on this ſubject, Mr. Everitt remarked to Mr. Thurtell, that if he ploughed deeper than common, he ought to add manure proportionably to the quantity of ſoil ſtirred; an old idea of his, and he remembers well, combated by his friend Arbuthnot. It is added, that Mr. Francis, of Martham, ploughs four or five inches deep: and Mr. Cubit, of Honing, on a fine ſandy loam, always as ſhallow as poſſible; and at Eaſt Ruſton, where the ſoil is exceedingly good, the ſame; he thinks a ſmaller quantity of muck by this means anſwers. But they do not plough four inches deep at Scotto; Mr. Dyble remarked, it is obſerved, that a piece was there ploughed five or ſix inches deep, and damaged for ſeven years; three inches enough; the ſoil much of it a fine ſandy loam, manifeſting no want of depth. Mr. Palgrave, at Colliſhal, however, applies deep ploughing in one caſe with ſingular judgment; he brings by water from Yarmouth large quantities of ſea ooze, or haven mud; this, on dry ſcalding gravels and ſands, he trench-ploughs in without fear of burying, and finds, on experience, the effect very great, forming thus a cool bottom, ſo that the ſurface burns no more. And Mr. Johnſon, of Thurning, thinks that it is common to plough too ſhallow; nor does he believe that any miſchief reſults from depth. He has made a ditch one year, and thrown it down again the next, and the benefit was ſeen for ſeven years, without the ſoil being acted on by draining, or wanting it; nor is he nice to have his muck ploughed in ſhallow, having no fear of burying it. By ploughing a good pitch for turnips, they come ſlow to the hoe, but when they do get hold, thrive much faſter than others. He alſo finds Mr. Reeve, of Wight, an advocate for deep ploughing; he goes five inches deep; if he did not he ſhould *get* no turnips. And Mr. Durſgate approves of deep ploughing; remarking, that he breaks up his *ollonds* deeper than moſt people. Mr. Willis obſerving the marle on his land was ſunk below the common path of the plough, turned it up again by going a deeper pitch, and found it to anſwer nearly as well as a new marling; and he ſuffered no inconvenience. It is added, that the two-furrow work about Holt, &c. is to turn a furrow on lay or *ollond;* the plough then returns and throws it back with the untouched land that is under it, into the former open furrow, and overlapping that, reſts on the baulk left beſide it. It is alſo obſerved, that Mr. Money Hill, in breaking up the ſtrongeſt land he has, ploughs deeper than on the lighter; that is, four inches, and on light three and a half; and on that depth drills on flag; if twitch in the land, ploughs only three and a half; if beyond the uſual depth, would hurt the crop and give weeds. Waterden is a thin and flinty ſoil. It is remarked, that Mr. Hill's father lived for many years at Gateſon, and was ſucceeded in the farm by Mr. Parker. Mr. Hill's laſt crop yielded 400 laſts of corn, above 320 of which were barley. He generally ploughed four inches deep, and never more than four and a half. Mr. Parker in the firſt year ploughed the ſecond barley earth ſeven inches deep, ſowing about eight ſcore acres (the common quantity twelve ſcore.) He ſold that year but twenty laſts; the ſeeds alſo were worſe than uſual; the wheat that followed, good; but in general, he had indifferent crops for fourteen or fifteen years. And in March he applies what he calls *one-furrow* work to a foul ſtubble, if he has ſuch by chance; the land ſide horſe (that on the left hand) always, after the firſt furrow, returns in it; it is left open; harrowed down with a heavy harrow; then the weeds gathered and burnt, and the next ploughing given acroſs. Norfolk Corrected Agricultural Report.

The Agricultural Report of Hertfordſhire ſtates, that the common depth of ploughing about Weſtmill is four or five inches; but Mr. Greg ploughs as deep as the ſtaple will admit; which account of his bailiff implies, that five inches are not the depth of the ſtaple. The crops in that vicinity are ſo great, that the writer ſhould ſuppoſe that there cannot be any material error in the baſis of their practice. And Mr. Whittington remarks, that winter tillage is but of little uſe: he avoids it as much as poſſible, and has found that the application of a break, or a large four-horſe harrow, is a good ſubſtitute for ſome ploughing.

With regard to the ſtrength of team which is neceſſary, it is ſtated by the author of the Norfolk Report, that Mr. Thurtell, through the ſummer, ploughs with three horſes two acres a day, one always reſting: this from finiſhing ſowing ſpring corn to the end of the turnip tillage. There is no doubt of their ploughing with eaſe an acre in four hours and a half. And in the clays of Marſhland, all are foot or ſwing-ploughs; never more than two horſes uſed: they do an acre a day, and in ſummer one and a half at two journies. And at Remſby, each pair of horſes two acres a day at two journies.

About thirty years ago, the common price of ploughing was 2*s*. 6*d*. an acre, in every part of the diſtrict, except Marſhland: it is now 4*s*.; in ſome places 3*s*. 6*d*. Mr. Young adds, that the farmers in every part of it get more land ploughed in a day, by their own men and horſes, than on any ſimilar ſoil in any other part of the kingdom; which, he thinks, is not altogether to be attributed to the merits of the plough, though it is certainly a good one, nor to any ſuperior activity in the horſes: the cauſe is more in the men, who have been accuſtomed to keep their horſes and themſelves to a quick ſtep, inſtead of the ſlow one common in almoſt every other diſtrict of the iſland.

And the Suffolk Report ſtates, that in every part of the county this ſort of work is done with a pair of horſes, conducted with reins by the ploughman; and the quantity of land uſually turned in a day is an acre upon ſtiff ſoils, and from one and a quarter to one and a half on ſands. And it is added, that the ploughmen are remarkable for ſtraight furrows, and alſo for drawing them by the eye to any object, uſually a ſtick whitened by peeling, either for water cuts, or for new laying out broad ridges, called there *ſlatches;* and a favourite amuſement is ploughing ſuch furrows, as candidates for a hat, or pair of breeches, given by ale-houſe keepers, or ſubſcribed among themſelves, as a prize for the ſtraighteſt furrow. The ſkill of many of them in this work is remarkable. Such a mode ſhould be practiſed in other diſtricts of the kingdom.

In the Hertfordſhire Report it is remarked, that the price of ploughing about Hatfield amounts to 11*s.* and 12*s.* an acre; twenty years ago, 7*s.* were paid; all is done with four horſes and a driver: 20*s.* *per* acre have been paid in the new incloſure at Cheſhunt. And that in the 17 acres of experiment ground of the marchioneſs of Saliſbury, the cultivation was began by a powerful trench ploughing, 18 inches deep. Mr. Stephenſon, the manager, who, having been bred a gardener, had the farmer's beſt education, knew that her ladyſhip intended to cultivate parſnips, carrots, cabbages, and other plants demanding deep tillage, and very wiſely began on garden principles. He remarks, that in general, in Hertfordſhire, there is a deficiency in not ploughing to a greater depth: they have a prejudice againſt it, and think land ruined that is ſtirred deeper than common. It is admitted that the firſt crop will ſometimes ſuffer in ſpots, but the ſucceeding ones make ample amends. Barley has been ſown on trench-ploughing, and with ſucceſs; in a dry ſeaſon it grew well, while that for which the land had been indifferently prepared ſtood ſtill.

Mr. Pratchet of Hatfield having aſſerted that he would readily give for ploughing his land once over 12*s.* *per* acre, and that he was ſure it coſt him more, put down the particulars on which he founded his opinion, and his calculations are theſe:

Expences *per* Week.

	£	*s.*	*d.*
Four horſes, ſeven buſhels of oats, at 4*s.*	1	8	0
Eight truſſes of hay, at 5*l.*	1	2	2
Ploughman	0	15	0
Driver	0	12	0
Wear and tear, plough and harneſs	0	6	0
	4	3	2

It is added, that they plough five roods *per* day, when they break up their land, and one acre and a half when they give it a ſecond, or any ſubſequent ploughing; and that at ſeven acres and a half *per* week, the expence amounts to 11*s.* and 1*d.* *per* acre, beſides the wear of the horſes; at nine acres, it amounts to 9*s.* 2½*d.* But the above eſtimate of Mr. Pratchet is drawn from the conſideration, that this includes none of the time when the horſes are unemployed, which is a very material point, and adds largely to the expence when they work; on a wet-land farm particularly, the time thus loſt is conſiderable.

Mr. Cook, from near Colcheſter in Eſſex, bailiff to the duke of Bridgewater, is of opinion, however prejudiced in favour of two-horſe ploughs, that they could not break up for a fallow the flinty clayey loams of this county; but that, after one ploughing, they are fully equal to the following tillage. And that about Hitchin, they break up with the common Hertfordſhire plough; but in ſtirring, uſe the ſwing-plough with three horſes, and ſometimes with two. And that at Mortgrave, near Hitchin, where Mr. Green is ſettled, who came from near Clare, in Suffolk, about four years ago, this farmer never uſes more than two horſes in a plough, and does his work juſt as well as the natives with four: he ſucceeds, and is ſuppoſed to be a very thriving man. Some of his Suffolk ideas, however, are, Mr. Young obſerves, ſaid not to have anſwered ſo well, particularly the making compoſts with ditch earth: this he has given up, and now goes to London for manure, like others. And Mr. Sedgewick recommends a practice in ploughing broad lands with the common plough, to leave two or four furrows for the ſmall narrow plough, to finiſh the lands; by which means, there are channels on the ſlopes of the open thoroughs to catch ſeeds; whereas, with the great plough, the ſeed rolls into thoſe thoroughs. But Mr. Parker of Munden uſes the foot-plough of Middleſex, as preferable to the great Hertfordſhire wheel-plough, and can break up flinty ſtrong land with it as well as the other performs it. Caſes very rarely happen, in which the county plough has the advantage. He has a great opinion of deep ploughing; never has the leaſt objection to any depth, nor ever yet checked his men for going too deep. His common depth is nine inches. This he has practiſed 23 years on good loamy land in Huntingdonſhire, and here on the gravels and flints of Hertfordſhire. He has never loſt a crop by it, but met with an unvarying ſucceſs; and is clearly of opinion, that at this time of day it ought not to be made a queſtion, but received as an admitted fact. He does not limit his ploughs to nine inches, for he would like twelve better, if eaſily attainable. It is added, that he has no idea of burying dung, but ploughs it in nine inches deep, and would plough it in deeper; for he is well aſſured from experience, that nothing is loſt: and a great advantage of depth is, that one ploughing, given deeply and clean, is of more effect and better than two, or even than ten, ſuch ſcratchings as are called ploughings often in this county; but the harrows in *cleaning* ſhould, on loamy ſoil, be as deep as the ploughing. Mr. King of Barkway, it is remarked, who has Suffolk connections, ploughs with a pair of horſes and no driver, and does as much and as well as his neighbours with four.

On their moſt retentive clays at Albury they are extremely attentive never to go on in wet weather: the ſoil is ſtiff and ticklish, and if touched when too moiſt, is greatly injured. This is a fact which is very general in moſt parts of the kingdom, on ſuch lands.

In every part of Hertfordſhire they have a method of ploughing, of which they are very fond, called *combing*, or *hacking*. A field that lies on flat or broad lands is half ploughed acroſs, by beginning with a furrow, and returning; the plough doubles the breadth of it by a ſecond furrow, the contrary way from the former, leaving a very ſmall baulk, juſt ſufficient to give ſteadineſs to the plough, by a purchaſe againſt the unſtirred land, which is equally well effected by leaving no baulk, but by going two inches deeper on the land ſide. Then the plough, returning for the third time, throws back the laſt turned furrow, taking up earth enough under it to clean plough the whole land, if wanted, or to do it at ſuch ſpaces as to whole plough, or half plough the field; but if combed cloſe, the ſurface is left in regular narrow ridges, called combs. This operation, with a little difference in the execution, is called ribbling in Suffolk. It appears a good hold for the harrows. The writer of the Hertfordſhire Report ſaw it well executed at ſir John Seabright's, at Beechwood, who underſtands the Hertfordſhire tillage well. And bouting, as it is called, is the lapping of two furrows together, by forming narrow ridges, a bout in each; then they are reverſed in the ſame manner by ſplitting; after that, they plough down by one furrow in the centre of the ridge, and ſo leave it for harrowing: ſome time elapſes between each operation. In breaking up, they do an acre a day, and ſometimes more.

It is ſtated in the Corrected Report of the County of Eſſex, that the ploughs which are employed there are both thoſe of the ſwing and wheeled kinds; the latter generally on dry land, and the former on wet: but that in ſome diſtricts, ſwing-ploughs are uſed on all ſoils. That in general the plough-team is two horſes, driven by the ploughman by means of a cord; and that a common addition is a perpendicular iron faſtened to the beam, with two holes to keep the cord from entangling with the plough or whippletrees. But that upon ſtrong land, three horſes abreaſt are not uncommon, when the work is hard, though ſtill without a driver. Further, that the uſual day's work is an acre; at buſy ſeaſons, and for good managers, five roods are ſometimes done. Scarcely any common farmers uſe oxen; there are ſuch caſes, but they are very few: ſome gentlemen have them. The ploughing is in general extremely well performed in this county, which abounds with ſkilful and accurate ploughmen. The reporter has walked over 40 acres of wheat freſh put in, eying the land carefully, and not diſcovering a ſingle falſe furrow; no variations in the breadths of the ſtitches, or of the furrows; no depreſſions, nor any variations in the curvatures of the ſtitches. But they do not plough ſo deep as in Kent, nor ſo flat as in Norfolk; nor is it their wiſh to do ſo. The number of ploughings for different crops are in moſt places great, as from four to eight, or more; and as to the depth of ploughing, ſome prefer it when done deep, others when more ſhallow. In the iſland of Foulneſs, they break up for fallows ſix to ſeven inches deep; but ſome farmers ſhallower. Mr. Vaſſal of Eaſtwood, in Rochford hundred, ploughs eight or nine inches deep; and Mr. Wood, who managed Rochford-hall, after the death of the late Mr. Wright, trench-ploughed ſeveral fields, which were the worſe for it, relative to the wire-worm. The preſent Mr. Wright ploughs his fallows only a fair depth, and is convinced that it is better, as he has had much better crops from ſhallow tillage. A neighbour of his, after ten years of deep ploughing, got at firſt nothing from it but weeds and wire-worm. Wild oats abounded much. He left off the practice, and then got much better crops.

At Little Wakering, Dr. Aſplin, and many others, plough the firſt earth of a fallow very ſhallow, and get deeper every time; other earths, not in fallowing, ſhallow. But as to the depth of ploughing for fallows, it muſt depend upon the ſoil; but the beſt farmers like to go deep enough to chip up the dead ſoil now and then, and ſhew it a little upon the ſurface, after all is finiſhed.

In the work of ploughing here, ſome think the laying the furrows flat the beſt; but others prefer feather-edged furrows, as covering the ſeed better in harrowing: and this is the more general opinion. At Burnham, Mr. Ketcher does not approve of feather-edged ploughing; and he thinks flat furrows beſt on wet land, as well as on dry. But Mr. Tabrum, at Margaretting, not only approves feather-edged work, but thinks it eſſential for giving moulds to cover the ſeed.

In regard to the expence of ploughing in this diſtrict, in all the ſtrong rich clays at Bradfield, and around by the coaſt to Clackton, it is 8*s*. an acre. On the wet loams at Dunmow, three horſes, a man, and boy, for the firſt and ſecond earths of a fallow, by the acre, 7*s*. At Snorum, from 8*s*. to 9*s*. each ploughing; the ſoil very ſtiff. Mr. Ruſh, at Latchingdon, gives 9*s*.; at Rochford, 10*s*. 6*d*.; at Raleigh it was formerly 5*s*., is now 8*s*.; at Thorndon, 10*s*.; at Margaretting, the common hiring price is 10*s*. 6*d*.; and at Toppesfield, Mr. Eley reckons it worth 8*s*. with three horſes; 6*s*. 6*d*. with two. They plough barley-fallows five or ſix times.

At Little Wakering, Dr. Aſplin uſed formerly to contract with one labourer for all the tillage of his farm, at 2*s*. an acre for ploughing, 6*d*. for harrowing, and 2*d*. for rolling. More work was done, always five roods ploughed *per* day, but he left it off on account of the ſhallowneſs and wide furrows.

At Jeſtworth, in Oxfordſhire, according to the report of that diſtrict juſt publiſhed, they plough with four horſes, and do an acre a day. In the ſouth-eaſtern diviſion of the county, a party of farmers agreed that an acre is the general quantity that ſhould be ploughed in a day by a team; but many ploughs go out for three roods. The expence was thus reckoned.

	£	*s*.	*d*.
Four horſes, 1½ *cwt*. of hay per week, at 4*s*. 6*d*. each	1	4	0
One buſhel of oats *per* horſe, at 3*s*. 6*d*.	0	14	0
Chaff, 2*s*. *per* week	0	8	0
Decline of value	0	4	0
	2	10	0
Per diem	0	7	1½
Wear and tear	0	2	6
Man and boy	0	2	6
	0	12	1½

However, on caſting up the account, they obſerved that it was too low, for an acre of land could not be ploughed under 14*s*.

At Wormſley, &c. horſes are allowed 20lb. of hay *per* diem, and a buſhel of oats *per* week; more for extra work. They plough with three or four, and do an acre a day. Three and four horſes are likewiſe employed in moſt other places, but ſome have tried two, though this is only ſeldom done. The ſame quantity of land is uſually ploughed in the day.

About Adderbury, it has been agreed by ſeveral very good farmers, that it is right to plough a ſtubble in autumn for a fallow, deep; five inches conſidered as deep ploughing. Alſo at and about Thumley, they are of the ſame opinion, when they break up for the firſt time in May. Mr. Edmonds thinks, that beans do beſt on deep ploughing; but the after crops may ſuffer for want of due tillage being given to ſuch additional depth. If deep, it ſhould be continued. Mr. Cozins, of Golder, ploughs eight inches deep for beans, and alſo in the firſt ploughing for a fallow. Mr. Newton, of Crowmarſh, likewiſe ploughs deep for beans and turnips; but thinks that clover land cannot be ploughed too ſhallow for wheat. At Mungwell, the biſhop of Durham ploughs for the moſt part according to the ſtaple of the ground, which is very ſhallow. He generally goes as deep as the ſtaple will admit. His lordſhip gained exceedingly by ploughing one inch deeper than the farmer before him had done; and which has gradually become an addition to the ſtaple and the ſoil.

Mr. Percey thinks, that they are apt to plough too much; the leſs they plough their land the better. A good farmer will plough enough to keep it clean, and all beyond that is bad. Hence, it is ſuppoſed, that land may be ploughed too much.

On the rich ſands at Adderbury, they do not plough more than four inches deep at any time, except on the little clay land they have, at the firſt breaking a fallow.

Mr. Davy of Dorcheſter ploughs as deep as he can for beans; but as ſhallow as poſſible on clover lays for wheat.

The rates of ploughing in moſt of the other diſtricts, both in the ſouth and the northern parts of the kingdom, ſtand equally high with theſe; and in ſome they are conſiderably higher, as more ſtrength of team is employed.

There are many other modes of ploughing practiſed in different counties, but it is not neceſſary to deſcribe them here. See TILLAGE.

PLOUGHING *in Green Crops*, the proceſs of turning down various ſorts of vegetable crops in their green or moſt ſucculent condition. It is a method of practice that has been employed for a great length of time on the continent, though little practiſed here by the farmers. The reaſon of which is probably, that the ſoils are in moſt diſtricts too wet and heavy for its being had recourſe to with advantage; the light and more friable kinds of land are moſt adapted for improvement in this way, as in ſuch the green materials undergo decompoſition much more readily, and become more quickly in the proper ſtate for affording the ſupport of crops. In ſome clayey ſoils, the putrefaction of ſuch materials is retarded in ſuch a way, that little or no benefit can be derived from their uſe. But in ſuitable ſoils, crops of the green kind, ſuch as buck-wheat, tares, clover, rape, and where ſown for the purpoſe, peaſe or beans, &c. may be uſed with advantage, being turned in as a preparation for wheat-crops, without the expence of a fallow. Where employed in this way, the crops, as obſerved above, ſhould always be turned down when in their moſt luxuriant ſtate of growth, and the ſoil rather dry, in order that a ſpeedy decompoſition and decay may be undergone. It has been ſuggeſted, that advantages may be gained in this view, by the application of ſmall proportions of calcareous ſubſtances in their cauſtic or more active ſtate over them before they are turned down. And that the economy of this practice muſt chiefly depend upon the ſavings in cartage, and the labour of preparation, which in other ſorts of manure is often very heavy. Mr. Young, in his Survey of Lincolnſhire, ſtates, that this practice, after having been attempted, appears to have been given up from its not fully anſwering the purpoſes for which it was intended, probably for the reaſons ſtated above. But it is a mode of huſbandry that Mr. Donaldſon ſtates to have been had recourſe to with ſucceſs in Warwickſhire, and which he conſiders as, beyond all others, the moſt economical. The expence of the ſeeds is almoſt the whole of what attends the practice. It is now little had recourſe to any where.

In the county of Eſſex, Mr. Hardy, of Bradfield, had a field of clover, part of which was mown twice, and part but once; the ſecond growth being kept until it was in bloſſom before feeding, when hogs, &c. were turned in, who trampled down five times as much as they ate, which was ploughed in for wheat: and where this latter management took place, gave by far the ſtouter wheat: and it is ſaid, that it ſhould be remarked that through all the parts of Tendring hundred, this huſbandry of trampling ſecond crop clover apparently to waſte is very general, and the opinion entertained of its merit is high. Lord Braybrook ſows cole for ploughing in November, and his bailiff, Mr. Nockold, aſſured the reporter that he could ſee to an inch in the barley where this management takes place. If the crop be high he mows it firſt, but this is for want of a ſkim-coulter, which would do it better ſtanding. Mr. Clayden, a very ſpirited tenant on the Audley-End eſtate, is in the ſame huſbandry. Corrected Agricultural Report of the County of Eſſex.

Ploughing in green crops is frequently practiſed by ſome of the beſt farmers bordering on the White-horſe hills, in Berkſhire, and found much leſs expenſive than carrying dung from the yard. Vetches, buck-wheat, rye, &c. are there chiefly employed for this purpoſe. Corrected Berkſhire Report.

PLOUGHMAN, in *Huſbandry*, the perſon who guides the plough, in the operation of tilling or tillage.

PLOUGHMAN'S *Spikenard*, the Engliſh name of a genus of plants called by the botaniſts *conyza*; it is likewiſe called by us *flea-bane*. See CONYZA.

PLOUGUENAST, in *Geography*, a town of France, in the department of the North Coaſts, and chief place of a canton, in the diſtrict of Loudeac; 7 miles N.N.E. of Loudeac. The place contains 3189, and the canton 12,503 inhabitants, on a territory of 132½ kiliometres, in five communes.

PLOUGUERNEAU, a town of France, in the department of the Finiſterre, and chief place of a canton, in the diſtrict of Breſt; 13 miles N. of Breſt. The place contains 6430, and the canton 15,033 inhabitants, on a territory of 152½ kiliometres, in 6 communes.

PLOUHA, a town of France, in the department of the North Coaſts, and chief place of a canton, in the diſtrict of St. Brieuc; 12 miles N.N.W. of Brieuc. The place contains 4145, and the canton 10,756 inhabitants, on a territory of 125 kiliometres, in 8 communes.

PLOUZE'VEDE, a town of France, in the department of the Finiſterre, and chief place of a canton, in the diſtrict of Morlaix; 8 miles S.W. of St. Pol de Leon. The place contains 2364, and the canton 11,436 inhabitants, on a territory of 130 kiliometres, in 6 communes.

PLOWMAN'S ISLANDS, a cluſter of iſlands, forming a part of Chu-ſan iſlands (ſee CHU-SAN), which are inhabited, and contain ſeveral ſpots of beautiful verdure; but not a ſingle ſhrub, except a very few dwarf fruit-trees, oak, and Weymouth pine. The rocks on theſe iſles are of the ſame nature with thoſe of the Ladrones; with the addition, in ſome parts, of perpendicular veins of white, and of blue and white ſpar. The Lion, one of the ſhips belonging to lord Macartney's embaſſy, moored between the Plowman and Buffaloe's Noſe iſlands: and found a moſt excellent harbour, ſecure from all winds, and the holding ground ſo good, that it required the whole ſtrength of the ſhip's crew, with the aſſiſtance of every purchaſe, to weigh the anchors: the depth of water being from 12 to 22 fathoms. The tide riſes about 12 feet, and runs at the full and change of the moon, 2½ miles an hour. Its latitude is 29° 45′ S., and longitude 121° 26′ E. The ſhip was ſupplied from theſe iſlands, at moderate rates, with bullocks, goats, and fowls; and from ſome of the ſurrounding boats with a variety of excellent fiſh. Staunton's Emb. to China, vol. i.

PLOWS, in *Agriculture*, a provincial term ſignifying ploughed ground, either in clover or open fields.

PLUCHE, ANTONY, *Abbé*, in *Biography*, an elegant writer, was born at Rheims in 1688. Having paſſed through the uſual courſe of education, he was appointed profeſſor of humanity in the univerſity of his native place, and two years afterwards of rhetoric, at which time he entered into holy orders. Some years afterwards he went to Paris, where he gave lectures in geography and hiſtory. In that capital he acquired a name among men of letters, by his popular work entitled "Spectacle de la Nature," of which the firſt volume appeared in 1732, and which was carried on to nine volumes. It contains a view of the moſt intereſting facts in natural hiſtory, as they were then known, in the form of dialogue. The dialogue is not well kept up, though few works have been more read, and it was tranſlated into various languages. His next publication was "Hiſtoire du Ciel," in two vols. 12mo., of which the firſt volume is chiefly mythological: the ſecond relates to the formation of the world, and concludes with a confirmation of the Moſaic account of the creation. In 1750, he publiſhed a treatiſe, entitled "The Truth of the Goſpel demonſtrated." As a philologiſt, he is diſtinguiſhed by his "Mecanique des Langues, et l'Art de les Enſeigner," which is ſaid to be a very uſeful and judicious treatiſe. He died in 1761, at the age of 73, leaving behind him the character of a truly virtuous and reſpectable man. Two of his poſthumous pieces were publiſhed after his death, entitled "Concorde de la Geographie des differens Ages:" and "Harmonie des Pſeaumes, et de l'Evangile."

PLUCKART BAY, in *Geography*, a S.E. branch of Loch Ewe, on the W. coaſt of Scotland. N. lat. 57° 45′. W. long. 5° 34′.

PLUCKENIN, a town of America, in Somerſet county, New Jerſey; 28 miles N. of Princeton. It carries on ſome trade.

PLUDENTZ, a town of Germany, and capital of a county of the ſame name, ſituated on the Ill. In 1533 it was almoſt deſtroyed by an earthquake, and in 1638 was wholly burnt down; 62 miles W. of Inſpruck. N. lat. 47° 3′. E. long. 9° 8′.

PLUDESCH, a town of Germany, in the county of Pludentz; 6 miles N. of Pludentz.

PLUE, LA, or *Rainy Lake*, a lake of Upper Canada, lying W. by N. of lake Superior, and E. by S. of the lake of the Woods. The Narrows are in N. lat. 49° 3′ 2″, Fort lac la Plue in 48° 35′ 49″, iſland Portage, 50° 7′ 31″, at the Barrier, 50° 7′ 51″. W. long. 95° 8′ 30″.

PLUE, *La*, a river forming a communication between lake La Plue and the lake of the Woods.

PLUG, a large wooden peg, with which to ſtop the bottom of a ciſtern, caſk, pipe, or the like.

PLUG, in *Ship Building*. *Hauſe-plugs* are pieces of timber trimmed to the ſize of the hauſe-holes, ſo as to keep out the water. *Shot-plugs* are formed like the fruſtum of a cone of various ſizes, in proportion to the holes made by the different ſizes of ſhot which may penetrate the ſhip's ſides in time of action. The latter are ſometimes made of tallow and junk, or oakum, made hard together, and are thruſt or driven into thoſe ſhot-holes, to prevent leaking: accordingly they are always ready for this purpoſe.

PLUKENET, LEONARD, in *Biography*, "a learned, critical, and laborious botaniſt," as Dr. Pulteney juſtly denominates him, was the contemporary and rival of PETIVER, ſee that article; and laboured, with ſtill more ardent, as well as excluſive, aſſiduity, to collect and to delineate the vegetable productions of nature. His origin and native country, as well as the place of his education, are unknown. He has indicated 1642 as the date of his birth, and we know that he ſurvived the ſixty-third year of his age, but there is no preciſe record of his deceaſe. A handſome portrait of him, at the age of forty-eight, is prefixed to his *Phytographia*, with the title of Doctor of Phyſic, and his arms; ermine, a bend dexter engrailed, gules. It is not known where he took his degree. His name ſeems to betray a French extraction, *plus que net*, and has been latinized *plus quam nitidus*. He reſided in Old Palace-yard, Weſtminſter, where he appears to have had a ſmall garden; but as Dr. Pulteney ſought in vain for his name, in ſeveral liſts of the College of Phyſicians, printed in the firſt years of the 18th century, as well as in thoſe of the Royal Society, of the ſame date, it ſhould ſeem that he was not then eminent, either as a medical practitioner, or a natural philoſopher. His motto, an anagram of his name, *ut pené nullus ſic ardeo*, well expreſſes the zeal with which he devoted himſelf to his favourite ſtudy; while another motto in the ſame page, over a burning candle, *aliis inſerviendo conſumor*, and a ſubſequent one, to the fourth part of his work, *nil niſi præmia deſunt*, evince that his worldly recompence was not adequate to his wiſhes or expectations. Dr. Pulteney has diſcovered that Plukenet had a ſon Richard, who was a ſtudent at Cambridge in 1696; and the *Almageſtum* contains ſome verſes written by another ſon, Robert, at Eton ſchool; which is all we know of his family or connections. He publiſhed his early works at his own expence, but was aſſiſted afterwards by trifling ſubſcriptions. Towards the cloſe of his life he is ſaid to have experienced royal patronage, to have obtained the ſuperintendency of the garden at Hampton-court, and the title of Royal Profeſſor of Botany; all from the favour of queen Mary. Three of the ſections of his *Phytographia* are ſeverally dedicated to biſhop Compton, the firſt earl of Portland, and king William III. That he enjoyed the friendſhip of Uvedale, who was his fellow-ſtudent; and the high commendation of Ray; are ſufficient proofs of his perſonal and ſcientific merits. The beginning of the *Almageſtum* teſtifies his elevated piety, which at the end degenerates into the orthodox ſtyle of the day. That he was ſkilled in the learned languages, and that his correſpondence was very extenſive, appears from almoſt every page of his works; and there are many particular parts which ſhew his reſearches to have been deep, and conducted with conſiderable ability. It is to be lamented that ſome of his latter pages betray a ſeverity of ſtricture, on the literary labours of Sloane and Petiver more eſpecially, of which we have already ſpoken in the life of the latter, and of which more may be ſaid hereafter when we come to ſpeak of Sloane. Plukenet was, apparently, a man of more ſolid learning than either of thoſe diſtinguiſhed writers, and having been leſs proſperous than either, he was perhaps leſs diſpoſed to palliate their errors. As far as we have examined, his criticiſms, however ſevere, are not unjuſt.

Theſe are all the circumſtances we can find, illuſtrative of the life or character of Plukenet. We ſhall now offer a few remarks upon his works.

Having collected a vaſt Herbarium, for the time in which he lived, not only by means of his various correſpondents, but alſo from the treaſures that were then daily pouring into the gardens about London, his object was to publiſh a catalogue of the whole, accompanied by figures of the new or rare ſpecies. The firſt part of this deſign was executed in his *Almageſtum Botanicum*, which, like all his other publications, is in quarto, making a handſome volume of 404 pages, dated 1696. Its arrangement is alphabetical, according to the generic names at that time received, and adopted from Bauhin and other old authors, though not without many corrections and alterations made by himſelf in this department. Each plant is diſtinguiſhed by a ſpecific definition, either adopted in like manner from his predeceſſors, or new-modelled by himſelf; and all the ſynonyms he could collect are ſubjoined. No ideas of ſyſtematical arrangement ſeem to have entered into his contemplation, at leaſt in the plan of this work. There are paſſages in his writings which ſhew he had occaſionally thought on that ſubject, nor could it altogether eſcape a man of ſo much reading; but it was by no means one of his primary objects. Theſe were rather ſpecific diſtinctions of plants, their ſynonyms, and their hiſtory. This work is ſaid to contain about 6000 ſpecies, of which its author ſuppoſed 500 to be new. Of thoſe 6000, many are now conſidered as varieties, being merely differences founded upon colour, or on double or ſingle flowers; but if Plukenet erred in theſe particulars, he erred in common with all the botanical world at that period.

The *Phytographia* of our author was anterior in date to the above work, and yet is rather to be conſidered as an accompaniment of the *Almageſtum*. It conſiſts of 350 plates, engraved by various hands, each plate containing figures of five, ſix, or more, plants, chiefly, if not altogether, done from dried ſpecimens, with various degrees of merit. If theſe figures ſeldom riſe to any great excellence of botanical preciſion, they are at leaſt original, and not only free from the faults of copies, ſo copiouſly diſplayed in the plates of Moriſon and ſuch authors, but alſo tolerably exempt from groſs miſtakes of their own. Of their beauty little can be ſaid, but the work improves as it advances. Being ſo generally cited by ſucceeding authors, eſpecially Linnæus, it is indiſpenſible to every botanic library. This book came out in four parts, of which the firſt and ſecond were publiſhed in 1691, the third in 1692. The plates of theſe have the names, and many ſynonyms, of each plant engraved at the bottom. The fourth part, which commences with tab. 251, and was publiſhed in 1696, wants this uſeful appendage, and moſt of its figures are deſtitute of any reference. They are however cited in the *Almageſtum*, and ſome of them likewiſe refer to that work; but in ſo obſcure and difficult a manner, that few perſons take the trouble of ſearching them out, or of citing them correctly in their own publications. Thoſe who inveſtigate the matter, will find ſeveral plants, ſuppoſed to be of recent introduction and hitherto no where delineated, which were known to Plukenet; though his references are often ſo faulty, as to damp our ardour of enquiry, by the needleſs difficulties they throw in our way.

In 1700 appeared the *Mantiſſa*, or appendix to the *Almageſtum*, conſiſting of 192 pages, with a copious index to both works. This publication comprehends above 1000 new plants, with numerous obſervations and corrections relating to the former. Some of Plukenet's criticiſms diſplay great learning; as what concerns the Gopher, or Juniper tree, of the bible, firſt book of Kings, chap. xix. ver. 4; though he errs in referring the Barbadoes Juniper to this oriental plant; ſee his Mant. 109. Commentators have not been ſufficiently attentive to botanical geography, on many occaſions.

In 1705, Plukenet publiſhed his laſt work, the *Amaltheum*, which is a ſupplement to the other two, and compoſed on the ſame plan, conſiſting of 216 pages, with an index, and 103 plates, ſome of which illuſtrate the plants of the Mantiſſa.

All theſe works were republiſhed, with new title-pages, in 1720, and again, with a re-impreſſion of the letter-preſs, in 1769, making four volumes all together. Giſeke publiſhed a very incomplete Linnæan index to them at Hamburgh in 1779. The herbarium of Plukenet, containing about 8000 plants, having been bought by ſir Hans Sloane, is now in the Britiſh Muſeum. The original manuſcript of his works was given by the late Mr. Hudſon to the writer of the preſent article. Pulteney's Sketches of Botany. Plukenet's Works. S.

PLUKENETIA, in *Botany*, was ſo named by Plumier, after Leonard Plukenet, M.D.; ſee the preceding article. Linnæus, in his *Critica Botanica*, p. 80, draws an analogy between the great ſingularity of ſtructure in the flowers, and the peculiarity of Plukenet's character as a botaniſt; which idea does not ſeem to us ſo happy as many of our great maſter's compariſons. Plukenet's works have no remarkable excentricity about them, but are, on the contrary, plain matter of fact, interſperſed with laborious, but ſober, criticiſm.—Plum. Gen. 47. t. 13. Linn. Gen. 501. Schreb. 652. Willd. Sp. Pl. v. 4. 514. Mart. Mill. Dict. v. 3. Sm. Nov. Act. Upſal. v. 6. 1. Ait. Hort. Kew. v. 5. 324. Juſſ. 392. Lamarck Illuſtr. t. 788.—Claſs and order, *Monoecia Monadelphia*. Nat. Ord. *Tricoccæ*, Linn. *Euphorbiæ*, Juſſ.

Gen. Ch. Male, *Cal.* Perianth of one leaf, in four deep, ovate, acute, equal, ſpreading ſegments. *Cor.* none. *Stam.* Filaments numerous, about 20, united in an imbricated manner, awl-ſhaped, very ſhort; anthers ſmall, ſmooth, of two tumid furrowed lobes.

Female, on the ſame plant, *Cal.* Perianth inferior, of one leaf, in four deep, ovato-lanceolate, acute, equal, ſpreading, permanent ſegments. *Cor.* none. *Piſt.* Germen ſuperior, four-lobed, depreſſed, ſmooth; ſtyle very long, cylindrical, declining, four-cleft at the ſummit; ſtigmas four, capitate, globoſe. *Peric.* Capſule four-lobed, coated, depreſſed, ſmooth, with dilated angles, of four cells, and eight elaſtic valves. *Seeds* ſolitary, large. compreſſed, with veiny wrinkles.

Eſſ. Ch. Male, Calyx in four deep ſegments. Corolla none. Stamens numerous.

Female, Calyx in four deep ſegments. Corolla none. Germen ſuperior. Style ſimple. Stigmas four, capitate. Capſule four-lobed; cells elaſtic, with ſolitary ſeeds.

1. P. *volubilis*. Twining Plukenetia. Linn. Sp. Pl. 1423. Willd. n. 1. Ait. n. 1. (P. ſcandens, hederæ foliis ſerratis, fructu tetragono; Plum. Gen. 47. t. 13. f. 2. Ic. 220. t. 226.)—Angles of the capſule compreſſed, keeled.—Native of the Weſt Indies. Miller appears to have cultivated it at Chelſea, in 1739, but it had long been loſt, till the late Hon. Mrs. Barrington received a living plant from Jamaica, which bloſſomed in her ſtove at Mungewell, near Wallingford, in 1795. The *ſtem* is twining, branched, round, leafy, ſmooth; the young branches alternate, axillary, downy in their upper part. *Leaves* alternate, ſtalked, ſimple, heart-ſhaped, pointed, about three inches long and half as wide, minutely ſerrated, deep green, rather roughiſh to the touch, naked, except a ſlight downineſs on the ribs at the back, reticulated on both ſides with copious veins, and furniſhed with a pair of glands at the baſe. *Footſtalks* about one-third the length of the leaves, channelled above, downy near the extremity. *Stipulas* in pairs at the baſe of the footſtalk, very minute, triangular, acute, ſmooth. *Flower-ſtalks* axillary, ſolitary, racemoſe, downy, ſquare at the baſe, round above, generally bearing one *female flower* at the baſe; conſpicuous for its quadrangular *germen*, thick *ſtyle*, above an inch long, and large globoſe *ſtigmas*; and above it a long compound downy *cluſter*, of numerous ſmall *male flowers*. Some branches terminate in a *cluſter* of, partly axillary, *female flowers* only. All the *flowers* are green, and more ſingular than beautiful. The *bracteas*, ſcattered through the cluſters, are ſmall, ovate, acute, ſmooth, membranous. *Fruit* the ſize of a ſmall walnut, green, depreſſed, with four ſpreading, dilated, compreſſed, rounded angles, the valves ſeparating elaſtically at the baſe. *Seeds* pale brown, large, greatly compreſſed, lenticular, ſomewhat bordered, rugged with elevated veins.

2. P. *verrucoſa*. Warty Plukenetia. Sm. in Act. Upſ. n. 2. Willd. n. 2. (P. volubilis; Linn. Suppl. 421. Am. Acad. v. 8. 264.)—Angles of the capſule terminated by two tubercles.—Native of Surinam, from whence our ſpecimens were ſent to Linnæus, who inadvertently referred

them to the above original ſpecies. The *leaves* indeed ſcarcely differ, except in being very minutely and diſtantly toothed, rather than ſerrated. The *flowers* are ſomewhat ſmaller. The *capſules* differ moſt eſſentially, in being but one-fourth as large as the former, their lobes each tipped with a pair of warts, and not dilated nor keeled. The *ſeeds* moreover are obovate, not lenticular nor compreſſed.

3. P. *corniculata.* Horned Plukenetia. Sm. in Act. Upſ. n. 3. Willd. n. 3. (Sajor volubilis, fructibus corniculatis; Rumph. Amboin. v. 1. 193. t. 79. f. 2.)—Angles of the capſule compreſſed, tapering, pointed.—Rumphius deſcribes this as found wild in the woods of the diſtrict of Baguala, in Amboina, where it is known by the name of *Utta Pela*, or *UttaTela.* The Dutch were accuſtomed to cultivate it, for the ſake of its leaves; which, when boiled with the milk of the cocoa-nut, prove an agreeable and delicate vegetable. Their name for the plant was *Sajor-Maccou.* The *ſtems* are long and ſlender, twining about the trunks of trees, and ſending off ſhort lateral alternate *branches.* *Leaves* much like both the foregoing, but according to the plate and deſcription, very evidently and diſtinctly ſerrated. Their ſcent is ſtrong like elder, but their taſte ſweet; at leaſt when boiled, for the natural affinities of the genus lead us to preſume that none of its ſpecies can be eaten without ſuch preparation. *Flowers* ſmall and green. There ſeem to be ſometimes two female ones, with a ſimple cluſter of numerous males above them. The *fruit* is very well deſcribed by Rumphius, as reſembling the ſtarry aniſe, *Illicium*, except in having but four cells, ſometimes only three, inſtead of ſix. "Each ſegment," ſays he, "is the ſize of the ſeed of *Ricinus*, with a very thin point, and theſe fruits, when ripe, fly aſunder, like the *Ricinus*, with an explosion, throwing out their round, compreſſed, or lenticular ſharp-edged *ſeeds.*" Nothing can more preciſely anſwer to the character of *Plukenetia*, and Linnæus actually confounded the plant in queſtion with his *P. volubilis.*

PLUM Island, in *Geography*, an iſland on the coaſt of Maſſachuſetts, about nine miles long, and half a mile broad, extending from the entrance of Ipſwich river S., nearly a N. courſe to the mouth of Merrimack river, and ſeparated from the main land by a narrow ſound called Plum iſland river, which is fordable in many places at low water. It conſiſts for the moſt part of ſand blown into ludicrous heaps, and covered with buſhes bearing the beach plum. On the N. end ſtand the light houſes, and the remains of a wooden fort, built during the war for the defence of the harbour. On the ſea-ſhore of this iſland, and on Saliſbury beach, the Merrimack Humane Society has erected ſeveral ſmall houſes, furniſhed with fuel and other conveniences, for the relief of mariners who may be ſhipwrecked on this coaſt. The N. end lies in N. lat. 43° 4′, and W. long. 7° 47′.

Plum-*Tree*, in *Botany*, &c. See Prunus.

Plum, *American black cocoa.* See Chrysobalanus.

Plum *Bay.* See Guaiava.

Plum, *Jamaica*, or *Hog.* See Spondias.

Plum, *Indian date*, *piſhamin*, *perſimon*, or *pitchumon.* See Diospyros.

Plum, *Maiden.* See Camocladia.

PLUMAGE, the feathers, or covering of birds; for the mechaniſm of which, ſee Feather.

Plumage, in *Falconry*, is particularly underſtood of the feathers under a hawk's wing.

The falconers alſo give their hawks parcels of ſmall feathers to make them caſt: and theſe they call plumage.

PLUMARTIN, in *Geography.* See Pleumartin.

PLUMAU, a town of Auſtria; ſeven miles N.W. of Hooren.

PLUMB, or Plum, in matters of ſpicery. See Currants and Raisins.

Plumb *Iſland*, in *Geography*, an iſland on the N.E. coaſt of Long iſland, in the ſtate of New York, annexed to Southhold in Suffield county. It contains about 800 acres, and ſupports ſeven families. It is fertile, and produces wheat, corn, butter, cheeſe, and wool. This iſland, with the ſandy point of Gardener's iſland, forms the entrance of Gardener's bay.

Plumb *Point, Great*, lies on the S. coaſt of the iſland of Jamaica, and forms the S.E. limit of the peninſula of Port Royal, which ſhelters the harbour of Kingſton. *Little Plumb Point* lies weſtward of the former, towards the town of Port Royal, on the S. ſide of the peninſula.

Plumb-*Line*, a term among artificers for a perpendicular line.

It is thus called, becauſe uſually deſcribed by means of a plumbet.

PLUMBAGINES, in *Botany*, the fourth natural order of Juſſieu's 7th claſs, immediately following his Nyctagines; ſee that article. The name is taken from one of the genera, and the characters are theſe.

Calyx tubular. *Corolla* of one or more petals, below the germen. *Stamens* definite, inſerted either below the germen, or into the corolla. *Germen* one, ſuperior; ſtyle one or many; ſtigma many. *Capſule* ſingle-ſeeded, with many valves at the baſe, hood-like. *Seed* ſtraight, inſerted by a thread-like ſtalk into the receptacle of the germen. *Corculum* oblong, flat, ſurrounded by a farinaceous albumen. *Stem* herbaceous, or ſomewhat ſhrubby. *Leaves* alternate.

The genera in Juſſieu are only two, *Plumbago* and *Statice.* Mr. Brown adds *Taxanthema* and *Aegialitis.*

PLUMBAGO, a name evidently derived from *plumbum*, lead, but whether it alludes to any colouring quality in the plant, or to the hue of its foliage, critics are not agreed. The latter ſeems conſiſtent with *P. europæa*, or Common Leadwort, whoſe leaves are of a very peculiar greyiſh-green. The *Polygonum Perſicaria*, with dark ſpots on its leaves, has ſometimes borne this name, for a ſimilar reaſon.—Linn. Gen. 86. Schreb. 114. Willd. Sp. Pl. v. 1. 837. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 1. 323. Brown Prodr. Nov. Holl. v. 1. 425. Sm. Prodr. Fl. Græc. Sibth. v. 1. 131. Juſſ. 92. Tourn. t. 58. Lamarck Illuſtr. t. 105. Gærtn. t. 50.—Claſs and order, *Pentandria Monogynia.* Nat. Ord. undetermined by Linnæus. *Plumbagines*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, ovate-oblong, tubular, with five plaits or angles, and five teeth, rough, permanent. *Cor.* of one petal, funnel-ſhaped; tube cylindrical, contracted upwards, longer than the calyx; limb in five ovate, rather ſpreading, ſegments. *Stam.* Filaments five, awl-ſhaped, unconnected with the corolla, encloſed within its tube; anthers ſmall, oblong, verſatile. *Piſt.* Germen ſuperior, ovate, very ſmall; ſtyle ſimple, the length of the tube; ſtigmas five, ſlender, ſimple. *Peric.* Capſule ovate, thin, of one cell and five incomplete valves. *Seed* ſolitary, ovate.

Obſ. We find no traces of the nectary, or valves ſupporting the ſtamens, deſcribed by Linnæus.

Eſſ. Ch. Corolla funnel-ſhaped. Stamens inſerted into the receptacle. Stigmas five. Capſule membranous, of one cell. Seed ſolitary.

1. P. *europæa.* Common Lead-wort. Linn. Sp. Pl. 215. Sm. Fl. Græc. Sibth. t. 191, unpubl. (P. Plinii; Ger. Em. 1254. Tripolium Dioſcoridis; Column. Ecphr. 160.

160. t. 161.)—Leaves claſping the ſtem, lanceolate-oblong, rough. Stem ſtraight, erect.—Native of the ſouth of Europe. Perennial and hardy in our gardens, but not in general cultivation. The *ſtem* is herbaceous, three feet high, upright, leafy, furrowed, with many ſtraight upright flowering branches, each terminating in a ſimple denſe *ſpike*, of ſmall pale-purple *flowers* with a briſtly *calyx*. The *leaves* are alternate, numerous, recurved, oblong-lanceolate, obtuſe, bluntly toothed, dull green, rough but not hairy; their baſe tapering, then dilated round the ſtem or branch.

2. P. *lapathifolia*. Dock-leaved Lead-wort. Willd. n. 2. (P. orientalis, lapathi folio, flore minore albido; Tourn. Cor. 7.)—"Leaves claſping the ſtem, lanceolate, ſmooth. Stem divaricated."—Native of Iberia. *Stem* taller, with longer more ſpreading branches; *leaves* much larger, ſmooth; *flowers* about half the ſize of the foregoing. *Willd.*

3. P. *capenſis*. Cape Lead-wort. Thunb. Prodr. 33. Willd. n. 3.—"Leaves ſtalked, oblong, nearly entire; glaucous beneath. Stem erect." *Thunb.*—Native of the Cape of Good Hope.

4. P. *zeylanica*. Ceylon Lead-wort. Linn. Sp. Pl. 215. Willd. n. 4. Ait. n. 2. Brown n. 1. (Lychnis indica ſpicata, ocymaſtri foliis, fructibus lappaceis oblongis, radice urente; Comm. Hort. v. 2. 169. t. 85.)—Leaves ſtalked, oblong-ovate, ſmooth, entire. Stem erect, round.—Native of the Eaſt Indies, and New Holland. It flowers in the ſtove from April to September. The *ſtem* is rather ſhrubby. *Flowers* white; with a long tube.

5. P. *roſea*. Roſe-coloured Lead-wort. Linn. Sp. Pl. 215. Willd. n. 5. Ait. n. 3. Curt. Mag. t. 230. (Radix veſicatoria; Rumph. Amboin. v. 6. 453. t. 168.)—Leaves ſtalked, ovate, ſmooth, ſomewhat toothed. Joints of the ſtem tumid.—Native of the Eaſt Indies; ſaid to have been introduced by Dr. Fothergill in 1777. It blooms in the ſtove almoſt all the year long; and is the moſt favourite ſpecies of its genus, on account of the delicate pale ſcarlet of its *flowers*, which form compound cluſters at the ends of the branches. The *ſtem* is ſhrubby, four or five feet high, ſlender, and requiring ſupport. *Leaves* recurved.

6. P. *ſcandens*. Climbing Lead-wort. Linn. Sp. Pl. 215. Willd. n. 6. Ait. n. 4. (Dentellaria lychnioides ſylvatica ſcandens, flore albo; Sloane Jam. v. 1. 211. t. 133. f. 1.)—Leaves ſtalked, ovate, ſmooth. Stem zigzag, climbing. Native of the Weſt Indies. It was brought into the ſtoves of this country very early, but is not much regarded at preſent, the *flowers* being white and not ſtriking in their appearance. Sloane compares them to the common field Campion. The climbing, much more lofty *ſtem*, diſtinguiſhes it from the two laſt. Their *leaves* are variable, and afford no well-marked diſtinction.

7. P. *auriculata*. Auricled Lead-wort. Lamarck Dict. v. 2. 270. Willd. n. 7.—Leaves ſtalked, ovate-oblong, with ſcaly dots beneath. Footſtalks auricled at their baſe, and claſping the ſtem.—Native of the Eaſt Indies. *Stem* ſhrubby, ſlender. *Leaves* obtuſe, ſmooth above; contracted at their baſe. *Flowers* in ſhort terminal ſpikes, reſembling thoſe of *P. roſea* in form, but in the dried ſpecimen they had no appearance of a red colour. *Lamarck.*

8. P. *triſtis*. Dark-flowered Lead-wort. Ait. n. 5.—"Leaves obovate, abrupt, ſmooth.—Native of the Cape of Good Hope, from whence it was ſent to Kew by Mr. Maſſon, in 1792. This is a greenhouſe ſhrub, flowering in May and June. We have ſeen no ſpecimens of theſe two laſt ſpecies.

PLUMBAGO, in *Gardening*, contains plants of the herbaceous, flowering, perennial kinds, of which the ſpecies cultivated are; the European leadwort (P. europæa); the Ceylon leadwort (P. zeylanica); the roſe-coloured leadwort (P. roſea); and the climbing leadwort (P. ſcandens).

Method of Culture.—The firſt ſort is increaſed by parting the roots in the autumn, when the ſtems decay, and planting them in a dry ſoil. They ſhould afterwards be kept clean from weeds, and have proper ſupport.

The three other ſorts ſhould be raiſed from ſeeds, which ſhould be ſown in pots in the ſpring, and plunged in hot-beds. They likewiſe may ſometimes be raiſed by planting ſlips and cuttings in pots, and plunging them in the ſame ſorts of hot-beds.

Theſe are all ornamental flowering plants; the firſt in the pleaſure-grounds, and the others in pots among hot-houſe collections.

PLUMBAGO, in *Metallurgy*, a metalline recrement, ſeparated in the purification of gold or ſilver with lead, and ſticking to the ſides of the furnace.

This is otherwiſe called *molybdæna;* and has the ſame virtue with litharge. See MOLYBDÆNA.

PLUMBAGO ſeems to have been uſed, among the *Ancients*, for *Black* LEAD (which ſee), and employed in making pencils for deſigning, &c.

The black lead uſed for this purpoſe, called "plumbago," and alſo "carbure of iron," by Werner "graphit," the "fer carbure" of Haüy, is a ſpecies of coal, or mineral carbon (ſee COAL), of a dark iron black colour, paſſing into ſteel-grey, and occurs in maſs, in kidney-ſhaped lumps, and diſſeminated. It has a gliſtening metallic luſtre; its fracture is ſmall, ſomewhat curved foliated, approaching to ſcaly, or granular uneven: in the great it is ſlaty. It occurs generally in granular or ſcaly diſtinct concretions; takes a poliſh by cutting or rubbing; gives a dark lead-grey ſtreak, and is unctuous to the feel, ſoft, and not very brittle. Spec. grav. 1.98 to 2.26. It does not flame when heated, nor can by itſelf to ſupport combuſtion. After long expoſure to a high heat in a muffle, its carbon is burnt off, and its earthy and metallic part remains behind. If one part of plumbago, and two of very cauſtic dry alkaline, be heated in a retort with the pneumato-chemical apparatus, the alkaline becomes efferveſcent, hydrogenous gas is obtained, and the plumbago diſappears. This experiment proves, that the ſmall quantity of water contained in the ſalt is decompoſed, and that its oxygen, by combining with the carbon of plumbago, forms the carbonic acid. The ſulphuric acid does not act upon plumbago, according to Scheele. Pelletier has obſerved, that 100 grains of plumbago, and four ounces of oil of vitriol, being digeſted in the cold for ſeveral months, the acid acquired a green colour, and the property of congealing by a very ſlight degree of cold. The ſulphuric acid diſtilled from plumbago paſſes to the ſtate of the ſulphureous acid; at the ſame time that carbonic acid is obtained, and an oxyd of iron is left in the retort. The nitric acid has no action upon plumbago, unleſs it be impure. The muriatic acid diſſolves the iron and clay which contaminate native plumbago. Meſſrs. Berthollet and Scheele availed themſelves of this method to purify it. The liquor being decanted after digeſtion upon the plumbago, the reſidue is then waſhed and ſubmitted to diſtillation to ſeparate the ſulphur. The muriatic acid alone has no action upon plumbago, but the oxygenated muriatic acid diſſolves it; the reſult being a true combuſtion effected by the oxygen of the acid, and the carbon of the plumbago. If ten parts of the nitrate of pot-aſh be fuſed in a crucible, and one part of plumbago be thrown upon it by a little at a time, the ſalt will deflagrate, and the plumbago will be deſtroyed. The matter which remains in the crucible conſiſts of very efferveſcent alkali, and a ſmall portion of martial ochre. If plumbago be diſtilled with muriate of ammonia, the muriate ſublimes, coloured by the iron. All theſe facts prove that plumbago is a peculiar combuſtible ſubſtance, a true charcoal combined with a martial baſis. The purer kind of plumbago, according to Scheele and Berthollet, conſiſts of about 90 *per cent.* of carbon and 10 of iron. An impure kind from Pluſſier afforded Vauquelin

23 carbon
2 iron
37 alumine
38 ſilex
—
100
—

The brilliant charcoal of certain vegetable ſubſtances, more eſpecially when formed by diſtillation in cloſe veſſels, poſſeſſes all the characters of plumbago : and the charcoal of animal ſubſtances, poſſeſſes characters ſtill more peculiarly reſembling it. When animal ſubſtances are diſtilled by a ſtrong fire, a very fine powder ſublimes, which attaches itſelf to the inner part of the neck of the retort. This ſubſtance may be made into excellent black-lead pencils. Carbon may be formed in the earth by the decompoſition of wood, together with pyrites ; but the origin of plumbago, ſays M. Chaptal, is principally owing to the ligneous, and truly indecompoſable, part of the wood, which reſiſts the deſtructive action of water in its decompoſition of vegetable ſubſtances. This mineral is found in primitive and tranſition rocks in England, Scotland, France, Spain, Germany, America, &c. Beſides its uſe for pencils, the beſt for this purpoſe is that from Borrowdale, in Cumberland ; it is ſometimes uſed to lubricate machinery inſtead of oil, and to protect iron from ruſt. The hearths and plates of chimnies and other utenſils, which appear very bright, owe their colour to plumbago. For this purpoſe Homberg long ago, *viz.* in 1699, directed 8lbs. of hog's-lard to be melted with a ſmall quantity of water, with the addition of 4 oz. of camphor. When this laſt is fuſed, the mixture is taken from the fire ; and while it is yet hot, a ſmall quantity of plumbago is added to give it a leaden colour. When this is to be applied, the utenſils muſt be heated to ſuch a degree, that the hand can ſcarcely bear to touch them. In this ſtate the compoſition muſt be rubbed on them, and afterwards wiped when the piece is dry. Thoſe who prepare ſmall ſhot, uſe black lead to poliſh or glaze it, by rolling or agitating them together with a quantity of plumbago. It is likewiſe uſed to make razor ſtrops. When kneaded with clay, it makes excellent crucibles. One part of plumbago, three of argillaceous earth, and a ſmall quantity of cow's dung very finely chopped, form an excellent lute for retorts ; this lute is very refractory ; and the glaſs will melt with the coverings changing its form. Aikin's Dict. Chaptal's Chem. vol. ii.

Pomet ſays, that plumbago was the ſea-lead, *plumbum marinum*, of the ancients ; who, he notes, took black-lead for a production of the ſea, not a mineral, as it really is ; but this is ſcarcely credible.

Plumbago, in the *Hiſtory of the Gems*, a word uſed by the Roman authors to expreſs a blemiſh common to their worſe kinds, and greatly debaſing their value. It was a ſort of blueiſh or blackiſh deadneſs in the ſtone, which mixed itſelf with the other colour, be that what it would, and rendered it dull and dead. The emerald was of all the gems the moſt ſubject to this fault ; and in this caſe, its fine green colour was always rendered cloudy and blueiſh ; and in ſome lights the ſtone appeared of a duſky greyiſh-blue, with no green at all in it. The Bactrian emeralds, which were in great eſteem with the ancients, were often ſubject to this imperfection ; and thoſe of Cyprus, taken out of the copper mines, though ſubject to many other imperfections, were uſually quite free from this.

Plumbago, in *Mineralogy*, a name given by many authors to a ſort of foſſil, having very much the appearance of a lead-ore, but not ſuch in reality.

It is called alſo galena, blende, and mock-lead. It is uſually of a plated texture, and dark blackiſh-blue colour, like the lead-ores ; but on trial it yields no metal. See Galena and Blende.

PLUMBARIA, in *Ancient Geography*, an iſland ſituated on the coaſt of Spain, near the promontory Dianium, according to Strabo.

PLUMBATÆ, among the *Ancients*, a kind of ſcourge, the thongs of which were armed with lead.

Plumbatæ likewiſe ſignified leaden balls, uſed by ſoldiers to annoy the enemy with ; whence the ſoldiers were called *martiobarbuli*.

PLUMBERY, formed of *plumbum*, *lead*, the art of caſting, preparing, and working lead ; and of uſing it in buildings, &c. See Lead.

The lead uſed in plumbery is furniſhed from the lead-works in large ingots, or blocks, called pigs of lead, ordinarily weighing about a hundred pounds a-piece.

As this metal melts very eaſily, it is eaſy to caſt figures of it, of any kind, by running it into moulds of braſs, clay, plaiſter, &c. But the chief article in plumbery is the ſheets, and pipes of lead. They are theſe which make the baſis of the plumber's work in building ; the proceſs of theſe, therefore, we ſhall give a deſcription of.

Method of caſting large Sheets of Lead.—The lead deſtined for this uſe is melted in a large cauldron or furnace, uſually built with free-ſtone and earth, fortified on the outſide with a maſſive of ſhards and plaiſter. At the bottom of it is a place ſunk lower than the reſt, in which is diſpoſed an iron pot, or pan, to receive what may remain of the metal after the ſheet is run. The furnace is ſo raiſed above the area of the floor, as that the iron pot juſt reſts on it.

To uſe the furnace, they heat it with wood laid within it ; that done, they throw in the lead at random with the burning coals, to melt.

Near the furnace is the table or mould, on which the lead is to be caſt. This conſiſts of large pieces of wood, well jointed, and bound with bars of iron at the ends. Around it runs a frame, conſiſting of a ledge or border of wood, two or three inches thick, and one or two high from the table, called the *ſharps*. The ordinary width of the tables is from three to four feet ; and their length from eighteen to twenty feet.

This table is covered with fine ſand, prepared by moiſtening it with a watering pot, then working it with a ſtick ; and at laſt, to render it ſmooth and even, beating it flat with a mallet, and planing it with a ſlip of braſs, or wood.

Over the table is a ſtrike or rake of wood, which bears and plays on the edges of the frame, by means of a notch cut in either end of it ; and is ſo placed, as that between it and the ſand is a ſpace proportionable to the intended thickneſs of the ſheet. The uſe of this ſtrike is to drive the matter, while yet liquid, to the extremity of the mould.

At top of the table is a triangular iron peel or ſhovel, bearing, before, on the edge of the table itſelf, and behind, on a treſſel ſomewhat lower than the table. Its uſe is in conveying the metal into the mould ; and the deſign of its oblique diſpoſition is, that it may by that means be able to retain the metal, and keep it from running off at the fore-ſide, where it has no ledge. Some of theſe peels are big enough to hold fifteen or ſixteen hundred weight of lead, and even more.

Things being thus diſpoſed, with a large iron ladle they take out the melted lead, coals and all, out of the furnace; and with this, mixed as it is, they fill the iron peel. When full, they take out the coals, and clear the lead with another iron ſpoon, pierced after the manner of a ſcummer.

This done, they hoiſt up the lower part of the peel by its handle; upon which the liquid matter running off, and ſpreading itſelf on the mould, the plumber conducts and drives it to the extremity of the table, by means of the ſtrike, which the workman paſſes along the ledges, and thus renders the ſheet of an equal thickneſs.

The ſheets thus caſt, there remains nothing but to edge them, *i. e.* to planiſh the edges on both ſides, in order to render them ſmooth and ſtraight.

Method of caſting thin Sheets of Lead.—The table or mould here uſed is of a length or breadth at diſcretion, only ledged on one ſide. Inſtead of ſand, they cover it with a piece of woollen ſtuff, nailed down at the two ends, to keep it tight; and over this they lay a very fine linen cloth. The feet of the table are uneven, ſo that it does not ſtand horizontal, but moderately inclined.

Great regard is, in this proceſs, had to the lead while melting, that it have the juſt degree of heat, ſo as it may run well, yet not burn the linen. This they judge of by a piece of paper; for if the paper take fire in the liquid lead, it is too hot; and if it be not ſhrunk and ſcorched a little, it is not hot enough.

Being then in its juſt degree, they have a ſtrike, but different from that deſcribed in the former article; as ſerving both for peel and ſtrike; both to contain and to conduct the liquid lead. It is, in effect, a wooden caſe without any bottom, only cloſed on three ſides. It is pretty high behind, but the two ſides, like two acute angles, ſtill diminiſh to the tip, from the place where they are joined to the third or middle piece, where they are of the ſame height with it; *viz.* ſeven or eight inches high. The width of the middle makes that of the ſtrike, which again makes that of the ſheet to be caſt.

The ſtrike is placed at top of the table, which is before covered in that part, with a paſteboard, that ſerves as a bottom to the caſe, and prevents the linen from being burnt while the liquid is pouring in. The ſtrike is ſo diſpoſed on the table, as that the higheſt part looks to the lower end of the table, and the two ſloping ſides to the higher end.

The ſtrike is now filled with lead, according to the quantity to be uſed; which done, two men, one at each ſide the table, let the ſtrike deſcend down the table, or elſe draw it down with a velocity greater or leſs, as the ſheet is to be more or leſs thick; the thickneſs of the ſheet ſtill depending on the promptitude with which the ſtrike ſlides down the inclining mould.

The fine ſmooth ſheets of lead, thus made, are ſometimes uſed between the joints of large ſtones in great buildings, &c.

For the method of caſting pipes, without ſoldering, ſee PIPE.

The ſolder which the plumbers uſe, is a mixture of two pounds of lead with one of tin. See SOLDER.

Plumber's work is commonly eſtimated by the pound or hundred weight; but the weight may be diſcovered by the meaſure of it, in the manner below ſtated. Sheet lead uſed in roofing, guttering, &c. is commonly between ſeven and twelve pounds weight to the ſquare foot; but the following table ſhews by inſpection the particular weight of a ſquare foot for each of ſeveral thickneſſes.

Thickneſs.	Pounds to a Square Foot.	Thickneſs.	Pounds to a Square Foot.
.10	5.899	.15	8.848
.11	6.489	.16	9.438
$\frac{1}{9}$	6.554	$\frac{1}{6}$	9.831
.12	7.078	.17	10.028
$\frac{1}{8}$	7.373	.18	10.618
.13	7.668	.19	11.207
.14	8.258	$.2 = \frac{1}{5}$	11.797
$\frac{1}{7}$	8.427	.21	12.387

In this table the thickneſs is ſet down in tenths and hundredths, &c. of an inch; and the annexed correſponding numbers are the weights in avoirdupois pounds, and thouſandth parts of a pound. So the weight of a ſquare foot of $\frac{1}{10}$ or $\frac{10}{100}$ of an inch thick, is 5 pounds and 899 thouſandth parts of a pound; and the weight of a ſquare foot to $\frac{1}{9}$ of an inch thickneſs is 6 pounds and $\frac{554}{1000}$ of a pound. Leaden pipe of an inch bore is commonly 13 or 14 pounds to the yard in length.

Examples.

1. How much weighs the lead which is 39 feet 6 inches long, and 3 feet 3 inches broad, at $8\frac{1}{2}$ lbs. to the ſquare foot?

Decimals.

39.5
$3\frac{1}{4}$

118.5
9.875

128.375
$8\frac{1}{2}$

1027.000
64.1875

1091.1875

Duodecimals.

39 . 6
3 3

118 6
9 10 6

128 4 6
$8\frac{1}{2}$
1024

64
$2\frac{5}{6}$
$0\frac{17}{48}$

Anſwer $1091\frac{9}{48}$ lbs.

2. What coſt the covering and guttering of a roof with lead, at 18*s.* the cwt.; the length of the roof being 43 feet, and the breadth or girth over it 32 feet, the guttering 57 feet long, and two feet wide; the former 9.831 lbs., and the latter, 7.373 lbs. to the ſquare foot? Anſ. 115*l.* 9*s.* $1\frac{1}{2}$*d.* Hutton's Menſuration.

PLUMBING, among *Miners*, a term uſed to expreſs the uſing a mine dial, in order to know the exact place of the work where to ſink down an air ſhaft, or to bring an adit to the work, or to know which way the load inclines when any flexure happens in it.

It is performed in this manner: a ſkilful perſon with an aſſiſtant, and with pen, ink, and paper, and a long line and a ſun-dial, after his gueſs of the place above ground, deſcends into the adit or work, and there faſtens one end of the line to ſome fixed thing in it; then the incited needle is let to reſt, and the exact point where it reſts is marked with a pen: he then goes on farther in the line ſtill faſtened, and at the next flexure of the adit he makes a mark on the line by a knot or otherwiſe; and then letting down the dial again, he there likewiſe notes down that point at which the needle ſtands in this ſecond poſition. In this manner he proceeds from turning to turning, marking down the points, and marking the line till he comes to the intended place; this done, he aſcends, and begins to work on the ſurface of the earth what he did in the adit, bringing the firſt knot in the line to ſuch a place where the mark of the place of the needle will again anſwer its pointing, and continues this till he comes to the deſired place above ground, which is certain to be perpendicularly over the part of the mine into which the air-ſhaft is to be ſunk.

PLUMBUM. See LEAD.

PLUMBUM *Corneum*, called alſo *Saturnus corneus*, in *Chemiſtry*, is a metallic ſalt, formed by the precipitation of lead from its ſolution in nitrous acid with the marine acid, and all the neutral ſalts which contain it. It is thus called from its reſemblance to the luna cornea. This ſalt may be made by other methods, and particularly by diſengaging the volatile alkali from ſal ammoniac by lead. In this way Mr. Margraaf makes the plumbum corneum, which he employs in the preparation of phoſphorus. See LEAD.

PLUMBUM *Uſtum*. See *Burnt* LEAD.

PLUME, a ſet or bunch of oſtrich feathers, pulled out of the tail and wings, and made up to ſerve for ornament in funerals, &c.

PLUME, formed of *pluma*, *feather*, in *Falconry*, is the general colour or mixture of the feathers of a hawk, which ſhews her conſtitution.

When a hawk ſeizes her prey, and diſmantles it of its feathers, ſhe is ſaid to plume it.

PLUME, in *Botany*. See PLUMULA.

PLUME, *La*, in *Geography*, a town of France, in the department of the Lot and Garonne, and chief place of a canton, in the diſtrict of Agen; 7 miles S.S.W. of Agen. The place contains 1588, and the canton 6633 inhabitants, on a territory of 127½ kiliometres, in 10 communes.

PLUME *Alum*. See ALUM.

PLUMENAU, or PLUMLAW, in *Geography*, a town of Moravia, in the circle of Olmutz; 4 miles W. of Proſnitz.

PLUMENTAAL, a town of Auſtria; 4 miles W. of Ziſterſdorf.

PLUMERIA, in *Botany*, was ſo named by Tournefort, in honour of its diſcoverer, the celebrated Father Plumier. (See PLUMIER, CHARLES.)—Tourn. Inſt. 659. t. 439. Linn. Gen. 117. Schreb. 164. Willd. Sp. Pl. v. 1. 1242. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 2. 70. Juſſ. 145. Lamarck Illuſtr. t. 173.—Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Contortæ*, Linn. *Apocineæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, ſmall, in five deep obtuſe ſegments. *Cor.* of one petal, funnel-ſhaped; tube long, gradually dilated upwards, naked at the mouth; limb ſpreading, in five deep, ovate-oblong, oblique ſegments. *Stam.* Filaments five, awl-ſhaped, from the middle of the tube; anthers converging. *Piſt.* Germen ſuperior, oblong, cloven; ſtyles ſcarcely any; ſtigma double, pointed. *Peric.* Follicles two, long, pointed, tumid, bent downwards, drooping, each of one cell, and one valve. *Seeds* numerous, oblong, imbricated, winged with a membrane. *Receptacle* ſeparate, cylindrical.

Eſſ. Ch. Corolla contorted, funnel-ſhaped: naked at the mouth. Follicles two, reflexed. Seeds with a membranous wing.

1. P. *rubra*. Red Plumeria. Linn. Sp. Pl. 306. Willd. n. 1. Ait. n. 1. Curt. Mag. t. 279. (P. flore roſeo odoratiſſimo; Tourn. Inſt. 659. Trew. Ehret. 11. t. 41. Jaſminum indicum; Merian. Inſ. Surinam. t. 8.)—Leaves ovate-oblong. Flower-ſtalks downy, even.—Native of Jamaica and Surinam, where it is cultivated on account of the beauty and fragrance of its bloſſoms, which come out before the leaves. Merian ſays it is readily propagated, and grows rapidly. In our ſtoves it bloſſoms in July and Auguſt. The *ſtem* is thick and fleſhy, forming a tall ſhrub, or ſmall tree, in the courſe of a few months, and abounding with milky juice. *Leaves* deciduous, ſcattered, ſtalked, a ſpan long, and one and a half or two inches wide, oblong, ſomewhat ovate or elliptical, pointed, entire, ſmooth, with one thick rib, and many tranſverſe veins, connected by a ſubmarginal line. We find no traces of the two glands on the *footſtalks*, mentioned by Linnæus, after Browne. The *flowers* are numerous, in a terminal cymoſe *panicle*, whoſe ſtalks, in all the ſpecimens we have ſeen, are denſely downy. The *corolla* expands near two inches, and is roſe-coloured, with a yellow mouth.

2. P. *acuminata*. Sharp Eaſt Indian Plumeria. Ait. n. 2. (Flos convolutus; Rumph. Amboin. v. 4. 85. t. 38.)—Leaves lanceolate, flat, taper-pointed. Flower-ſtalks ſmooth, even.—Native, as well as cultivated, in various parts of the Eaſt Indies, being much admired for its beautiful and fragrant white *flowers*. Theſe, according to Rumphius, are ſometimes candied with ſugar. It was introduced at Kew, about 1790, by ſir Joſeph Banks, and flowers there from June to September. The habit of the plant is like the laſt, but the *corolla* is white with a yellow mouth; the *flower-ſtalks* ſmooth; and the *leaves* much more pointed. The tapering *leaves*, and leſs tumid or rugged *flower-ſtalks*, diſtinguiſh this from the following, which the *flowers* moſt nearly reſemble.

3. P. *alba*. White Weſt Indian Plumeria. Linn. Sp. Pl. 306. Willd. n. 2. Ait. n. 3. Jacq. Amer. 36. t. 174. f. 12. (P. flore niveo, foliis longis anguſtis et acuminatis; Tourn. Inſt. 659. Plum. Ic. 227. t. 231.)—Leaves lanceolate, revolute. Flower-ſtalks ſmooth, knotty above.—Native of the Weſt Indies, on rocks by the ſea ſide. *Jacq.* It flowers in our ſtoves in July and Auguſt, but is more rare than the firſt ſpecies. Nothing can exceed the fragrance of the large and elegant white *flowers*, whoſe inſide, at the mouth of the tube, is yellow, as in the two preceding.

4. P. *obtuſa*. Blunt-leaved Plumeria. Linn. Sp. Pl. 307. Willd. n. 3. Ait. n. 4. Aubl. Guian. v. 1. 259. (P. flore niveo, foliis brevioribus obtuſis; Tourn. Inſt. 659. Plum. Ic. 228. t. 231. Cateſb. Carolin. v. 2. t. 93.) —Leaves obovate, obtuſe, with a ſhort point.—Native of South America and the Weſt Indies. It flowers in the ſtove in July, according to Mr. Aiton. Our ſpecimen is from Aublet. The ſhape of the *leaves*, as above defined, is very different from any of the foregoing, with much more diſtant, leſs parallel, veins; in which reſpect Plumier's plate is altogether unlike our plant. Our *flower-ſtalks* too are much more elongated, zig-zag, and copiouſly jointed. Aublet ſays it is as large as a pear-tree of the largeſt ſize. Burmann has very improperly confounded the ſynonyms of *P. rubra* with this, and Willdenow, like Linnæus, erroneouſly cites under it Rumphius's *Flos convolutus*; ſee n. 2.

5. P. *pudica*. Virgin Plumeria. Jacq. Amer. 37. Willd. n. 4.—Leaves oblong, flat. Limb of the corolla cloſed.—Jacquin ſays he ſaw this plant cultivated in the gardens of Curaçao, where it was highly eſteemed for its *flowers*, known there by the name of Douzellas, or virgins, becauſe they are never expanded. Their colour is entirely yellow, and their ſcent, in the opinion of the author we quote, greatly excels every other *Plumeria*, and ſeemed ſuperior to all the flowers with which he was acquainted. The *ſhrub* is five feet high, milky, with umbrageous, oblong, flat veiny *leaves*. *Flowers* laſting, in abundant ſucceſſion, for two

months, their *corolla* always rolled up, like the *Achania Malvaviſcus*.

6. P. *cuneata*. Wedge-leaved Plumeria. Linn. fil. MSS. (P. alba; Aubl. Guian. v. 1. 259, excluding the ſynonyms.)—Leaves obovate, ſomewhat wedge-ſhaped, rounded, pointleſs; veins diſtant.—Cultivated at Cayenne, according to Aublet, who took it for the Linnæan *P. alba*. We have numerous *leaves* from his own herbarium, given by ſir J. Banks to the younger Linnæus, who juſtly remarked that this muſt conſtitute a diſtinct ſpecies, though he had ſeen merely theſe ſeparate *leaves*. Another ſpecimen, apparently from the ſame herbarium, and likewiſe without *flowers*, is marked *P. laurifolia;* but it looks to us like a leſs blunt variety of Aublet's *obtuſa*.

The French name of this genus, *Frangipanier*, is rather remarkable. It is ſaid to allude to its fragrance, *Frangipani* being a ſort of perfume, ſo called in France from its inventor, an Italian, of the Frangipani family, ſo conſpicuous in the Roman diſturbances of the twelfth century.

PLUMERIA, in *Gardening*, contains plants of the ſucculent, flowering, exotic kind for the ſtove, of which the ſpecies cultivated are the red plumeria, or jaſmine (P. rubra); the white plumeria (P. alba); the blunt-leaved plumeria (P. obtuſa); and the cloſe-flowered plumeria (P. pudica.)

Method of Culture—Theſe plants are capable of being increaſed by ſeeds and cuttings of the young branches. The ſeeds ſhould be procured from the native ſituation of the plants, and be ſown in pots, filled with a light ſandy compoſt, plunging them in a hot-bed, covered by glaſſes, or the bark-bed in the ſtove, when they readily vegetate; and when the plants have attained a few inches in growth, they ſhould be removed into ſeparate pots, of a ſmall ſize, which muſt be plunged in beds of the ſame kind as above.

The cuttings ſhould be made from the young branches, and after being laid in the ſtove or ſome other dry ſituation, to diſpel their ſucculence, and heal over the wounds, be planted out during the ſummer months, in pots, filled with light dry mould, plunging them in the bark bed of the ſtove, giving occaſional ſhade and very ſlight waterings, till they have ſtricken freſh root, and when they have become well rooted, they may be removed into ſeparate pots, being managed as other ſtove exotics.

They afford much ornament and variety among collections of ſtove plants; eſpecially the red ſort; and when ſet out with other potted plants in the ſummer, have a delightful fragrance.

PLUMIER, CHARLES, in *Biography*, a French botaniſt and eccleſiaſtic, of the moſt reſpectable character, was born in 1646. He belonged to the religious order of Minims, and is deſcribed as of a ſimplicity of character becoming his monaſtic profeſſion, if not invariably aſſociated with it. To this he added the moſt enthuſiaſtic love of botany, and a degree of accuracy and penetration rarely excelled in that ſcience. He was ſent, at the expence of the French king, on three different voyages to the Weſt Indies; and was about to undertake a fourth, when he died of a pleuriſy at Cadiz in 1704, aged 58.

His firſt publication is entitled *Deſcription des Plantes de l'Amerique, avec leurs figures*, a ſplendid folio of above 100 pages, with 108 plates, which iſſued from the Louvre preſs, at the king's expence, in 1693. The text is French; the plates are outlines, drawn by Plumier himſelf, with a maſterly hand. In the preface he relates, that he firſt imbibed a taſte for botany at his convent of Trinitâ dei monti at Rome, from the lectures of Father Sergeant, a French monk, and of de Onuphriis, a Roman phyſician. By this taſte he was inſenſibly diverted from the mathematics, which have always been much ſtudied in that convent, even to our own times. Being ordered to his native country, he obtained the permiſſion of his ſuperiors to botanize on the ſhores of Provence, and the mountains of the Alps. Here he meditated a general *Pinax*, or Syſtem of Botany, with figures, of which he had actually drawn a conſiderable number, when he found at Marſeilles an opportunity of ſailing to America. Begon, intendant of the French navy, furthered his views, and procured for him the patronage and ſupport of government; by which action alone, if by nothing elſe, the intendant may be ſaid to have merited his own botanical honours. (See BEGONIA.) Of the plates of this book, 50 are devoted to the fern tribe, and contain many curious ſpecies, previouſly unknown to botaniſts. The reſt of the engravings conſiſt of many ſpecies of *Piper*, *Arum*, and *Paſſiflora*, with other climbing plants. Their parts of fructification are not critically detailed; but that defect was ſupplied in the author's *Nova Plantarum Americanarum Genera*, a thin quarto, publiſhed in 1703, after his third voyage. In this book 106 new genera are eſtabliſhed, and illuſtrated with plates. The manner and principles of Tournefort are adopted throughout. In his nomenclature, Plumier is profuſe in honouring botaniſts, as well as in adopting the moſt uncouth words of barbarous origin; ſcarcely conſtructing one original name, of Greek or Latin derivation, except perhaps *Saururus*, a genus now ſunk in the more ancient *Piper*. Haller juſtly complains, that Plumier falls into the imperfections of Tournefort, with reſpect to his ſuperficial mode of conſidering the parts of the flower, and his inattention to number in their deſcription. He hints alſo that ſome of the delineations have a doubtful or ſuſpicious aſpect. That ſome of theſe figures are erroneous in parts, cannot be denied; as the ſtamens of *Fuchſia*, the ſtigmas of *Plukenetia*, and the whole flower of *Matthiola;* beſides abundance of ſlight negligences or inaccuracies; but we muſt not try the performances of one of the fathers of ſcientific botany, by the teſt of our preſent advanced knowledge.

The Ferns of Plumier's firſt publication were reprinted with a great number of additional figures of the ſame tribe, very finely executed, in another ſplendid folio, containing 172 plates, with Latin as well as French deſcriptions. In the preface he inveſtigates all that had been ſaid relative to the flowers of theſe plants; and though he attributes to Tournefort a ſentiment of Pliny's, he proves himſelf ſufficiently converſant with botanical writers. To give the more conſequence to his favourite purſuit, he very commendably enlarges on the benefits which medicine may derive from the ſtudy of the vegetable world: but as Rouſſeau's Swiſs herbaliſt died of a pleuriſy, whilſt employed in gathering a ſovereign Alpine remedy for that diſorder; ſo it is not improbable that Plumier was extolling the *Polytrichum*, ſee his preface p. 2, as "un antipleuritique des plus aſſurez," when he himſelf fell a victim to the very ſame diſtemper; leaving his half-printed book to be his monument. So much eaſier is it for an ardent botaniſt to catch a pleuriſy, we write from the conviction of experience, than to cure one!

The above works contained but a ſmall part of the productions of Plumier's pencil. Vaſt treaſures of his drawings, in outline, have remained in the French libraries, for the moſt part unpubliſhed. The late earl of Bute obtained copies of a great number of theſe, which after his lordſhip's death paſſed into the hands of ſir Joſeph Banks. Boerhaave had previouſly procured copies of above 500, done by the accurate Aubriet, under Vaillant's inſpection, which were afterwards, in great part at leaſt, publiſhed by John Burmann at Amſterdam, between the years 1755 and 1760. Theſe plates are executed with tolerable, but by no means infallible, accuracy, being far inferior in neatneſs and correctneſs to what Plumier himſelf publiſhed. The well-meaning editor has overloaded the book with deſcriptions of his own, neceſſarily made from the figures, and therefore entirely ſuperfluous. They are indeed not unfrequently founded in miſapprehenſion; nor has he been very happy in the adaptation of his materials to Linnæan names and principles. He ought rather, as Lamarck obſerves, to have given Plumier's materials without alteration or addition. A careful reader may, neverthelefs, avoid being miſled; as the original names and definitions of the author are ſubjoined. It is a pity that nothing is preſerved of the native country, hiſtory, properties or colours of each plant.

Father Plumier wrote, in the *Journal des Sçavans* for 1694, and elſewhere, on Cochineal, and ſome ſubjects connected therewith; proving that valuable article of commerce to be an animal, and not any thing of a vegetable nature. His opinion was, in every eſſential point, confirmed, as well as more preciſely illuſtrated and eſtabliſhed, by Richter, in his rare little treatiſe *de Cochinilla*, publiſhed at Leipſic in 1701.

Our author left no herbarium of his own, his collection of dried plants having been loſt at ſea; but he had, on various occaſions, communicated dried ſpecimens to Tournefort; and theſe ſtill remain, with his hand-writing annexed, in the collections at Paris. Liſter, who viſited Plumier in his cell at the convent of Minims in that city, ſpeaks of his obliging and communicative manners, and of his "deſigns and paintings of plants, birds, fiſhes, and inſects of the Weſt Indies, all done by himſelf very accurately." It appears that, notwithſtanding the royal favour, he was obliged to ſolicit repeatedly, and moſtly in vain, for the publication of his drawings at the king's printing-preſs; ſo imperfect is government patronage for ſcience on all occaſions, and in all countries! See Liſter's Journey to Paris. Plumier's Works. Haller Bibl. Bot.

PLUMMER's Ethiops. This medicine is compoſed of the ſulphur auratum antimonii and calomel, commonly in equal parts, *e. gr.* of each three drams; but this may be varied occaſionally, according to the phyſician's diſcretion. Theſe two powders muſt be well levigated together, by which the bright red colour of the ſulphur is changed into a duſky brown; afterwards, add two drams of the extract of liquorice; and the maſs, with a ſufficient quantity of the mucilage of gum arabic, may be made into pills. We refer to the Medical Eſſays of Edinburgh for the doſe, regimen to be obſerved, and effects of this medicine; as alſo for the manner of preparing the ſulphur of antimony according to Angelus Sala, which is ſaid to be preferable to the common method. See Med. Eſſ. Edinb. abridg. vol. i. p. 205. vol. ii. p. 455.

This medicine has been found greatly beneficial in cutaneous eruptions, and is ſaid to have oompleted a cure after ſalivation has failed, in venereal infections, and in gleets remaining after the cure of a gonorrhœa. It operates by carrying off the excrements of diſtempers by inſenſible perſpiration or ſweat. It has alſo been found ſucceſsful in obſtinate glandular ſwellings; two or three pills of an ordinary ſize may be taken night and morning, the patient keeping moderately warm, and drinking after each doſe a draught of the decoction of the woods, or of ſarſaparilla.

PLUMMET, *Plumb-rule,* or *Plumb-line,* an inſtrument uſed by maſons, carpenters, &c. to draw perpendiculars; in order to judge whether walls, &c. be upright, planes horizontal, and the like.

It is thus called from a piece of lead, *plumbum,* faſtened to the end of a thread or chord, which uſually conſtitutes this inſtrument.

Sometimes the ſtring deſcends along a ruler of wood or metal raiſed perpendicularly on another; in which caſe it becomes a level.

At ſea a plummet is uſed by the pilot to ſound the depth of the water.

PLUMOSE Antennæ, in *Natural Hiſtory,* a term uſed to expreſs the antennæ, or horns of certain moths and butterflies, which are formed in the manner of feathers, being compoſed of a ſtem and fibres iſſuing on each ſide from it: theſe are jointed and moveable any way; and even the ſmall fibres, at their ſides, are jointed at their bottom, and are moveable, but they move all together. See Feelers.

PLUMSTEAD, in *Geography,* a poſt-town of Pennſylvania, ſituated on the weſt ſide of Delaware river; 36 miles N. of Philadelphia.

PLUMULA, in *Botany* and *Vegetable Phyſiology,* ſo called from its reſemblance to a little feather, is the expanding embryo of a ſeed juſt ſprouting, which ſoon becomes a tuft of young leaves, elevated by the protruding ſtem. See Embryo and Cotyledones.

PLUNDER, in *Sea Language,* a name given to the effects of the officers or crew of a prize, which are pillaged by the captors.

PLUNGE, in the *Manege.* See Estrapade.

PLUNGER, in *Mechanics,* a ſolid braſs cylinder uſed as a forcer in forcing pumps.

Plunger is alſo a large veſſel, intended to act as a counter-poiſe for raiſing the water in a lock, in ſome of the ſchemes for ſaving water. See Canal.

PLUNOS, in *Ancient Geography,* a port of Lybia, at the extremity of the country of the Adymachides; mentioned by Lycophron and Herodotus.

PLUQUET, Francis Andrew, in *Biography,* a French abbé of ſome celebrity in the 18th century, was born at Bayeux, in Normandy, in 1716. He was educated for the church, and obtained ſome preferment in it: after this, he was nominated to fill the chair of profeſſor of hiſtory in the univerſity of Paris. By his lectures he acquired a conſiderable ſhare of reputation, the claim to which he ably ſupported by ſeveral uſeful and well-written works. He died in 1790, at the age of 74, having maintained through life the character of a truly virtuous good man. His principal publications are, "An Examination of the Doctrine of Fataliſm," in 3 vols. 12mo.; "A Dictionary of Hereſies," in 2 vols. 8vo.; "A Treatiſe on Sociability," in oppoſition to the ſyſtem of Hobbes, and to prove that man is diſpoſed to benevolence and religion; "The Claſſical Books of the Chineſe Empire," in 4 vols. 12mo., tranſlated from the collection of father Noel; and "A philoſophical and political Treatiſe on Luxury," in 2 vols. 12mo.

PLURAL, Pluralis, in *Grammar,* a particular inflexion of nouns and verbs, whereby they come to expreſs a plurality or number of things.

The Latins, Engliſh, &c. have only two numbers, *ſingular* and *plural;* the Greeks and Hebrews have three, *ſingular, dual,* and *plural.*

In Latin, &c. both nouns and verbs have uſually diſtinct terminations to their different numbers; in Engliſh, nouns ſubſtantives uſually become plural by the addition of an *s* or *es* to the ſingular.

Nouns adjective are the ſame in both numbers; and in verbs, the number is diſtinguiſhed by that of the pronouns.

PLURALITY, Pluralitas, a diſcrete quantity, conſiſting of two, or a greater number.

A *plurality of worlds* is a thing which Mr. Huygens has endeavoured to prove in his Coſmotheoros. And the ſame is likewiſe contended for in a very pretty treatiſe of M. Fontenelle under that title.

See the chief argument for a plurality of worlds under MOON, PLANET, and EARTH.

The greateſt abſurdity in the pagan theology is the *plurality of gods.*

PLURALITY *of Benefices*, or *Livings*, is where the ſame clerk is poſſeſſed of two or more ſpiritual preferments, with cure of ſouls. See BENEFICE.

Plurality of benefices is a thing too much tolerated in the church, but never approved of.

It was the ſmallneſs of ſome benefices that firſt gave occaſion to pluralities; for an eccleſiaſtic, not being able to ſubſiſt on a ſingle one, was allowed to hold two; and at length the number increaſed without bounds.

The abuſe was endeavoured to be remedied at the council of Lateran, under Alexander III. and Innocent III., in the year 1215, when the holding more than one benefice was expreſsly forbid by a canon, under the penalty of deprivation: but the ſame canon granting the pope a power to diſpenſe with it in favour of perſons of diſtinguiſhed merit, there were ſo many found a title to this merit, that the prohibition became uſeleſs.

Pluralities were alſo reſtrained by ſtatute 21 Hen. VIII. cap. 13, which enacts, that if any perſon, having one benefice with cure of ſouls, of the yearly value of 8*l.* or above, (in the king's books,) accept any other with cure of ſouls, the firſt benefice ſhall be adjudged in law to be void, &c., though the ſame ſtatute provides for diſpenſation in certain caſes. For other proviſions of a later date, ſee CHAPLAIN and CURATE.

In order to procure a diſpenſation, the preſentee muſt obtain of the biſhop, in whoſe dioceſe the livings are, two certificates of the values in the king's books, and the reputed values and diſtance of ſuch livings; one certificate for the archbiſhop, and the other for the lord chancellor. And if the livings lie in two dioceſes, then two certificates, of the ſame kind, are to be obtained from each biſhop. He muſt alſo exhibit to the archbiſhop his preſentation to the ſecond living; and bring with him two papers of teſtimonials from the neighbouring clergy, concerning his behaviour and converſation, one for the archbiſhop, and the other for the lord chancellor; and he muſt alſo exhibit to the archbiſhop his letters of orders of deacon and prieſt, and a certificate of his having taken the degree of maſter of arts at the leaſt, in one of the univerſities of this realm, under the hand of the regiſter of ſuch univerſity. And in caſe he be no doctor or bachelor of divinity, nor doctor of law, nor bachelor of canon law, he is to procure a qualification of a chaplain, which is to be duly regiſtered in the faculty office, in order to be tendered to the archbiſhop, according to the ſtatute. And if he hath taken any of the aforeſaid degrees, which the ſtatute allows as qualifications, he is to procure a certificate thereof as already mentioned, and to exhibit the ſame to the archbiſhop; after which his diſpenſation is made out at the faculty office, where he gives ſecurity according to the direction of the canon. Afterwards he muſt repair to the lord chancellor, for confirmation under the broad ſeal; and then he is to apply to the biſhop of the dioceſe where the living lies, for his admiſſion and inſtitution. By 48 Geo. III. c. 149, for every ſkin, or paper, or parchment, &c. on which any diſpenſation to hold two eccleſiaſtical dignities or benefices, or a dignity and a benefice, ſhall be engroſſed or written, there ſhall be paid a ſtamp duty of 30*l.*, when either of them ſhall be above the yearly value of 10*l.* in the king's books; and in all other caſes 20*l.*

We have alſo a regulation in regard to pluralities; but it is often diſpenſed with; for, by the faculty of diſpenſation, a pluraliſt is required, in that benefice from which he ſhall happen to be moſt abſent, to preach thirteen ſermons every year, and to exerciſe hoſpitality for two months yearly.

In Germany the pope grants diſpenſations for poſſeſſing a plurality of benefices, on pretence that the eccleſiaſtical princes there need large revenues to bear up againſt the Proteſtant princes.

PLURIES, in *Law*, a writ that iſſues in the third place after two former writs have been diſobeyed: for firſt goes out the original writ or *capias*, which, if it has no effect, then iſſues the *alias*; and if that alſo fails, then the *pluries*. Old. Nat. Br. 33.

It is uſed in proceedings to outlawry, and in great diverſity of caſes. Tabl. Reg. Writs.

PLURS, in *Geography*. See PLEURS.

PLUS, in *Algebra*, a term commonly uſed for *majus*, of *magis*, *more*; denoted by the character +.

Thus $4 + 10 = 14$, is read, four, *plus*, or more, 10, is equal to 14.

PLUSH, in *Commerce*, &c., a kind of ſtuff having a ſort of velvet nap or ſhag on one ſide; compoſed regularly of a woof of a ſingle woollen thread, and a double warp, the one wool, of two threads twiſted, the other goats' or camels' hair; though there are alſo ſome pluſhes entirely worſted, and others compoſed wholly of hair.

Pluſh is manufactured, like velvet, on a loom with three treadles. Two of theſe ſeparate and depreſs the woollen-warp, and the third raiſes the hair-warp, upon which the workman throwing the ſhuttle, paſſes the woof between the woollen and hair-warp; and afterwards laying a braſs broach, or needle, under that of the hair, he cuts it thereon with a knife deſtined for that uſe, conducting the knife on the broach, which is made a little hollow, all its length; and thus gives the ſurface of the pluſh an appearance of velvet.

Some aſcribe the invention of pluſh to the Engliſh; others ſay it was firſt made in Holland, and particularly at Haerlem. Be this as it will, it is certain the French are the people who make the moſt of it; there being ſeveral very conſiderable pluſh manufactures at Amiens, Abbeville, and Compeigne.

There are other kinds of pluſh, all of ſilk; ſome of which have a pretty long knap on one ſide, and ſome on both.

PLUSH, among *Botaniſts*, is a name given to the middle of roſes, anemonies, &c., called alſo *thrum* or *thrummy heads*; by others, *hairy heads*, *buttons*, *baſs*, *tuft*, or *wort*.

This is properly the *ſtamina* of the flower.

PLUTARCH, in *Biography*, an eminent biographer, was born at Chæronea in Bœotia, of a family that had long filled the offices of magiſtracy in that city. The time of his birth is not exactly aſcertained, but it was probably about the commencement of the reign of Nero. He ſtudied under a philoſopher of the name of Ammonius, whoſe particular ſect is not known. After he had completed the uſual courſe of academical education, he travelled for improvement; and it is ſaid that he viſited Egypt: there is, however, no other evidence of this fact than that he wrote a treatiſe on Iſis and Oſiris. His attachment to ſtudy did not prevent him from engaging in public buſineſs. While he was a very young man, he went on a deputation to the Roman proconſul; and it was probably in ſome public capacity that he firſt viſited Rome, and other parts of Italy; for

for he ſays, he had not leiſure at that time to learn the Latin language, on account of the number of commiſſions with which he was charged, and the numbers who reſorted to him in order to be inſtructed in philoſophy. He either reviſited Rome, or made it his continued abode for a conſiderable time, ſince we find him in reputation there during the reign of Trajan, who is ſuppoſed to have been one of his auditors. That ſame emperor is ſaid to have raiſed Plutarch to the conſular dignity: this, however, was probably only a titular honour. He finally retired to his native place, in which he fixed his reſidence, giving this as a reaſon, that being born in a little city, he would not make it leſs by deſerting it. Here he was choſen to the office of archon, or chief magiſtrate, and was afterwards admitted into the college of prieſts of the Delphic Apollo. He is thought to have died about the year 120. He was married, and had ſeveral children. Two ſons ſurvived him, *viz.* Plutarch and Lamprias; the latter probably imitated his father in his ſtudies, as he drew up a catalogue of his works, and is ſuppoſed to have collected his apophthegms. He had a nephew, Sextus, who was preceptor in the Greek language to the emperor Marcus Antoninus. The name of Plutarch is popularly known by his “Lives” of illuſtrious men, one of the moſt intereſting remains of ancient literature, and to which, in our biographical articles, we have had frequent recourſe. A vein of pure morality runs through them, with a ſpirit of piety, occaſionally deviating into ſuperſtition. From the liſt of his writings it appears that ſeveral of his biographies are loſt. Plutarch's moral treatiſes are numerous and valuable; the author does not excel in depth and ſagacity, but his ſentiments are commonly marked with good ſenſe and candour. In kindneſs of heart and humanity few philoſophers have ſurpaſſed him. It appears from his ſon's catalogue, that more of his works of the moral and critical claſs have been loſt than preſerved. Of the complete works of Plutarch, the beſt editions are thoſe of Mauſac and of Reiſke. There are numerous editions of the Lives, and other detached works, tranſlated into various languages. In our own language we have a great number of different editions.

Though no dictionaries or biographical accounts in our country, or in France, ſeem to have taken notice of his knowledge and love of muſic, or of his writings on the ſubject, M. Burette, in the 8th vol. 4to., and 11th abridg. of the Memoirs of the Acad. des Inſcriptions et Belles Lettres, in 1726, took up the ſubject of ancient Greek muſic, and, with a true critical ſpirit, laid open all its arcana, after a long ſtudy of modern muſic, and the Greek writers who have treated of it *ex profeſſo*, or incidentally; letting us know nearly all that is to be known with certainty of this myſterious ſubject.

After denying to the ancients, in the moſt formal terms, the knowledge of counterpoint, he proceeds to the examination of Plutarch's “Dialogue on Muſic,” firſt removing all doubt of its having been written by him, which had been diſputed, and then proceeds to a cloſe, and, in general, faithful tranſlation, which he gives oppoſite to the original text; and proves from that work itſelf, that the ancients were perfectly ignorant of compoſition, or muſic in parts. And what gives greater force to this proof is, that Plutarch was thoroughly verſed in the ſubject which he treats. He writes of the nature of ſound, ſo far as was then known; of its generation and proportions; of the genera, intervals, modes, rhythm, melopœia; explains the muſical technica of the Greeks, (not the notation,) but neither quotes nor mentions any practical muſician, except Ariſtoxenus. Of poet muſicians, from Homer to the time of Alexander the Great, he makes honourable mention, but of none after.

He ſpeaks frequently of muſic having been corrupted by the theatre, particularly in his “Dialogue,” where he ſays, “If we look back into remote antiquity, we ſhall find that the Greeks were unacquainted with theatrical muſic. The only uſe they made of this art was in praiſing the gods, and educating youth. The idea of a theatre had not then entered their thoughts, and all their muſic was dedicated to ſacrifices, and to other religious ceremonies, in which they ſung hymns in honour of the gods, and canticles in praiſe of great and good men.”

It ſhould be remembered here, that Plutarch was a prieſt of Apollo; and, moreover, that what he, Plato, and Ariſtoxenus ſay, concerning the injuries which muſic had received from the theatre, ſavours very much of cant and prejudice. Athenæus, on the contrary, tells us, that notwithſtanding the complaints of Ariſtoxenus againſt theatrical corruption, others were of opinion, that muſic derived its principal improvements in Greece from the theatre; and it ſeems natural, that the hope of applauſe, and the fear of cenſure, ſhould operate more powerfully on the induſtry and faculties of a compoſer or performer, than the idea of private praiſe or blame. And, if we may judge of ancient times by the preſent, the theatre ſeems the place to develope all the powers of muſic, and to expand the talents of its profeſſors: for it is at the muſical theatre, the modern temple of Apollo and the muſes, that perfection of various kinds is more frequently found than any where elſe. But old things do get violently praiſed, particularly muſic, after it ceaſes to give pleaſure, or even to be heard; and old people excluſively praiſe what pleaſed them in their youth, without making allowance for their own want of judgment and experience at that time, which, perhaps, joined to the diſpoſition of youth to be eaſily pleaſed, occaſioned their former delight.

It is natural to ſuppoſe as Greek muſic, like other arts, and other things, muſt have had its infancy, maturity, and decrepitude; that in ſecond childhood, as its effects were more feeble, its purſuits would be more trivial than before its decline. Few great actions were achieved by the Greeks after their total ſubjection. However, they cultivated muſic under the Roman emperors, under their own, and are ſtill delighted with it under the Turkiſh government; but their muſic is now ſo far from being the ſtandard of excellence to the reſt of the world, that none but themſelves are pleaſed with it.

Plutarch treats the ſubject of muſic in a manner leſs dogmatical than hiſtorical. The two principal branches of the art, upon which he lays the moſt ſtreſs, are the harmonical and rhythmical; that is, *tone*, or melody, and *time*.

In M. Burette's notes, he gives a biographical account of all the ancient poets and muſicians mentioned in the courſe of the Dialogue; which ſaves his readers much trouble in ſeeking them, diſperſed as they are through all literature; and greatly enlivens the tranſlation of many parts of the treatiſe, that are now either unintelligible or uſeleſs.

Upon the whole, however, there is more to be learned from this Dialogue, concerning the hiſtory, and indeed practice, of ancient muſic, thus illuſtrated and explained, than in Meibomius, Ptolemy, and all the philoſophers and mathematicians, who only treat of the monochord, ratios, and harmonics, without giving us a ſingle paſſage of ancient muſic, or telling us what it was in practice.

PLUTEI, in the Roman *Art of War*, were engines contrived for the defence of ſoldiers, conſiſting of the ſame materials with the vineæ, but of a different figure; being ſhaped like an arched ſort of waggon, and having three wheels, ſo conveniently placed, that the machines would move either way with equal eaſe.

PLUTO, in *Mythology*, the ſon of Saturn and Rhea, and ſovereign of the empire of darkneſs. Statius calls him the black Jupiter; and he is repreſented by the poets as ſeated on a throne, holding his ſceptre in his hand, which had two points by way of diſtinguiſhing it from Neptune's trident, which had three, with a veil over his head, which, as well as his complexion, ſhould be dark and terrible. He is ſometimes called by the name of Dis.

The fable of Pluto's having had hell or the empire of darkneſs aſſigned him for his lot is thus explained by Diodorus Siculus. He ſays, that it aroſe from his being the firſt who founded the cuſtom of burying the dead, of transferring them into ſepulchres, and of beſtowing other ſervices upon them, which before him had been neglected. But Banier, not thinking it probable that duties ſo natural would have been neglected till the time of Pluto, is of opinion, that he was reckoned the king of hell, becauſe he lived in a very lone country in reſpect of Greece, where Jupiter had fixed his empire. This country was the extremity of Spain, where he buſily employed himſelf in working at the gold and ſilver mines, which were very common near Cadiz, where he fixed his reſidence. Spain was anciently reckoned a country abounding with rich mines; and near Tarteſus, at the mouth of the river Betis, it is ſaid there was a mountain of ſilver: and from this name of the iſland Tarteſus, Tartarus is ſuppoſed to have been derived. This circumſtance induced Pluto to fix his reſidence in this iſland, and hence he obtained the name of Pluto, the god of riches, and has been ſometimes confounded with Plutus. Beſides, Pluto's kingdom was not only low in reſpect of ſituation compared with Greece, but as Pluto employed labourers in the mines, who dug into the bowels of the earth, and penetrated, as it were, to the gloomy manſions of the manes, αδης, or hell, in ſearch of hidden treaſures, he was reckoned king of the dead. Beſides, the ocean, on the coaſt of which he reigned, was accounted a place overſpread with darkneſs, and this, as Banier imagines, was the foundation of all the fables that were invented concerning Pluto and his realms of darkneſs. Tartarus he ſuppoſes to have been derived from Tarteſus near Cadiz, and the river Lethe from Guadelethe, which runs over-againſt that city, and the lake Avernus from the word Abarona, importing *at the extremities*, a name given to that lake, which is near the ocean; accordingly Pluto was particularly worſhipped at Cadiz, under the name of Death, as Philoſtratus has obſerved; of which there can be no doubt, ſince the Phœnicians, whoſe language was eſtabliſhed at Cadiz with the colonies planted there by Hercules, called Pluto *Muth*, their name for Death. We might alſo add, that all the names given to him, or the countries where he was worſhipped, have a relation to this title, "god of the dead." For the rape of Proſerpine by Pluto, ſee PROSERPINE.

PLUTUS, the god of riches, reckoned amongſt the number of infernal deities, becauſe riches are derived from the bowels of the earth. Heſiod makes him to be a deſcendant of the Ceres and Jaſion in the iſle of Crete, probably becauſe theſe two perſons applied themſelves to agriculture, which is the means of obtaining the moſt ſubſtantial riches. Plutus had a ſtatue at Athens, placed in the temple of Minerva, where the public treaſures were depoſited; at Thebes, in the temple of Fortune, this goddeſs holds Plutus in her arms as an infant, nouriſhed by her; and at Athens, Plutus is in the arms of the ſtatue of Peace, as the ſymbol of riches, which give peace.

This Plutus, having been obſerved to diſpenſe his favours very unequally, was therefore repreſented as blind: and Ariſtophanes in his "Plutus" adds, that he was lame, becauſe whenever he had a mind to enrich the good, he came to them very ſlowly; and when it was his intention to favour them, he was very clear-ſighted, and ſaid to have good eyes. Pindar, Ariſtophanes, and Lucian inform us, that Plutus was a daſtardly god, on which circumſtance Eraſmus has founded one of his proverbs; but Plutus vindicates himſelf from that imputation, in the comedy above cited, and ſays, that as thieves and robbers never could catch him, that is, never could acquire great riches, they hence conſtructed his precaution and foreſight to be cowardice. St. Jerom, followed by ſeveral eccleſiaſtical writers, alleges that the Syriac or Chaldaic word "Mammona" was the ſame with the Plutus of the Greeks.

PLUVIAL, PLUVIALE, anciently ſignified a hood or cloak; which eccleſiaſtics, chiefly religious, wore in the country, to ſhelter themſelves from the rain; by the Latins called *pluvialis lacerna*.

The word is now uſed, in the Romiſh church, for a large hood worn by the chanter and ſubdeacon at maſs and veſpers, &c. It covers the whole man, and is fixed before with two claſps.

PLUVIALIS, in *Ornithology*. See PLOVER.

PLUVIALIS *Major*, a name given by ſome authors to the limoſa, a bird in ſome reſpects reſembling our red ſhank, but larger and longer legged.

This bird is alſo called the *glottis*. See SCOLOPAX *Glottis*.

PLUVIALIS *Levis*, a name given by many to the common green wood-pecker, the *picus viridis* of authors, called alſo in Engliſh the *rain-fowl*, from an obſervation of its always being moſt clamorous when rain is coming on. See PICUS *Viridis*. See alſo CUCULUS *Pluvialis*.

PLUVIGNER, in *Geography*, a town of France, in the department of the Morbihan, and chief place of a canton, in the diſtrict of L'Orient; 14 miles E. of L'Orient. The place contains 4800, and the canton 12,476 inhabitants, on a territory of 252½ kiliometres, in ſeven communes.

PLUVIUS, in *Antiquity*, an attribute of Jupiter; implying him the author of rain; *q. d.* he that ſends rain. Among the baſſo relievos of the Antonine column, in the place where the miracle of the thundering legion is repreſented, we ſee a flying man in the air, his arms ſpread out, and with a very long beard, which ſeems to diſſolve into rain. The learned take this to be a repreſentation of Jupiter Pluvius. The Athenians worſhipped him under this name, as we learn from Pauſanias in Attic.

PLYERS, in *Fortification*, denote a kind of balance uſed in raiſing or letting down a draw-bridge. They conſiſt of two timber levers, about twice the length of the bridge they lift, joined together by other timbers framed in the form of a St. Andrew's croſs, which ſerves as a counterpoiſe. They are ſupported by two upright jambs, on which they ſwing; and the bridge is raiſed or let down by means of chains joining the ends of the plyers and bridge.

PLYING, or PLYING *to Windward*, in *Seamanſhip*, the act of making, or endeavouring to make, a progreſs againſt the direction of the wind. Hence, a ſhip that advances well in her courſe in this manner of ſailing, is ſaid to ply well, or be a good plyer. See BEATING, in *Navigation*.

Plying is alſo uſed by ferrymen to denote their waiting for a fare.

PLYMOUTH, in *Geography*, a town having ſeparate juriſdiction, in the hundred of Roborough, at the weſtern extremity of Devonſhire, is 218 miles W.S.W. from London. It is ſituated at the head of a capacious haven, formed by the conflux of the rivers Tamar and Plym with the ſea, and is probably the largeſt corporate town in the county, as well as one of the moſt important maritime places in England. Within a circuit of two miles, including its appendages of Stonehouſe and Dock, there is a population of between 60,000 and 70,000 people, excluſive of ſeamen and ſoldiers. Plymouth is of conſiderable antiquity, and was called, in the time of the Saxons, Tameorwerth: after the Conqueſt it acquired the name of South-Town, or Sutton; and in the reign of Edward I. of Sutton-Prior, and Sutton-Valletort, the north part of the town being ſituated on the lands of the prior of Plympton, and the ſouth part on the eſtate of the Valletorts. Theſe names were relinquiſhed in the reign of Henry VI., for the more appropriate appellation of Plym-mouth. In the reign of Edward III. the increaſing conſequence of the town rendered it an object of jealouſy to the French, who landed here, and endeavoured to deſtroy it by fire; but were repulſed, with the loſs of 500 men, by Hugh Courtenay, earl of Devonſhire, under whoſe command the ſurrounding gentry and their vaſſals had aſſociated with much celerity. In the ſixth year of Henry IV. the French were more ſucceſsful, when they landed near that part now called Briton-ſide, and burnt upwards of 600 houſes; but failing in their attempts againſt the caſtle and higher part of the town, they retired to their ſhips, and proceeded to Dartmouth, where their commander, De Caſtell, and ſeveral hundred men, were made priſoners. From this time till the reign of Henry VI., the town dwindled into a mere fiſhing village; when it was rebuilt and improved by the prior of Plympton, who, by granting certain privileges, occaſioned a conſiderable increaſe of inhabitants, and effected the revival of trade and enterprize. In the 18th year of Henry VI. it was incorporated as a borough, and on the diſſolution of monaſteries, in the reign of Henry VIII., the entire lordſhip of the borough, together with the patronage of the religious eſtabliſhments within or near the town, were given to the mayor and commonalty, and theſe advantages they ſtill retain. In the reign of queen Elizabeth, through the means of ſir Francis Drake, various privileges were granted to the town, and at the private expence of the ſame gallant admiral, a ſtream of water was conveyed to it from ſome ſprings on Dartmoor, by a winding channel of twenty-four miles in length. In the year 1579, Plymouth was viſited by a dreadful plague, ſuppoſed to have been introduced with ſome cotton-wool, landed from a Smyrna ſhip, without firſt being properly aired. Upwards of 600 perſons fell victims to its ravages; and ſo general was the fear of its ſpreading, that the annual election for mayor was held in the open air, on Cat-down, ſome diſtance from the town. In 1581 the plague again broke out, and continued ſeveral months; and many of the inhabitants became victims to its violence. At the period of the expected invaſion by the Spaniſh Armada, in 1588, a Britiſh fleet of 120 ſail was aſſembled in Plymouth Sound, under the command of lord Howard, and the admirals ſir Francis Drake and ſir John Hawkins. This fleet ſailed for Torbay to join the Exeter ſhips; and ſoon afterwards the grand Spaniſh armada, which papal arrogance had pronounced invincible, appeared in the form of a creſcent, and *lay to* off the harbour of Plymouth; but proceeding to the eaſtward, it was aſſailed by the Britiſh fleet, and a deſtruction thus commenced was completed by a violent ſtorm, which utterly fruſtrated the expedition. In 1595, the landing of the Spaniards in Cornwall, (for which ſee PENZANCE,) threw the inhabitants of Plymouth into much alarm, and cauſed the adoption of various precautions to enſure their ſafety. From this period till 1625, nothing material occurred, when Charles I. with his whole court, 120 ſhips, and 6000 troops, came from Portſmouth, and remained here ten days, ſumptuouſly entertained by the mayor and corporation. In the following year, Plymouth was a third time infeſted by a plague, which raged with incredible fury, till nearly 2000 perſons were deſtroyed. About 1637, in conſequence of a petition to that effect from the mayor and commonalty, the town was divided into two pariſhes, and in 1640, an act was obtained for the erection of a new church; but the civil wars, which ſoon after enſued, occaſioned the ſuſpenſion of this latter deſign. At the breaking out of the civil war, Plymouth very early declared in favour of the parliament, and the year 1643 forms a memorable era in the annals of its hiſtory, from the ſpirited reſiſtance made by the inhabitants againſt the forces of prince Maurice, who beſieged it from September till the cloſe of the year without ſucceſs. What the citizens wanted in means of defence, was made up to them in enthuſiaſm, and they held out till the parliamentary forces, under the earl of Eſſex, approached to their relief. On the ſurrounding eminences are ſtill to be traced the remains of various works, conſtructed both for the defence and reduction of the town. The different attempts of the royaliſts, under the king in perſon, and his general, ſir Richard Grenville, ſucceſſively proved abortive, and they were finally compelled to raiſe the ſiege, and entirely withdraw their forces. In the year 1683 the charter of the town was ſurrendered to the king, on the requiſition of judge Jefferies, and a new one granted at an expence of 417*l.* 19*s.* This veſted the power in ten aldermen and twelve aſſiſtants only, and continued in force till the latter end of the year 1697, when the old charter was reſtored, though not before upwards of 600*l.* had been ineffectually expended.

Various fortifications have been at different times erected for the ſecurity of Plymouth, and it is now in a ſtate of reſpectable and formidable defence. Several ſmaller block-houſes and forts were demoliſhed on the building of the citadel on their ſcite, in the time of Charles II., in 1670. This ſtrong fortreſs conſiſts of three regular, and two irregular baſtions; and the curtains of the regular baſtions are further ſtrengthened by two ravelins and horn-works. On the eaſt, north, and weſt ſides is a deep ditch, counterſcarp, and covered way, paliſadoed. In the time of war the parapets are mounted with a great number of heavy ordnance, and the garriſon conſiſts of a regiment of militia. A lieutenant-governor, and other officers, reſide here. The view from the ramparts is exceedingly beautiful, and comprehends a great variety of intereſting objects. There is a lower fort, connected with the citadel, and chiefly intended for the defence of the ſound. Beſides theſe works, ſeveral batteries and block-houſes are raiſed on different points of the harbour; on mount Batten, Staddon-heights, and at Maker; but its chief ſecurity is St. Nicholas iſle and its formidable batteries. This iſland riſes nearly in the centre of the ſound, between the Plymouth ſhore and mount Edgecumb. Between the latter and the iſland is a ridge of rocks, great part of which is viſible at low water, and renders the entrance into the ſound, or harbour, difficult and dangerous.

The Victualling office, under the eaſtern walls of the citadel, is an extenſive range of buildings, where the ovens for ſupplying the navy with bread, and the ingenuity exerciſed in the baking and preparations, preſent intereſting objects: though there are but two bakehouſes, each containing four ovens, yet they are heated eight times a day, and in the courſe of that time bake a ſufficient quantity of bread for 16,000 men. The granaries are large and well conſtructed; and the whole proceſs of converting the grain into bread is ſimple and ingenious.

The town itſelf has very few claims either to elegance or neatneſs; the ſtreets are in general ill conſtructed, irregular, and badly paved, but a better taſte characteriſes the improvements which are taking place. Amongſt the public buildings the moſt ancient is the pariſh church, which conſiſts of a nave, ſide aiſles, and chancels, with a tower at the weſt end, ornamented with pinnacles. This ſtructure contains ſeveral curious and ancient monuments. The preciſe period of its erection is not known, but it is mentioned in a general ſurvey in the year 1291. The tower is of more recent date, having been built, in 1440, by Thomas Yogge, a merchant of the town. The other church, begun in 1646, is conſecrated to the memory of Charles I., and called Charles's church. Sectariſts are numerous, and here are various meeting houſes, chapels, and a ſynagogue for Jews. The Guildhall, lately rebuilt on the ſcite of a more ancient one, is a very indifferent edifice. It contains a few portraits of ſome of the Engliſh ſovereigns and other illuſtrious perſonages. Adjoining the guildhall, and connected with it, are the public priſons of the town; they conſiſt of a room for debtors, and ſeveral cells for priſoners, all very ſmall and inconvenient. There are twenty-one charitable inſtitutions in Plymouth, ſome of them eſtabliſhed and ſupported by the town, others by voluntary contribution, and the reſt from the annual income of donations by individuals. Of the former are the workhouſe, which is a very uſeful and well regulated inſtitution; St. Andrew's alms-houſes, in which twelve widows are permitted to live gratis, with a ſmall weekly allowance; and the workhouſe alms-houſes, of a ſimilar nature with the laſt. Thoſe ſupported by voluntary contribution are the Public Diſpenſary, Houſehold of Faith, Female Aſylum, Grey and Yellow School, School of Induſtry, Public School, on the new plan of inſtruction deſigned by Dr. Bell and Mr. Lancaſter; Miſericordia, Lying-in-Charity, and Merchants' Hoſpital, for maimed and diſabled ſeamen, and the widows and orphans of ſuch as are killed, ſlain, or drowned in the merchants' ſervice. Thoſe maintained by private bequeſts are, Hele's charity, Lanyon's charity, Orphan's aid hoſpital and grammar-ſchool, Charles' alms-houſes, Jory's alms-houſes, lady Rogers' ſchool, Kelway's truſt. The Preſbyterians have a very extenſive ſeminary for educating girls in the tenets of their ſect, ſupported by the contributions of their members. Among the other public buildings are to be noticed the public library, a new and elegant edifice erected by the ſubſcribers. It is capacious and convenient, and the architectural part executed with taſte and judgment by Mr. Feneſton; the front in imitation of a temple at Athens. The theatre and hotel, covering with their appendages nearly an acre of ground, have juſt been completed by the mayor and commonalty, at an expence of nearly 40,000*l.*; the front is very noble and has a portico, the largeſt in this country, containing eight columns of the Ionic order forty feet in elevation. The theatre is the handſomeſt country theatre in England, and is conſtructed almoſt entirely of iron. The roof is ſixty-four feet ſpan, and was made at Briſtol of wrought iron bars. There are three tiers of boxes formed of caſt-iron, the fronts thinly caſed with wood to preſerve the ſound. Plans for a new public exchange have been adopted, and are about to be acted upon, as well as are thoſe for a new pariſh church. Government has ſeveral military eſtabliſhments here, ſuch as barracks, hoſpitals, and priſons. The latter have lately been rebuilt, and are capable of containing 3000 men; they are placed under the direction of a captain of the navy, and uſed as a depot for priſoners of war, from whence they are ſent to Dartmoor and other inland priſons.

Plymouth was conſtituted a borough in the eighteenth year of Henry VI., and has ſent two members to parliament, without intermiſſion, ſince that period. It is governed by its own magiſtrates; who are a mayor, juſtice, and the two ſenior members of the bench of aldermen. In addition to the mayor and juſtice, the corporation conſiſts of twelve aldermen, twenty-four common-council men, a town clerk, and a coroner. A general ſeſſions of the peace is holden here four times in the year, where all offences, which extend to tranſportation for ſeven years, are tried, and thoſe of minor importance are determined by the mayor at his weekly ſitting in guildhall. There is a conſiderable trade carried on at Plymouth independently of the importation of coals, culm, corn, wine, timber, and articles for town conſumption, even during war, at which times a vaſt deal of buſineſs ariſes from the ſale of prizes and their cargoes, which attract purchaſers from all parts of the kingdom. During peace an active trade is carried on with Newfoundland. A new and convenient pier was erected in 1790, at the expence of government, which ſecures the veſſels lying in the pool, or inner harbour, from the violence of the waves. The market days are Mondays, Thurſdays, and Saturdays. The market-place has lately been erected at an expence of 10,000*l.*, and is very extenſive and commodious, comprehending three acres of ground, with an open area for a cattle market. The revenues belong to the corporation, and are conſiderable. Here are held two annual fairs.

The borough of Plymouth and its ſuburbs, according to the population report of 1811, contains 5732 houſes, and 56,060 inhabitants. Of theſe it is ſpecified that 12,339 were reſident within the pariſh of St. Andrew.

This town has not acquired much literary character. Joſeph Glanville, a celebrated divine and philoſopher, was born here in 1636. (For an account of his life and writings, ſee vol. xvi. art. GLANVILLE, JOSEPH.) The brave admiral ſir John Hawkins, who commanded the rear of the fleet which defeated the Spaniſh armada, was a native of this town (ſee vol. xvii.); and it was long the reſidence of the celebrated ſir Francis Drake, who was a member of the corporation, repreſentative to parliament, and the author of many valuable improvements in Plymouth, and its vicinity. (See vol. xii.) In the eaſt parts of the town are the remains of the priory of White friars, granted in the 38th year of Henry VIII. to Giles Iſelham. The principal gateway or entrance is in a very dilapidated ſtate, but the ruins of the priory itſelf are almoſt extinct, and their ſcite occupied by a ſmith's ſhop. The hoſpital of the Grey friars is ſtill remaining, and is now a private houſe. An abbey of Ciſtertian friars is ſtill ſtanding ſouth of St. Andrew's church, and is denominated the abbey wine vaults, the vaults being occupied for that purpoſe.

PLYMOUTH *Port and Harbour* is conveniently adapted for the purpoſes of trade, and affords an excellent road for ſhips of war, their prizes, and merchant veſſels. The harbour is divided into ſeveral ramifications, which are diſtinguiſhed by different appellations. Sutton-pool immediately adjoins the town, the buildings of which nearly encircle it. The entrance to the pool is between two large piers, erected by parliamentary grants in 1791—1799. It is ſurrounded with public and private quays, and all ſhips entering it are obliged to pay certain dues on landing their cargoes. The pool is under the ſuperintendance of a company, by whoſe management it has been benefited with important improvements.

Catwater harbour is formed by the eſtuary of the river Plym, and is capable of protecting from the ſouth-weſt gales, which are prevalent, upwards of 500 ſhips. Part of this harbour is under the juriſdiction of the mayor and commonalty of Plymouth, the other part is ſubject to the controul of the preſent lord Boringdon, who has been at much expence in laying down moorings, buoys, &c. On the banks of the Catwater are ſeveral ſmall villages. Cat-down, on the northern ſide, is famous for its lime-ſtone quarries: it has a ſhipwright's yard, various ſtore-houſes, wharfs, &c. for commercial tranſactions. Turnchapel, on the oppoſite bank, is the property of the Boringdon family, and is principally inhabited by ſhipwrights employed at the dock-yard here, where large ſhips of war are frequently repaired, and merchant and armed veſſels conſtructed. Oreſton is a populous village on the eaſtern banks, principally inhabited by ſea-faring men. In this neighbourhood are alſo the beautiful villages of Upper and Lower Hooe.

Proceeding from Catwater we enter into that part of the harbour denominated the *Sound*, which is a large and capacious bay peculiarly adapted for a naval rendezvous. One diſadvantage, however, attends it, of no inconſiderable kind, which is its expoſure to ſoutherly and ſouth-weſterly winds, that occaſion a tremendous ſwell. To obviate this objection, and render it ſafe as well as commodious, the lords of the admiralty determined to erect a pier or breakwater, and applied to Mr. Rennie, a gentleman well fitted, from his extenſive architectural knowledge, to propoſe an efficient and practicable remedy, and render them a plan for the purpoſe. The report of this gentleman has been put in execution, and the work is in a ſtate of great forwardneſs. The plan of its conſtruction is this: it is a maſs of ſunken ſtone, in length 850 fathoms, extending from about 60 fathoms eaſt of St. Carlo's rocks, on the eaſt, to about 300 fathoms weſt of the Shovel, on the weſt. Another pier is made from Andurn Point towards the before-mentioned breakwater, about 400 fathoms in length, having an inclined kant, forming an angle of about 120°. Of the firſt, about 500 fathoms in the middle are ſtraight, and 170 fathoms at each end inclined to the ſtraight parts in an angle of 120°. Theſe inclined ends prevent the inrun of the ſea from agitating the water, and ſhelter a greater extent of the ſound. The two kants of the eaſtern end of the breakwater, and weſtern end of the pier, repel the waves in ſuch a manner as to prevent them from paſſing in any material degree through the opening between. The improvements are conſtructed of large blocks of ſtone, thrown promiſcuouſly into the ſound in the line of the breakwater, leaving them to find their own baſe, which is about ſeventy yards broad, and the top is intended to be about ten yards in width, at the level of ten feet above the low water of an ordinary ſpring tide. The principal part of the ſtone uſed for the works is brought from quarries at the head of Catwater, in ſmall veſſels, of from 50 to 100 tons, with a crane fixed in their decks to take out the ſtones, and throw them into the water. The expences neceſſary to complete the undertaking were eſtimated at 1,150,000*l.*: the quantity of ſtone required 2,360,000 tons. The coſt of the firſt year was calculated at 60,000*l.*: 170,000 tons of ſtone have been depoſited, and 500 yards in length of the mole are already apparent above low water, and the expence ſo far has been conſiderably within the eſtimate preſented by Mr. Rennie to the lords of the admiralty. At a more advanced ſtate of the buſineſs, it is contemplated to erect a cut-ſtone pier on the top of the great breakwater, and build two light-houſes on each extremity, to aſſiſt ſhips entering the ſound.

The *Eddyſtone light-houſe*, at the mouth of the ſound, five leagues ſouth of Plymouth, is neceſſarily an appendage of the moſt important kind to the harbour, without which the entrance to it would be extremely dangerous. There is a duty payable by ſhips paſſing the light-houſe, which is collected at all the neighbouring ports. Merchant ſhips only are ſubject to this tax, thoſe belonging to the king are free. For an account and hiſtory of the Eddyſtone light-houſe, ſee vol. xii.

Stonehouſe is a populous town, containing about 5000 inhabitants, ſituated on the road leading from Plymouth to Plymouth-dock, and almoſt connecting the latter with the former by the continuation of buildings. The ſtreets are generally irregular, but moſt of them paved, and the houſes handſome and convenient. Stonehouſe bridge, erected over a ſmall creek of the ſame name, is a neat ſtone fabric of one arch. The revenue ariſing from its toll is conſiderable, and paſſes to the lords of the manor. Stonehouſe has ever been the property of individuals; as early as the 27th of Henry III. it belonged to Joel de Stonehouſe, and has ſince, by various marriages, paſſed into the family of Mount Edgecumbe. By the laſt cenſus the number of houſes was found to be 566, and the population 5174. There are a chapel, work-houſe, and market-place; but the moſt important public buildings are the Royal Marine barracks, a handſome range of uniform granite edifices, in the form of a quadrangle, and capable of containing upwards of 1000 men, with their officers. At Stonehouſe, and connecting it with the borough and town of Plymouth, is the Royal Naval hoſpital, which is an immenſe eſtabliſhment, under the ſuperintendance of a governor, lieutenants, and medical officers. Beſides the chapel, diſpenſary, and officers' reſidences, there are ſeven large, commodious buildings ſurrounding the lawn, each containing ſix wards, and capable of accommodating 959 perſons, officers and ſailors. The ſick and wounded are brought in boats from their ſhips, and landed at a quay immediately adjacent to the hoſpital. The Royal Military hoſpital, of a more recent erection than the former, is ſituated on the oppoſite bank of the ſtream, and conſiſts of only four diſtinct buildings. Its government is ſimilar to the other. Adjacent to Plymouth are ſeveral inland towns and villages of minor conſequence. St. Budeaux, about five miles north of Plymouth, is a pleaſant village, formerly the property of ſir William Gorges, the only deſcendant of whom is ſaid to be the celebrated Gorges, who commanded the Chouans in Brittany during the latter part of the French revolution. The church is a plain ſimple edifice, erected in the 14th century, with the materials of an older ſtructure. Buckland-Monachorum is entitled to notice for its handſome church, conſiſting of a nave, ſide aiſles, tranſepts, a tower, with turrets and pinnacles. The remains of the Drake family are depoſited here, with ſeveral handſome monuments to their memory, as well as to that of lord Heathfield, the brave commander at the famous ſiege of Gibraltar. There are alſo the villages of Lipſon, Widey, Tamerton, Crabtree, and Compton. Polwhele's Hiſtory of Devonſhire, folio. Beauties of England, vol. iv. Picture of Plymouth.

PLYMOUTH-*Dock*, ſometimes denominated *Dock*, in the hundred of Roborough, and pariſh of Stoke-Damerell, Devonſhire, is ſituated weſt of Plymouth, with the town of Stonehouſe only intervening. It is placed on the eaſtern bank of Hamoaze. The manor, excepting a part of the dock-yard, is the property of the St. Aubyn family, who inherit it from ſir William Morice, ſecretary of ſtate to Charles II., and mentioned by Clarendon as inſtrumental to the reſtoration. In this family reſt the preſentation to the living of Stoke-Damerell. The ſtreets are regular, interſecting each other at right angles, and generally well built. The pavement is of the marble with which the neighbourhood abounds, and after a ſhower its veins have a beautiful appearance. Though of ſuch conſiderable magnitude, it is wholly of modern date, and owes its origin and rapid increaſe to the eſtabliſhment of the dock-yard and naval arſenals. It was made a king's yard in the latter part of the reign of William III., before which it was a mere hamlet of a few houſes. The greater part of the town has been erected ſince 1760. The number of inhabitants in Dock is about 25,000, and the houſes 2400. They are erected by the inhabitants on leaſes for ninety-nine years, ſubject to a ſmall annual quit rent. The town and the dock-yard are defended by lines. They were commenced in the reign of George II., but the works have been much improved under an act made in the 21ſt of his preſent majeſty, George III. On the north-eaſt and ſouth ſides the town is bounded by a ſod wall, about twelve feet high, which was built in 1787. The weſtern ſide is ſkirted by the walls of the dock-yard and gun-wharf. Without the lines is a ditch from twelve to eighteen and twenty feet deep, excavated from the ſolid ſlate and limeſtone rock. In this line of fortification are three barrier gates; the North barrier, the Stoke barrier, and the Stonehouſe barrier. Round the whole extent are planted pieces of ordnance, at regular diſtances. The other fortifications are a battery on mount Wiſe; another at the Obeliſk hill; and a redoubt or block-houſe on mount Pleaſant, without the lines, which command the whole. It is in contemplation to fortify the town regularly, and the buſineſs is actually begun; but the dock-yard may be commanded from many of the adjacent eminences, all of which muſt be fortified alſo, at an expence that would erect ſeveral diſtinct yards! The town, being circumſcribed by this boundary of defence, does not admit of any increaſe of building within it. A new town without the lines, named Morice-town, is alſo the property of the St. Aubyn's family. Dock has two chapels, and ſeveral meeting-houſes for ſects of different denominations, which are very numerous. The pariſh church is ſituated about a mile from the town. There are few charitable inſtitutions, perhaps in conſequence of the recent growth of the town. The poor-houſe is extenſive, and will contain nearly 300 perſons: picking oakum for the dock-yard affords conſtant employment to its inmates. The town, not being incorporated, is under the juriſdiction of the county magiſtrates, who hold their ſeſſions quarterly here. The inhabitants are ſupplied with water from the ſprings on Dartmoor, by an aqueduct ſimilar to that of Plymouth. Markets are held three days in the week in the new market place, lately erected by ſir John St. Aubyn. The government houſe is a handſome building, erected when lord Lennox commanded here; it is appropriated ſolely to the diſpatch of military buſineſs, court-martials, &c. and has in front a grand parade. Here are eight different barrack eſtabliſhments, which afford conveniencies for 3000 men. The naval department conſiſts of an admiral and rear admiral, deputy judge advocate, and commiſſioner for the payment of ſeamen's wages. Near the grand parade ſtands the telegraph, by which a communication is kept up with the Admiralty in London, through thirty-ſix different ſtations. Inſtances have occurred of a ſhort meſſage being tranſmitted to London, and an anſwer returned, in fifteen minutes. (See Post and Telegraph.) The dock-yard, even in its preſent unfiniſhed ſtate, is acknowledged to be one of the fineſt in the world. When it was firſt uſed as a naval arſenal is uncertain; but as the baſon and its dock are the moſt ancient, and were not made till the reign of William III., it ſeems evident that this was a place of little conſequence before that period. The wall, which ſeparates the yard from the town, is of ſlate and limeſtone, and in ſome places thirty feet high. The area within the wall is ſeventy-one acres and thirty-ſix poles; including the projecting parts of the jetties. The entrance to the dock-yard from the land ſide is from Fore-ſtreet, by a large gate for carriages, &c., and a ſmall one for foot paſſengers. No perſon is ſuffered to enter, unleſs well known, or in uniform, without an order from the commiſſioner. Immediately within the gates is the maſter porter's houſe; and cloſe by is the chapel, the tower and one aiſle of which are as old as 1700, the other aiſle is of much more recent date. In front of the chapel is the military guard-office, and over that the navy pay-office. From the gates, a flat paved road, ſkirted with elms, leads to the officers' dwelling-houſes, which are of brick, and thirteen in number. From hence to the lower part of the yard, which has been levelled from the ſolid rock, is a deſcent by a flight of ſteps, leading to two handſome buildings, the northernmoſt of which is the joiner's ſhop, the other is uſed as an office. Directly in front of theſe is the baſin and dock, made in the reign of William III. The baſin is a large excavation, in which all the boats belonging to the yard, as well as the launches employed in moving ſhips, are kept; the water flows into it through an opening about ſeventy feet wide. Within the baſin is a dock, ſufficiently capacious for a ſeventy-four gun ſhip; its length is 197 feet 3 inches; its width, 65 feet 10 inches; and its depth, 23 feet 1 inch. The baſin is bounded on each ſide by jetty-heads, which are platforms projecting over the ſea, ſupported by wooden pillars driven full of nails, to prevent the worms from perforating them. Ships of all ſizes lie alongſide theſe jetties without grounding, and here all veſſels are brought to be fitted out. On the ſouth jetty is a landing place, called the maſter attendant's ſtairs, where all ſtores returned from ſhips are landed, and thoſe to be ſent to them ſhipped off. Adjoining this jetty is the rigging houſe, a handſome building, 480 feet long, and three ſtories high, forming one ſide of a quadrangle. This fabric is of lime-ſtone, with the coins and cornices of Portland ſtone. Within it the rigging for the ſhips of war is kept in ſuch a ſtate of forwardneſs, as to be fit for uſe at a very ſhort notice. Over the rigging is the ſail loft, where all the ſails are cut out and made. The remaining three ſides of the quadrangle are ſtore-houſes, in which the various articles neceſſary to equip the fleets are kept. Advancing ſouthward is a ſlip for hauling up and graving the bottoms of ſmall veſſels, ſuch as ſloops of war, cutters, &c. Beyond this is the Camber, a long canal, about ſeventy feet wide, terminating at the upper end in a baſin, where boats lie; on the north ſide of which is the boat-houſe, where boats are built and repaired. Here, before the year 1768, were the bounds of the yard; all thence to the ſouthward is ſtill called the "new ground." The blackſmith's ſhop is ſituated ſouth of the canal; it is a ſpacious building, about 210 feet ſquare, and contains forty-eight forges. The largeſt anchors made here weigh five tons; they are made of iron bars forged together, and are moved in and out of the fire by the aid of cranes.

The quantity of coals burnt in 1802 was 876 chaldrons and 23 buſhels. The anchor-wharf fronts the blackſmith's ſhop. Near this wharf are three ſlips, whereon large ſhips are built; and adjoining them is a boiling-houſe, in which the planks that are to receive a particular curve are boiled in water for a conſiderable time, and being afterwards applied hot to their places are immediately faſtened. Northward of the ſlips are the maſt-houſe and pond; in the former the different maſts and yards are made of many pieces of balk, formed to fit into each other, then rounded and preſſed together with iron hoops driven on red-hot. The pond is a large piece of water, incloſed from the ſea by a very ſtrong wall, of at leaſt 10 feet in thickneſs, and about 380 feet long; the top of which is laid flat with large flags of coarſe granite. The water flows in through two openings about forty feet wide, over which are light wooden bridges. An immenſe number of maſts, yards, &c. are always kept in this pond, to prevent their cracking, from expoſure to the ſun. Near the ſouth end of the maſt-houſe is a ſmall mount, generally called "Bunker's Hill," on the ſummit of which is a watch-houſe and a ſmall battery. Under this hill is a ſmall powder magazine, and near it a ſlip for building cutters and ſmall veſſels. Returning from the interior of the yard, the rope-houſes firſt engage the attention. Theſe are two buildings of limeſtone, two ſtories high, and twelve hundred feet long, running parallel to each other. In the upper ſtories twine is made, and yarns prepared for the cables, which are *layed* (twiſted together) below. The largeſt cables that are made are 25 inches in circumference, and 100 fathoms long; they weigh 116 cwt. 1 qr. and 16lb., and contain 3240 yarns. One of theſe buildings was partly conſumed by an accidental conflagration in June 1812. The whole of the machinery was deſtroyed, and only 400 feet of the rope-houſe ſaved. The loſs was eſtimated at 15,000*l*. In 1776 conſiderable alarm was excited from an attempt of John Aitken, commonly called "Jack the painter," to deſtroy the dock-yard with fire; he was afterwards detected in a ſimilar endeavour at Portſmouth, and hanged. (See PORTSMOUTH.) The mould or model loft, where the different parts of ſhips to be built are laid down according to plans ſent from the Navy Board, is in front of the ſtore-houſe, and is the laſt building of importance in that part of the yard ſouth of the baſin. On the north jetty is a landing place, called the North-ſtairs, where officers not on duty generally land. Near it is a houſe, where pitch is kept continually boiling, to be applied to the bottoms and ſeams of ſhips. The double dock is the firſt of three, very near each other, for line of battle ſhips, and ſo denominated from its capability of containing two ſhips at the ſame time. The dock gates, by which the water is kept out of the docks, form, when cloſed, the ſegment of a circle, with its convex ſide toward the ſea: they are made of timbers ſtrongly put together and hung on each ſide of the mouth of the dock. As ſoon as a ſhip is taken into dock, which is always at high water, the gates are ſhut and locked; the water within the dock then runs out through ſluices made for the purpoſe, till the ebb tide has ceaſed; the ſluices are then ſhut, and the water which may ſtill remain is thrown out by engines on the plan of pumps, worked by horſes. The ſhip is taken out by opening the ſluices, and ſuffering the water to attain an equal height within as without, when the gates are opened without difficulty. The ſecond dock, called the Union, or North dock, is 239 feet 4 inches long, 86 feet 7 inches wide, and 26 feet 10 inches deep, and is faced with Portland ſtone. The New Union, or North New dock, 259 feet 9 inches long, 85 feet 3 inches wide, and 27 feet 8 inches deep, was made in the year 1789, and is on the ſame plan. Near the head of this latter dock is the burning place for old copper; and further northward, are the plumbers', braziers', and armourers' ſhops, and the bricklayers' and ſtone cutters' yards. Behind all this ſide of the yard, the rock, having never been levelled, riſes very high and irregular: on it are a few ſheds and ſtorehouſes. Every perſon belonging to the dock-yard is under the command of the commiſſioner, from whom all orders are received, and who has it in his power to diſcharge workmen for neglect of duty. The gun-wharf is ſeparated from the dock-yard by North-corner ſtreet; it was begun in 1718 or 1719, and completed about 1785. The buildings are in general good, but very heavy, and in the Dutch ſtyle. They were projected by the late ſir John Vanburgh, who was then attached to the ordnance department. The quantity of ground within the walls is four acres and three quarters. Here are two principal ſtore-houſes, of three ſtories high, for 80,000 muſkets, piſtols, and other ſmall ſtores; a number of ſheds for gun-carriages, &c.; a powder magazine, and a cooperage. The dock-yard, as well as the gun-wharf, is rated to the poor, and pays houſe and window-tax for the dwellings; but neither tithes, church rates, nor land-tax. The diverſity of employments, ingenuity, and manual activity, exhibited in the various departments of the dock-yard, preſent a very intereſting ſpectacle to thoſe who have not been accuſtomed to appreciate the effects of human induſtry on a large ſcale. The bay or eſtuary of Hamoaze, on which the dock-yard is ſituated, is a commodious baſin about four miles long, and half a mile wide, where in times of peace a very conſiderable part of the Engliſh navy is laid up in ordinary. The port admirals, hoſpital and priſon ſhips, are always ſtationed here, and thoſe that have undergone, or are about to receive repair in the dock. The ſhips are moored by large chains of iron, ſixty fathoms long, conſiſting of 120 links, and having at the end a large anchor. On the banks of this harbour are other eſtabliſhments of government: the powder magazine, higher up, conſiſts of ſeveral detached ſtone buildings; the powder-kilns, erected for drying damaged powder; and on the bank of a creek of the harbour running to the S.W. is the South-down brewery, where all the beer for the fleet is brewed. In the vicinity of Dock are ſeveral ſmall towns, of which Stoke is the moſt important. It is an ancient village, and has conſiderably enlarged itſelf within a few years. The church is ſituated at a ſhort diſtance from the town, conſiſting of three aiſles and a tower: the period of its erection is unknown. Morice-town, on the north ſide of Dock, near the ferry which croſſes the Tamar, is increaſing very faſt in ſize and conſequence. There are other villages in the neighbourhood, which will be treated of in our deſcription of SALTASH. Immediately oppoſite to Dock is the delightful peninſula of Mount-Edgecumbe, the ſeat of the earl of Mount-Edgecumbe. The manſion was completed in the reign of queen Mary, and is antiquated in its appearance. It contains a few good paintings and portraits, and is pleaſantly ſituated on the ſide of a wooded hill, from whence the proſpect is variegated and comprehenſive. The grounds occupy an area of about three miles in circumference, and are divided into parks, lawns, woods, terraces, kitchen and flower gardens. The eſtate became the property of the preſent family about the beginning of the 16th century from an intermarriage; by which connection they alſo became the proprietors of Stone-houſe. On the heights bordering the park of Mount-Edgecumbe ſtands Maker-church, the tower of which is uſed as a medium for conveying ſignals from the admirals' ſhips in Hamoaze to ſhips in the Sound, and alſo to forward the information of any fleets or veſſels of war in the offing, or paſſing up or down Channel. Polwhele's Hiſtory of Devon, folio. Beauties of England, vol. iv. Picture of Plymouth and Dock.

PLYMOUTH, a maritime county, in the eaſtern part of the ſtate of Maſſachuſetts, containing 35,169 inhabitants, and ſubdivided into 18 townſhips, of which Plymouth is the chief. Within the counties of Plymouth and Briſtol there were, in 1796, in actual work, 14 blaſt and ſix air-furnaces, 20 forges, ſeven ſlitting and rolling mills, beſides a number of nail ſhops, and others for common ſmithery. Theſe furnaces, ſupplied from the neighbouring mines, produce annually from 1500 to 1800 tons of iron-ware. The forges, at an average, manufacture more than 1000 tons annually, and the ſlitting and rolling mills at leaſt 1500 tons. The manufactures of theſe mills have given riſe to various others dependent upon them, ſuch as cut and hammered nails, ſpades, and ſhovels, card teeth, ſaws, ſcythes, metal-buttons, cannon-balls, balls, fire-arms, &c. In theſe counties are alſo manufactures of hand-bellows, combs, ſheet-iron for the tin-manufacture, wire, linſeed oil, ſnuff, ſtone and earthen ware. The iron-works, called the Fæderal furnaces, are ſeven miles from Plymouth harbour.

PLYMOUTH, the capital of the above county, is a poſt-town and port of entry, 42 miles S. from Boſton, to which belongs an extenſive townſhip, more than 80 ſquare miles, is about 16 miles in length, and more than five in breadth, containing, by the cenſus of 1791, 2495 inhabitants, and in 1810, 4228. The town, or principal ſettlement, containing more than two-thirds of the inhabitants, lies on the N.E. part of the townſhip, near a ſtream, called the "Town-brook," which flows from a large pond, bearing the name of "Bellington ſea." The principal ſtreet croſſes the ſtream, and is interſected by three croſs ſtreets, extending to the ſhore; another ſtreet runs weſterly on the N. ſide of the brook. The town is compactly built, and contains about 200 dwelling houſes, a handſome meeting-houſe, court-houſe, and gaol. Here are two precincts, one including the town and the diſtrict of Hobbs-Hole and Eel river; the other at Monument Ponds, a village about ſeven miles E. from the town, beyond the highlands of Monument. The ſoil near the coaſt is generally good; the reſidue of the townſhip is barren, and remains a foreſt, conſiſting partly of pine and partly of oak. The harbour is ſpacious, but ſhallow; formed by a long and narrow neck of land, called "Salthouſe beach," extending ſoutherly from Marſhfield and terminating at the Gurnet head, and by a ſmaller beach within, running in an oppoſite direction, and connected with the main land near Eel river, about three miles from the town. On the Gurnet is a light-houſe, and on Salthouſe-beach is placed one of the huts, erected and maintained by the Humane Society of Maſſachuſetts, for the reception and relief of ſhipwrecked mariners.

The principal buſineſs of the town is the cod-fiſhery, employing about 2000 tons of ſhipping and about 300 men annually. Many of the fiſhing veſſels make voyages to the ſouthern ſtates in the winter ſeaſon. The exports in 1795 exceeded 70,000 dollars, and in 1796 amounted to near 130,000 dollars. The produce of the fiſhery was formerly ſold at Boſton, or Salem; but it is now almoſt wholly exported from the town. The proceeds of the foreign voyages are generally conveyed to Boſton for a market. During the war for independence, Plymouth ſuffered much, and was reduced to a ſtate of great diſtreſs; but it has ſince revived, and both the town and its environs have been improved. A ſtage paſſes to Boſton twice a-week, and an aqueduct is conſtructed for bringing freſh water to the inhabitants. The townſhip abounds with ponds (amounting to more than 100) and ſtreams. Bellington ſea covers near 300 acres, about two miles from the town, and from it runs a ſtream, which ſupplies the aqueduct. South pond is much larger. Many of the ponds abound with white and red pearch, pike, and other freſh-water fiſh, and in the numerous brooks which run into the ſea are found excellent trout. Theſe ponds and ſtreams are frequently ſcenes of amuſement for parties of both ſexes, in the ſummer ſeaſon. At the villages of Monument Ponds and Eel river, and in ſome other parts of the townſhip, many of the inhabitants are farmers; and in the town the gardens are numerous and well-cultivated, and aided by the aqueduct will furniſh a ſupply adequate to the wants of the inhabitants.

The ſituation of the town is pleaſant and healthful, but the eaſterly winds of the ſpring are noxious. Although the market is not regularly ſupplied, fowl, fiſh, poultry, and wild fowl are plentiful, and cheaper, perhaps, than in any other ſea-port of the ſame ſize. The people are ſober, induſtrious, and friendly. Plymouth is the firſt ſettlement in New England, in 1620, but is peopled, principally, by the deſcendants of the ancient ſtock, intermixed with a few foreigners. The rock on which their forefathers firſt landed, was conveyed, in 1774, from the ſhore to a ſquare in the centre of the town. Although fiſhing and foreign commerce engage at preſent almoſt the whole native capital of the town, a variety of circumſtances will probably render it, at ſome future period, a conſiderable manufacturing town.

PLYMOUTH, a town in Litchfield county, Connecticut, containing 1882 inhabitants.—Alſo, a port and half-ſhire town in Grafton county, New Hampſhire, on the S. ſide of Baker's river, at its mouth, where it falls into the river Pemigewaſſet; 45 miles N. of Concord; incorporated in 1763, and containing 937 inhabitants.—Alſo, a town of New York, in Onondago county; lying about 12 miles S.E. of Geneva, on a beautiful declivity on the E. ſide of Seneca lake, and commanding a view of the whole lake. The ſituation is healthful and pleaſant, well watered by copious ſprings: more than twenty houſes were built here in 1796. The new ſtate road interſects this town, and here is a ferry acroſs the lake to another thriving town on the oppoſite ſide.—Alſo, the name of two townſhips in Pennſylvania, one in Luzerne county, and the other in that of Montgomery; the former has 765, and the latter 895 inhabitants.—Alſo, a town of North Carolina, about 20 miles from Edenton, and a place of conſiderable trade; the navigation is free and open, and the two places have a conſtant communication acroſs Albemarle ſound.—Alſo, a ſettlement on the S. peninſula of St. Domingo, in the dependence of Jeremie.—Alſo, a townſhip in Windſor county, Vermont, formerly Saltaſh, 12 miles W. of Windſor; containing 834 inhabitants.

PLYMOUTH *Town*, a town in the iſland of Tobago. N. lat. 10° 10′. W. long. 60° 3′.

PLYMOUTH *Marble*, among our *Artificers*, a term uſed for a ſort of marble dug in great plenty about Plymouth, and in ſome parts of Devonſhire, where it lies in very thick ſtrata, and whence it is brought in large quantities to us; and when wrought looks little leſs beautiful than ſome of the Italian marble.

It is very hard and firm, and of a beautiful texture; its ground is a blueiſh-white, and its variegations are principally a pale red, and in ſmaller quantities brown and yellow:

theſe lie in very orderly beds, and often there is a very agreeable glow of a faint red diffuſed through the whole ſubſtance. It is remarkable even in its whole ſtructure, and is therefore capable of a more than ordinarily elegant poliſh.

PLYMPTON, a townſhip in Plymouth county, Maſſachuſetts; 45 miles S.E. of Boſton, containing 900 inhabitants.

PLYMPTON-MAURICE, or Earls-Plympton, a borough and market town in the hundred of Plympton, and county of Devon, England, is 216 miles W.S.W. from the metropolis, and 39 miles S.W. from Exeter. According to the population returns of 1811, it contains 92 houſes, and 715 inhabitants. It is one of the ſtannary towns, and formerly conſtituted part of the honour of Plympton, to which no fewer than eighty-nine knight's fees were appendant, when it was granted by Henry I. to Richard de Rivers, or Redverſe, earl of Devonſhire. That nobleman built here a magnificent caſtle, and made it the capital ſeat of his barony. He and his ſucceſſors likewiſe conferred upon the town conſiderable privileges. Baldwin de Rivers granted it a charter of incorporation, which was ſucceſſively confirmed and extended by Edward III., Richard II., and Henry V. and VI. Queen Elizabeth granted a new charter, under which the town is now governed by a mayor, a recorder, eight aldermen, a bailiff, and a town clerk. The mayor is inveſted with the powers of a juſtice of the peace, and holds a court of record at ſtated intervals.

Plympton ſends two members to parliament, and has done ſo, though irregularly, ſince the reign of Edward I. Theſe are elected by the mayor and free burgeſſes, who are eſtimated at one hundred in number. The mayor is the returning officer. The market day here is Saturday every week; beſides which there are four annual fairs. The houſes are chiefly diſpoſed in two ſtreets, extending at right angles with each other in the form of the Roman letter T. The church is only a chapel annexed to the church of Plympton St. Mary, an adjoining pariſh and village. The living is a curacy, in the patronage of the dean and canons of Windſor. The other public buildings are a guildhall and a free-ſchool. The guildhall is an ancient ſtructure supported on ſtone pillars, and contains, among other portraits, one of ſir Joſhua Reynolds, painted by himſelf. The free-ſchool was erected in 1664, by one of the truſtees of Elizeus Hele, eſq. of Fardel, who bequeathed 1500*l.* *per annum*, to be expended in charitable purpoſes. Of this ſchool, the father of ſir Joſhua Reynolds was maſter for many years, and in the maſter's houſe belonging to it the celebrated artiſt himſelf was born on the 16th July 1723. See Reynolds.

Plympton *St. Mary*, above-mentioned as adjoining to Plympton-Earls, is a village and pariſh of very conſiderable antiquity. The church was formerly collegiate for a dean or provoſt, and four prebendaries with other miniſters. This college is ſaid to have been of the foundation of one of the Saxon kings. It was diſſolved by William Warlewaſt, biſhop of Exeter, on the refuſal of its religious to diſcard their wives in obedience to the decrees of the ſynod, held in London A.D. 1102, by which celibacy was enjoined to the clergy. That prelate afterwards ſettled here a prior and canons regular of the order of St. Auguſtin. The benefactions conferred on this priory by earl Baldwin and others were immenſe, and rendered it the richeſt monaſtic inſtitution in the dioceſe of Exeter. Its revenues at the time of the diſſolution were valued at 912*l.* 12*s.* 1*d.* *per annum*. The ſcite was granted by queen Elizabeth to Arthur Champernon, eſq. Here was alſo an hoſpital for lepers. The pariſh of Plympton St. Mary, excluſive of Plympton-Earls, contains, according to the parliamentary returns of 1811, 272 houſes, 1727 inhabitants.

Near Plympton is Boringdon, the ancient ſeat of the Parkers, and now the property of their repreſentative John Parker, earl of Boringdon. The manſion which was built in the fourteenth century has been converted into a farmhouſe, and has conſequently undergone great alteration and diminution ſince the removal of the family ſeat to Saltram, in the neighbourhood, by lady Catharine Parker. Saltram is remarkable for the beauty of its ſituation; for excluſive of the diverſity of landſcape diſplayed by the ſurrounding pleaſure grounds, the proſpects which it commands "of Plymouth ſound, the town, citadel, Mount Edgecumbe, and the endleſs variety of effects peculiar to the ſea and harbour, are extremely intereſting and amuſing." The houſe is the largeſt in the county, and contains a valuable collection of paintings by ancient and modern maſters. Beauties of England and Wales, vol. iv. by John Britton, F.S.A. and E.W. Brayley.

PLYNTERIA, Πλυντερια, in *Antiquity*, a feſtival in honour of Aglaurus, the daughter of king Cecrops, or rather of Minerva, who had from that lady the name of Aglaurus. Theſe were the holidays of Minerva, which was reckoned unlucky, at which time, according to Xenophon, they ſhut up the temples of that goddeſs. It was expreſsly forbidden to purſue any work whatever on the day of this feſtival, even in caſes of neceſſity. It was then allowable by the law of Solon to ſwear by the three names of Jupiter Propitious, Expiator, and Defender. For the ceremonies obſerved at this ſolemnity, ſee Potter, Archæol. Græc. lib. ii. cap. 20. tom. i. p. 425.

PNEUMA, Πνευμα, in Hippocrates, ſometimes imports ſpirit, air, or vapour, and frequently it ſignifies the breath, that is, the air drawn in by inſpiration, and expelled during expiration. But pneuma, by the above quoted author, is often uſed to expreſs a difficult, ſhort, and laborious reſpiration.

PNEUMATICS, Pneumatice, called alſo *Pneumatology* and *Pneumatoſophy*, the doctrine and contemplation of ſpirits, and ſpiritual ſubſtances.

The word is formed of the Greek ϖνευμα, *ſpiritus*, *breath*; whence, from the different acceptations of that word either as an incorporeal ſubſtance, or as air, there ariſe two ſorts of pneumatics.

Pneumatics, in the *Schools*, is frequently uſed for the doctrine of ſpirits; as God, angels, and the human ſoul. See Spirit.

In this ſenſe pneumatics coincide with what we otherwiſe call metaphyſics.

Pneumatics is more commonly uſed among us for the doctrine of the air; or that part of natural philoſophy which treats of the nature, properties, and effects of the air.

Some make pneumatics a branch of mechanics; becauſe it conſiders the air in motion, with the effects of it. It is certainly a ſiſter of hydroſtatics; the one conſidering air in the ſame manner that the other does water.

Wolfius, in lieu of pneumatics, uſes the word *aerometry*, *q. d.* the art of *meaſuring the air*.

The doctrine and laws of pneumatics will be found under Air, Atmosphere, Elasticity, Gravity, Compression, Condensation, Rarefaction, Expansion, &c.

Pneumatic *Engine*, *Machina* or *antlia pneumatica*, denotes the air-pump.

Pneumatic *Sect* of phyſicians, a ſubdiviſion of the methodic ſect, which took place at Rome, and is aſcribed to two or three different perſons, who are ſeverally eſteemed its founders,

founders. The chief diſtinction of the pneumatic ſect, conſiſted in referring to a particular ſpirit, or *pneuma*, which they conſidered to ariſe from the heart and arteries. See Medicine, *Hiſtory of.*

PNEUMATOCELE, from ϖνευμα, *wind*, and κηλη, *a tumour*, in *Surgery*, a ſwelling containing air: alſo a wind rupture; a complaint which is ſpoken of by many ſurgical writers; but has no real exiſtence. Hernial tumours do, indeed, ſometimes include air, which is combined within the protruded bowel, or elſe produced in the cellular membrane from putrefaction in the ſloughing ſtate of the diſeaſe. Yet it is not the accidental preſence of ſuch air that conſtitutes the rupture or hernia; but the protruſion of ſome of the viſcera from the cavity of the abdomen.

PNEUMATODES, a word uſed by Hippocrates to expreſs a perſon who fetches his breath ſhort and quick: and ſometimes for one who has his belly or ilia much diſtended by flatulencies. *Pneumutias* is alſo uſed in the ſame double ſenſe.

PNEUMATOMACHI, Πνευματομαχοι, in *Eccleſiaſtical Hiſtory*, ancient heretics, ſo called, becauſe they oppoſed the divinity of the Holy Spirit, placing him in the number of creatures.

PNEUMATOMPHALOS, from ϖενυμα, *wind*, and ομφαλος, *the navel*, in *Surgery*, a rupture of the navel, containing air, or ſuppoſed to be produced by wind.

PNEUMATOSIS, in *Medicine*, from πνευμα, *air*, a term denoting large accumulations of air in any cavity of the body. It may include, therefore, not only *tympanites*, but *emphyſema*. In this ſenſe Sauvages employs the term, and deſcribes four ſpecies of pneumatoſis; the firſt he calls *ſpontanea*, as it ariſes without any evident cauſe; the ſecond, *traumatica*, which originates from wounds of the lungs, whence the air is permitted to eſcape into the cellular membrane of the whole body; the third, *venenata*, ariſing from poiſons; and the fourth, *hyſterica*, when the air is confined to the ſtomach and inteſtines. (See his Noſol. Method. claſs x. gen. 5.) See alſo Emphysema.

PNEUMONANTHE, in *Botany*, a name given by many botanical writers to a ſpecies of gentiana, called alſo by ſome the *calathian* violet.

PNEUMONIA, in *Medicine*, from πνευμων, *the lungs*, ſignifies an inflammation of the lungs and its inveſting membrane. It includes, therefore, both the forms of the diſeaſe, peripneumony and pleuriſy. See Peripneumony.

PNEUMONICS, Πνευμονικα, medicines proper in diſeaſes of the lungs, in which reſpiration is affected.

The word is formed from the Greek ϖνευμων, *lungs*, or ϖνευμα, *ſpiritus*, *breath*.

Of this number are ſulphur, lung-wort, hyſſop, ground-ivy, and colt's-foot; they are uſed in phthiſes, aſthmas, peripneumonies, pleuriſies, &c.

PNEUMORA, in *Entomology*, a genus of inſects of the order Hemiptera. The generic character is; body ovate, inflated, diaphanous; head inflected, armed with jaws; thorax convex, carinate beneath; wing-caſes deflected, membranaceous; legs formed for running. There are three ſpecies of this genus, and they all appear to conſiſt of a mere hollow inflated membrane; by rubbing together their ſerrate or toothed legs, they make a ſhrill kind of noiſe morning and evening; and they follow a light; they are ſo nearly allied to the cricket tribe, that they have been ranked by Fabricius with the Gryllus genus.

Species.

Immaculata. Green ſpotted with white; wing-caſes immaculate. It inhabits the Cape of Good Hope. In Fabricius it is the Gryllus papilloſus.

Maculata. Wing-caſes green, with ſquare white ſpots.

6-Guttata. Wing-caſes green, with two white ſpots; abdomen with three white ſpots on each ſide. This is found at the Cape of Good Hope.

PNIGITIS Terra, in the *Materia Medica of the Ancients*, a name given at different periods of time to two different ſpecies of earth: the terra pnigitis of Dioſcorides and Pliny being a grey marle, and the pnigitis of Galen a black clay.

The laſt of theſe is ſaid to be a very valuable aſtringent, and is found in many parts of this kingdom, particularly in the neighbourhood of London, and well deſerving to be introduced in the practice of phyſic.

PNIGMOS, from ϖνιγω, *I ſuffocate*, in *Medicine*, a kind of ſuffocation, from whatever cauſe: it is very often uſed to expreſs that of hyſteric fits in women.

PNIX, a word uſed by phyſicians to expreſs the ſuffocation from hyſteric fits, or any other cauſe.

PO, in *Geography*, *Padus*, (which ſee,) a river of Italy, which riſes in mount Viſo, at the N.W. part of the marquiſate of Saluzzo, ſeven miles N. of Chateau Dauphin, traverſes a part of the marquiſate of Saluzzo, the province of Chieri, the duchy of Montferrat, the Milaneſe, Mantuan, and Ferrareſe, and runs into the gulf of Venice, by a great number of mouths.

Po, *Department of*, one of the ſix departments into which Piedmont was divided, after having been united to the French republic, Auguſt 26, 1802, the other five being Doire, Seſia, Marengo, Tanara, and Stura. This department is formed of the diſtrict of Turin, quatre-vallois, and the marquiſate of Suſa, in N. lat. 45°, lying between Doire and Stura, and on the W. and N.W. bounded by the Alps, containing 264 ſquare leagues, and 395,193 inhabitants. It is divided into three circles, *viz.* Suſa, including 61,236 inhabitants; Turin, 232,313; Pignerol, 101,634. Situated at the foot of the Alps, and broken into vallies, hills, and plains, the ſoil of this department is of various qualities. The plains and vallies, in general, are fertile. In the mountains are mines of copper, lead, iron, quarries of marble, ſtone, ſlate, &c.

Po, *Lower*, a department of the new kingdom of Italy, compoſed of the duchy of Ferrara, and the valley of Comachio.

Po, *Upper*, a department of Italy, formed of the Cremoneſe, the Cremaſco, and the Lodeſan.

Po, *the Vale of the*, one of the four regions into which Italy may be divided; it extends about 260 miles in length, and in breadth, where wideſt, 150. It is bounded by the Alps and Apennines on the N., W., and S., and on the E. lies open to the Adriatic. The ſecond region is the tract incloſed by the Apennines, forming the Roman and Tuſcan territories. The third is confined to the Campania Felix, and its immediate dependencies, ſuch as the borders and the iſlands of the bay of Naples, and of the plains of Pœſtum. The laſt conſiſts of Abruzzo, Apulia, Calabria, and the ſouthern extremities of Italy.

The firſt of theſe regions has been repreſented by many, as perhaps the moſt fertile and the moſt delicious territory in the univerſe. It owes this fertility to the many ſtreams that deſcend from the bordering mountains, and furniſh a conſtant ſupply to the majeſtic river that interſects it. Mr. Euſtace, in the ſecond volume of his "Claſſical Tour," avoids the name frequently given to the plains of the Po or of Milan. *Lombardy* (which ſee) is, he ſays, a barbarous appellation, derived from one of the fierceſt tribes that invaded and waſted this delicious region. After more than two centuries of devaſtation and reſtleſs warfare, they were exterminated by Charlemagne; and our author does not ſee why their name ſhould ſurvive their exiſtence, or why a barbarous term ſhould diſplace a Latin appellation.

Po, a city of China, of the ſecond rank, in Kiang-nan; 260 miles S.S.W. of Peking. N. lat. 33° 45′. E. long. 115° 14′.—Alſo, a town of China, of the third rank, in Chan-tong; 262 miles S. of Peking. N. lat. 35° 48′. E. long. 115° 14′.

POA, in *Botany;* ποα, a general name for *graſs*, or *herbage*, is appropriated by Linnæus to this, one of the moſt common and copious genera of the graſs family.—Linn. Gen. 34. Schreb. 49. Willd. Sp. Pl. v. 1. 385. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 95. Prodr. Fl. Græc. Sibth. v. 1. 53. Schrad. Germ. v. 1. 278. Ait. Hort. Kew. v. 1. 153. Brown Prodr. Nov. Holl. v. 1. 179. Purſh North-Amer. v. 1. 78. Juſſ. 32. Lamarck Illuſtr. t. 45. Michaux Boreal-Amer. v. 1. 67.—Claſs and order, *Triandria Digynia.* Nat. Ord. *Gramina.*

Gen. Ch. *Cal.* Glume of two ovate, pointed, awnleſs valves, collecting the numerous florets into a two-ranked ovate-oblong ſpikelet. *Cor.* of two ovate, ſharpiſh, concave, compreſſed valves, rather longer than the calyx, membranous at the edges. Nectary of two acute or torn leaflets, gibbous at the baſe. *Stam.* Filaments three, capillary; anthers forked at each end. *Piſt.* Germen ſuperior, roundiſh; ſtyles two, reflexed, villous; ſtigmas feathery. *Peric.* none, the corolla unites itſelf to the ſeed, and does not ſeparate. *Seed* one, oblong, pointed, compreſſed at each ſide, covered by the corolla.

Obſ. In ſome ſpecies the florets are connected at the baſe by a fine web of folded ſilky threads.

Eſſ. Ch. Calyx of two valves, many-flowered. Spikelet rounded at the baſe. Corolla of two ovate, rather acute, awnleſs valves, membranous at the edge.

Of this large and valuable genus the 14th edition of Syſt. Veg. contains 33 ſpecies; Willdenow reckons up 61; but we ſuſpect the laſt of theſe, *P. plumoſa*, not to be different from his n. 38, the Linnæan *tenella.* The Britiſh ſpecies are 18, which we ſhall particularize, along with a few of the moſt remarkable exotic ones. Mr. Brown deſcribes 21 *Poæ*, moſtly new, in his New Holland Prodromus.

P. *aquatica.* Reed Meadow-graſs. Linn. Sp. Pl. 98. Willd. n. 1. Engl. Bot. t. 1315. Curt. Lond. faſc. 5. t. 12. Knapp. t. 44. (Gramen aquaticum majus; Ger. Em. 6.)—Panicle erect, branched, lax. Spikelets ſix-flowered, linear. Florets obtuſe, with ſeven ribs.—In ditches and about the banks of rivers, perennial, flowering in July, conſpicuous for its large ſize and reedy aſpect. Its colour is a light, not at all glaucous, green. *Stem* five or ſix feet high. *Leaves* flat, acute, broad, ſtraight, rough at the edges and keel, with a nearly ſmooth ſheath, and a ſhort, entire, very blunt *ſtipula. Panicle* very large and numerouſly branched, the ſubdiviſions rather zigzag, rough. *Calyx* almoſt equal, whitiſh, poliſhed. *Florets* from five to eight, ſcarcely more, nearly cylindrical, ſomewhat diſtant, obtuſe, rough, purpliſh at the outer part.

Cattle are ſaid to be fond of this graſs, though coarſe. It uſually makes a principal part of marſh-land hay.

P. *fluitans.* Floating Meadow-graſs. Scop. Carn. ed. 2. v. 1. 73. Fl. Brit. n. 2. Ait. n. 2. Engl. Bot. t. 1520. Knapp. t. 45. (Feſtuca fluitans; Linn. Sp. Pl. 111. Curt. Lond. faſc. 1. t. 7. Mart. Ruſt. t. 113. Willd. Sp. Pl. v. 1. 426. Glyceria fluitans; Brown Prodr. N. Holl. v. 1. 179.)—Panicle branched, divaricated. Spikelets cloſe-preſſed, cylindrical, many-flowered. Florets obtuſe, with ſeven ribs, and intermediate ones at the baſe.—In ditches and ſlow rivulets, perennial, flowering throughout the ſummer, in moſt parts of Europe. Mr. Brown found it at Port Jackſon, New South Wales, the ſeeds probably having been carried from England by accident. This writer has ſeparated it as a genus from *Poa*, chiefly becauſe of the *ſtigmas* being repeatedly branched, and the *nectary* a ſolitary fleſhy ſcale. But the neighbouring ſpecies of *Poa*, wanting theſe characters, ſeem too ſtrictly akin to this to allow of ſuch a ſeparation. The *root* creeps extenſively. *Stems* ſpreading widely, floating for the moſt part, with their lower *leaves*, on the ſtill ſurface of the water. *Sheaths* long, compreſſed, ſtriated, ſmooth. *Stipulas* ſhort, triangular, jagged. The larger branches of the *panicle* ſpread widely, and are accompanied by ſhort more erect ones. The ſhort intermediate ribs, at the bottom part of each *floret*, afford a peculiar character.

P. *diſtans.* Reflexed Meadow-graſs. Linn. Mant. 32. Willd. n. 55. Ait. n. 22. Engl. Bot. t. 986. Knapp. t. 47. (P. retroflexa; Curt. Lond. faſc. 6. t. 10. P. ſalina; Pollich. Palat. v. 1. 89.)—Panicle branched, ſpreading; the branches at length reflexed. Spikelets of five, very obtuſe, ſlightly five-ribbed, ſhining florets.—In meadows, and amongſt rubbiſh, chiefly near the ſea, in various parts of England. Jacquin found it in Auſtria. The *root* is fibrous, perennial. *Stems* ſeveral, about a foot high, decumbent at the lower part, ſtriated, ſmooth to the touch. *Leaves* glaucous, flat, with long *ſheaths*, and a blunt emarginate *ſtipula. Panicle* erect, with branches of various lengths, ſeveral together, remarkable for being ſtrongly bent downwards as they advance in age. *Florets* much like the *aquatica* in their form and arrangement, but with only five ribs. Vahl in his Symbolæ, v. 2. 19, moſt unaccountably confounds this graſs with Gouan's *P. divaricata*, Willd. n. 56.

P. *maritima.* Creeping Sea Meadow-graſs. Hudſ. 42. Willd. n. 39. Ait. n. 16. Engl. Bot. t. 1140. Knapp. t. 46. Fl. Dan. t. 251.—Panicle branched, rather cloſe. Spikelets of five bluntiſh, nearly cylindrical, ſlightly five-ribbed florets. Root creeping.—Native of ſandy ſalt-marſhes, in various parts of Europe, flowering in July. Akin to the laſt, but the creeping *root*, branches of the *panicle* erect after flowering, rarely divaricated, and longer, more acute *florets*, diſtinguiſh the preſent ſpecies.

P. *dura.* Hard Meadow-graſs. Scop. Carn. ed. 2. v. 1. 70. Sm. Prodr. Fl. Græc. Sibth. n. 181. Schrad. Germ. v. 1. 284. Hoſt. Gram. Auſtr. v. 2. 53. t. 73. (Cynoſurus durus; Linn. Sp. Pl. 105. Willd. Sp. Pl. v. 1. 413. Pollich Palat. t. 1. f. 1.)—Spike nearly ſimple. Spikelets ſeſſile, alternate, crowded, rigid, obtuſe, compreſſed, all turned one way, of about five elongated ribbed florets.—Native of ſandy waſte ground in the ſouth of Europe, flowering in May and June. *Root* annual, of many long ſimple fibres. *Stems* numerous, two to four inches high, ſpreading in every direction, leafy, rigid, ſometimes branched at the baſe. *Leaves* glaucous. *Spike* ovate, an inch long, rigid, its zigzag ſmooth ſtalk viſible at the back only. *Spikelets* about a dozen, linear-oblong, glaucous, all their glumes ſtrongly ribbed, and each bordered with a broad white membrane. This ſpecies is cloſely allied to the preceding and the following ones, nor has it any character of *Cynoſurus.* It has not been found in Britain.

P. *procumbens.* Procumbent Sea Meadow-graſs. Curt. Lond. faſc. 6. t. 11. Engl. Bot. t. 532. Knapp. t. 49. Fl. Brit. n. 5. Ait. n. 3. (P. rupeſtris; With. 146. t. 26. Gramen maritimum, paniculis aſperis loliaceis;

Bocc. Muſ. 135. t. 95.)—Panicle lanceolate, denſe, rough, turned one way; common ſtalk round. Spikelets cylindrical, of about five bluntiſh, ribbed florets.—Native of ſandy inundated waſte ground, near the ſea, in England, Holland, and Sicily, flowering in ſummer. The *root* is annual. Whole plant much like *P. dura*, but more ſlender, taller, and leſs rigid, with a doubly compound *panicle*, not a *ſpike*, and far more numerous, ſmaller, cylindrical *ſpikelets*.

P. *rigida*. Rigid Meadow-graſs. Linn. Sp. Pl. 101. Willd. n. 40. Curt. Lond. faſc. 2. t. 4. Knapp. t. 48. Engl. Bot. t. 1371.—Panicle lanceolate, denſe, ſmooth, two-ranked, turned one way; common ſtalk bordered. Spikelets of ſeven cylindrical, ribleſs florets.—Common on the tops of dry walls, and in barren ſandy ground, annual, flowering in June. The whole plant is four or five inches high, of a peculiarly rigid, elaſtic, wiry habit, and purpliſh-brown hue. Every part is ſmaller than in the laſt.

P. *divaricata*. Straggling Meadow-graſs. Gouan Illuſtr. 4. t. 2. f. 1. Willd. n. 56. Desfont. Atlant. v. 1. 75. (Gramen phalaroides, ſparſâ paniculâ, minimum anguſtifolium; Barrel. Ic. t. 44. f. 1.)—Panicle capillary, divaricated, with corymboſe branches. Flower-ſtalks club-ſhaped. Florets four. Leaves briſtle-ſhaped.—Native of the ſouth of France and of Barbary. A ſmall, delicate, ſlender, annual graſs, with the habit of *Aira caryophyllea*, for which the plate of Barrelier has been quoted, a circumſtance that has cauſed ſome confuſion. It flowers in the ſpring, and has a very elegant aſpect. The thickened *flower-ſtalks*, and the crowded little ſhining *ſpikelets*, are characteriſtic of this ſpecies.

P. *Eragroſtis*. Spreading Meadow-graſs. Love-graſs. Linn. Sp. Pl. 100. Willd. n. 24. Ait. n. 12. Sm. Fl. Græc. Sibth. v. 1. 57. t. 73. Cavan. Ic. t. 92. (P. megaſtachya; Schrad. Germ. v. 1. 288. Briza Eragroſtis; Linn. Sp. Pl. 103. Willd. Sp. Pl. v. 1. 405. Schreb. Gram. t. 39. G. eranthemum, ſeu εραγρωστις; Barrel. Ic. t. 43.)—Panicle erect, branched, ſpreading. Spikelets linear, many-flowered. Florets tumid, with three keels. Stipula briſtly.—Native of Greece, Barbary, Italy and Switzerland, though not known to Haller as a Swiſs plant; ſee the following ſpecies. A very elegant annual graſs, with numerous *ſtems*, from one to two feet high, quite ſmooth. *Leaves* ſpreading, graſs-green; their *ſtipula* of many fine hairs. *Panicle* ample, looſe, much branched. *Spikelets* linear, alternate, ſtalked, green or purpliſh, ſhining. *Florets* from ten to thirty-ſix, imbricated, ovate, tumid, roughiſh, with three diſtant ribs or keels. The above two plants of Linnæus are certainly one and the ſame, differing merely as to number of *florets*. The ripe *ſeed* being unconnected with the *corolla*, makes the plant a *Poa*, not a *Briza*.

P. *elegantiſſima*. Elegant Meadow-graſs. (P. Eragroſtis; Villars Dauph. v. 1. 135. Schrad. Germ. v. 1. 287. Schreb. Gram. t. 38. P. n. 1450; Hall. Hiſt. v. 2. 219. Gramen phalaroides, ſparſâ Brizæ paniculâ minus; Barrel. Ic. t. 44. f. 2. G. paniculis elegantiſſimis, minimum; Scheuchz. Agr. 192. t. 4. f. 2.)—Panicle erect, branched, capillary, ſpreading. Spikelets lanceolate, ſcarcely ten-flowered. Florets compreſſed, keeled, three-ribbed. Stipula briſtly.—Native of Switzerland, France, and Italy. About one-third the ſize of the foregoing, with ſharper *leaves*, dark purple tapering *ſpikelets*, and about a quarter of the number of *florets*, which are compreſſed and keeled, with one obſolete rib at each ſide, near the edge. This is commonly taken for *P. Eragroſtis* of Linnæus, but erroneouſly, he having never been acquainted with the graſs before us, though he cites ſome of its ſynonyms for his *P. Eragroſtis* above deſcribed.

P. *compreſſa*. Flat-ſtalked Meadow-graſs. Linn. Sp. Pl. 101. Willd. n. 42. Ait. n. 18. Knapp. t. 57. Engl. Bot. t. 365. Hoſt. Gram. Auſtr. v. 2. 51. t. 70.—Panicle denſe, turned one way. Stem aſcending, compreſſed. Florets angular, connected at the baſe by a folded web.—Common in dry fields and on walls, in Europe as well as America. Mr. Purſh ſays it is known in the laſt-mentioned country by the name of Blue Graſs. It flowers with us in July and Auguſt, and has a perennial creeping *root*. The whole plant is rather glaucous, about a foot high, readily known by its very flat *ſtem*, and denſe *panicle*, whoſe branches ſpread but for a ſhort period, while in full bloſſom. *Florets* from three to nine, cloſely imbricated, ovate, angular, three-ribbed, bluntiſh, purple juſt under the white membranous tip, connected together at the bottom by a ſet of fine cottony fibres, ſhorter than in ſome other ſpecies.

P. *alpina*. Alpine Meadow-graſs. Linn. Sp. Pl. 99. Willd. n. 2. Ait. n. 4. Engl. Bot. t. 1003. Hoſt. Gram. Auſtr. v. 2. 49. t. 67. Knapp. t. 50 and t. 117.—Panicle looſe. Spikelets heart-ſhaped, of about four flowers. Glumes ovate, rather falcate, not connected by a web. Lower ſtipulas very ſhort.—Native of the mountains of Lapland, Germany, and Scotland, as well as of the Bithynian Olympus, flowering in ſummer. *Root* tufted, perennial, with ſmooth fibres. *Stems* from four to twelve inches high; leafy below; ſmooth, ſhining, often purpliſh, above. Radical *leaves* forming a denſe tuft; thoſe on the ſtem furniſhed with much longer *ſheaths* as well as *ſtipulas*. *Panicle* ſpreading, ſhort, ſomewhat ovate, with angular, nearly ſmooth, branches. *Spikelets* broad, ſhining, elegantly variegated with green, white, and a purpliſh brown. "*Florets* ovate, acute, membranous at the edge, the lower part of which is ſilky, and the keel ſtill more ſo:" ſeveral longiſh hairs, but no complicated web, are found at the baſe. In wet ſeaſons the *flowers* are changed into buds, forming young plants, as ſhewn in Scheuchz. Agroſt. t. 4. f. 14, and in Engl. Bot.

P. *flexuoſa*. Zigzag Meadow-graſs. Sm. Fl. Brit. 101. Engl. Bot. t. 1123. Knapp. t. 51. Ait. n. 5. (P. laxa; Willd. n. 3. Schrad. Germ. v. 1. 291.)—Panicle denſe, ſomewhat drooping, zigzag. Spikelets three-flowered. Glumes ovate, connected by a web. Stipulas all lanceolate.—Diſcovered on the Scottiſh mountain of Ben Nevis, by the late Mr. J. Mackay, flowering in July. Schrader mentions it as a native of various alpine ſituations in Germany. The *root* is ſomewhat creeping. This ſpecies is of a more ſlender habit, and paler glaucous aſpect, than the *alpina*, and differs eſſentially in the above characters. The glumes are not ſilky at the keel nor margin.

P. *bulboſa*. Bulbous Meadow-graſs. Linn. Sp. Pl. 102, α and γ, not β. Willd. n. 50. Ait. n. 21. Engl. Bot. t. 1071. Knapp. t. 53, with the root of another ſpecies. (G. vernum, radice aſcalonitidis; Vaill. Paris. t. 17. f. 8.)—Panicle ſlightly zigzag. Spikelets four-flowered. Glumes veinleſs, connected by a web. Leaves finely ſerrated. Stem bulbous at the baſe.—Native of France, Italy, Germany, Switzerland, and England, in dry ſandy places. With us it is found only on the ſandy ſea-coaſt, over which its little dry bulbs are blown in various directions, during ſummer, till the firſt rains of autumn make them vegetate, and take deep root. The plants then yield abundance of ſhort denſe herbage, a welcome ſpring food for cattle, and flower in April or May; having, meanwhile, formed young bulbs, like a minute kind of garlick, which are diſperſed, like their predeceſſors, after the leaves wither. The *ſtems* are naturally three or four inches high; in a garden they riſe to above a foot, and the *leaves* are long in proportion. The ſerrated *foliage*, the *bulbs*, the woolly web connecting the *florets*, and their broad veinleſs *glumes*, clearly aſcertain this ſpecies. The *panicle* is ſmall, hoary or ſilvery, and purpliſh. —We have gathered this graſs for the moſt part in a viviparous ſtate, on the open ground near St. John Lateran, at Rome, in the early ſpring. This is probably the variety β of Schrader and other German authors; but the β of Linnæus is a very different, much taller, and greener graſs, with long and extremely narrow *leaves*, an elongated *panicle*, of numerous viviparous *flowers*, and peculiarly rough *flower-ſtalks*. Oriental ſpecimens are in the Linnæan collection, apparently ſent by Haſſelquiſt. This is what Scheuchzer has deſcribed in his *Agroſtographia* 211, and what Moriſon has figured, ſect. 8. t. 5. f. 14, after Bauhin's *Theatrum* 32. But the beſt repreſentation is in Barrelier, t. 703. f. 2. We are afraid to deſcribe this as a ſpecies, without ſeeing ſome ſpikelets in a natural ſtate; but we are perſuaded it is perfectly diſtinct, and that there are, beſides, other bulbous *Poæ*, hitherto confounded with the true *bulboſa*.

P. *cæſia*. Sea-green Meadow-graſs. Fl. Brit. 103. Engl. Bot. t. 1719. Ait. n. 7.—Panicle ſpreading. Spikelets ovate, five-flowered. Glumes lanceolate, ſilky-edged, unconnected by any web. Stipula very ſhort and blunt.—Native of the Highlands of Scotland, flowering in June and July. It ſeems unknown in every other country. The *root* is perennial, fibrous, tufted. Whole plant very glaucous. *Stems* erect, about a foot high, round, ſmoothiſh, with two joints near the bottom. *Leaves* bluntiſh, flat, rough to the touch, except on the back near the baſe. *Sheaths* roughiſh, about as long as the leaves. *Stipula* ſometimes variable in ſize and ſhape. *Panicle* much branched, rough. *Flowers* variegated with purple, white, and green, each outer valve marked with a ſilky line of hairs, near the edges, and on the keel; but there is no complicated web connecting the florets. The doubtful reference to Withering is to be ſtruck out of Fl. Brit., as belonging to our *glauca*, hereafter mentioned, which Mr. Knapp has by miſtake figured for *cæſia*.

P. *trivialis*. Roughiſh Meadow-graſs. Linn. Sp. Pl. 99. Willd. n. 6. Ait. n. 8. Curt. Lond. faſc. 2. t. 6. Knapp. t. 54. Engl. Bot. t. 1072. (P. dubia; Leers Herborn. 28. t. 6. f. 5.)—Panicle ſpreading. Spikelets three-flowered. Glumes lanceolate, five-ribbed, connected by a web. Stem roughiſh. Stipula elongated.—Very general in meadows and paſtures throughout Europe, particularly where the ſoil is moiſt, flowering from June to September, and forming perennial tufts of valuable herbage for the food of domeſtic cattle. The *ſtems* are a foot and half high, rough when drawn through the hand, by which this ſpecies is known from the equally common and uſeful *P. pratenſis*. The *leaves* are graſs-green, pliant, with ſheaths of their own length, crowned with an oblong pointed *ſtipula*. *Panicle* ample and ſpreading. *Florets* with five ſtrong-ribs, wanting in many of the laſt deſcribed. The web which connects them is copious and long. *P. ſetacea* of Hudſon's firſt edition is a mere variety, with narrow involute leaves.

P. *pratenſis*. Smooth-ſtalked Meadow-graſs. Linn. Sp. Pl. 99. Willd. n. 8. Ait. n. 9. Curt. Lond. faſc. 2. t. 5. Knapp. t. 55. Engl. Bot. t. 1073.—Panicle ſpreading. Spikelets four-flowered. Glumes lanceolate, five-ribbed, connected by a web, ſtem ſmooth. Stipula ſhort and blunt.—Equally common with the laſt, but it will grow in much drier ſituations. It flowers rather earlier, comes ſooner into leaf, but Mr. Curtis remarks that the *trivialis* produces a better crop as the ſeaſon advances. That excellent obſerver found the ſmoothneſs of the *ſtem* the beſt criterion for diſtinguiſhing this from the laſt; which Hudſon and Ehrhart have likewiſe noted. The *panicle* of the preſent ſpecies is moſt inclined to aſſume a purple hue; and the web connecting the *florets* is peculiarly long and complicated. *P. anguſtifolia*, Linn. Sp. Pl. 99, is a trifling variety, whoſe lower *leaves* are narrower and more rigid, with roughiſh ſheaths, and the *panicle* is ſmaller. This variety is figured in Leers, t. 6. f. 3.

P. *humilis*. Short Blueiſh Meadow-graſs. Ehrh. Calam. n. 115. Sm. Fl. Brit. 1387. Ait. n. 10. (P. ſubcærulea; Engl. Bot. t. 1004. P. cærulea; Knapp. t. 118.)—Glaucous. Panicle ſpreading. Spikelets ovate, of about three acute florets, connected by a web. Stipula very ſhort and blunt.—Native of mountainous paſtures in Weſtmoreland, Cumberland, and Angleſea, flowering in June. *Root* perennial, creeping, with villous fibres. *Stem* from four to ſix inches high. Whole plant glaucous. *Florets* ribbed, green at the baſe, purple and brown in the middle, white and membranous at the margin. Schrader, who directs us to ſtrike out the ſynonyms of Willdenow, Haller, and Scheuchzer, quoted in Fl. Brit. (as belonging to his *ſupina*, Fl. Germ. v. 1. 289.) thinks the preſent plant differs from *pratenſis* in its glaucous colour only. We agree that this is the chief diſtinction, but it ſeems to us eſſential. Hudſon made our plant a variety of *pratenſis*, but he miſtook it for the Linnæan *alpina*, a widely different ſpecies.

P. *annua*. Annual Meadow-graſs. Linn. Sp. Pl. 99. Willd. n. 16. Ait. n. 11. Curt. Lond. faſc. 1. t. 6. Mart. Ruſt. t. 98. Engl. Bot. t. 1141. Knapp. t. 52. —Panicle widely ſpreading. Spikelets ovate. Florets a little remote, five-ribbed, deſtitute of a web. Stem oblique, compreſſed.—Common every where in waſte as well as cultivated ground throughout Europe, flowering at all times of the year when the weather is mild. In gardens it is a troubleſome weed; in paſtures it affords excellent food for cattle, and is rather improved than damaged by being trodden. Though the *roots* are annual, the lower part of the *ſtems* ſpread by numerous fibres, and thus the plant extends itſelf widely during ſummer, as well as by ſcattering abundance of ſeed. The herbage is bright green, not glaucous. *Leaves* flat, with a crumpled appearance here and there. *Sheaths* compreſſed, crowned with a ſharp *ſtipula*. *Spikelets* ovate, variegated with green and white, rarely reddiſh. *Florets* a little ſilky at the back, membranous at the edge, deſtitute of a web at their baſe.

P. *glauca*. Slender Glaucous Meadow-graſs. Fl. Dan. t. 964. With. 148. Sm. Fl. Brit. 1388. Engl. Bot. t. 1720. Ait. n. 19. (P. cæſia; Knapp. t. 56. P. n. 1468; Hall. Hiſt. v. 2. 224. Feſtuca airoides; Lamarck Dict. v. 2. 464, excluding the reference to Haller's n. 1439, which is Feſtuca pumila of Willd. Sp. Pl. v. 1. 420.)—Panicle glaucous, ſlender, erect. Spikelets ovate, of about three flowers. Glumes bluntiſh, ſilky-edged, unconnected by any web. Stipula very ſhort.—Found on the loftieſt mountains of Wales and Scotland; perennial, flowering in June. The whole plant is very glaucous, and of a much more ſlender habit than any of the foregoing, in which laſt character it approaches the following. Schrader indeed ſuſpects it to be but a mountain variety of the *nemoralis*. The *ſpikelets* however are more ovate and cloſe, and we believe the glaucous colour to be an important diſtinction. If however the proximity of this, in other reſpects, to *nemoralis*, and of our *humilis* to *pratenſis*, ſhould be thought to invalidate that character, we ſubmit our opinion to the teſt of cultivation by ſeed, which alone can decide the queſtion.

P. *nemoralis*. Wood Meadow-graſs. Linn. Sp. Pl. 102.

Willd. n. 47. Ait. n. 20. Engl. Bot. t. 1265. Knapp. t. 58. Fl. Dan. t. 749. Hoſt. Gram. Auſtr. v. 2. 51. t. 71.—Panicle and leaves ſlender. Spikelets lanceolate, of about three flowers. Glumes acute, obſoletely five-ribbed. Stipula very ſhort, notched.—This graſs compoſes the tall thin herbage in woods or groves in the north of England, as well as rather mountainous woods throughout Europe. In lowlands it is leſs frequent, except on chalk. It is perennial, flowering in July and Auguſt. The whole plant is extremely ſlender, graſs-green, one and a half, or two feet high. *Stems* ſmooth, flattiſh. *Leaves* rough to the touch, taper-pointed. *Sheaths* ſmooth, tight, compreſſed, ſhorter than the leaves. *Stipula* very ſhort, notched, or torn. *Panicle* nearly erect, looſe, capillary, zigzag, rough. *Spikelets* ſmall, pale green, lanceolate rather than ovate. *Glumes* rough at the keel. *Florets* from two to four, ſhining, lanceolate, ſilky at their backs and hairy at the baſe, but not connected by a web.

There is a ſtouter variety, Hudſon's *P. anguſtifolia* α, the true *nemoralis* being his β.

P. *decumbens.* Decumbent Meadow-graſs. Scop. Carn. v. 1. 69. With. 147. Sm. Fl. Brit. 107. Ait. n. 24. Schrad. Germ. v. 1. 305. Engl. Bot. t. 792. Knapp. t. 59. Hoſt. Gram. Auſtr. v. 2. 52. t. 72. (Feſtuca decumbens; Linn. Sp. Pl. 110. Willd. Sp. Pl. v. 1. 424. Fl. Dan. t. 162.)—Panicle nearly ſimple, condenſed, erect. Spikelets ovate, of four florets, ſcarcely exceeding the calyx. Stipula briſtly.—Native of ſpongy bogs, in barren ſandy or mountainous ſituations, flowering in July. This ſpecies is perennial, of a remarkably harſh and rigid habit, lying cloſe to the ground, except when in flower, and of no agricultural uſe. The *roots* creep moderately, and are very ſtrong. *Stems* about a foot long. *Leaves* ſtraight, tapering, acute, rather glaucous, with long hairy *ſheaths*, and a briſtly tuft of hairs in the place of the uſual membranous *ſtipula*. *Panicle* zigzag, of a very few large purpliſh-glaucous *flowers*, of ſo ambiguous an appearance, that botaniſts have differed much about the genus of the graſs in queſtion; ſome making it a *Melica*, to which, as Linnæus remarks, it has a degree of affinity in habit as well as ſtructure. Koeler eſteems it a *Bromus*, and Bernhadi, like Decandolle, cuts the knot, by making it a new genus, we know not by what eſſential character. Mr. Brown is inclined to refer this puzzling plant to his own *Triodia*, Prodr. Nov. Holl. v. 1. 182.

The extra-european ſpecies of *Poa* afford a wide range for the botaniſt, too extenſive for our preſent purpoſe. They require a more general inveſtigation than they have yet received, though abundance of particular ſpecies have been deſcribed with ſufficient care. Thoſe of American growth agree beſt, as might be expected, with our's. Some tropical ones have ſo different an aſpect, that it is to be wiſhed they poſſeſſed ſome generic diſtinction. Many of them are ſingularly elegant when minutely examined. We apprehend that a great number ſtill remain undeſcribed.

Poa, in *Agriculture*, a genus of graſſes, which principally forms the green covering of the fields: the meadow-graſs.

There are ſeveral ſpecies, ſome of which are highly uſeful as field-graſſes.

Poa *Anguſtifolia*, the narrow-leaved meadow-graſs, which Mr. Sole ſays is a very ſweet graſs, eſpecially for hay, but like the trivialis, is liable to go off after mowing. It is diſperſed ſparingly in the meadows about Hinton Abbey.

Poa *Annua*, the dwarf or white meadow, or Suffolk graſs, which, according to Mr. Sole, is the quickeſt in growth of all the graſſes, coming up, blooming, and ripening its ſeeds in the courſe of one month. It ought therefore to be called *menſual;* but as it will keep time with no other graſs, it is not worth ſowing. It is always leaving the ground bare in patches, except there happens to be an *agroſtis* to fill its place. It is however a very ſweet graſs, and very generally liked by animals of moſt ſorts.

Poa *Aquatica*, the reed meadow-graſs, which, Mr. Sole ſays, is an excellent graſs in its native ſoil, the fens of the iſle of Ely, growing to the height of ſix feet. It is uſually cut when about four feet in height, and when dry, is bound into ſheaves; and it moſtly undergoes a heat in the ſtack that improves its quality. It is found an excellent fodder for milch cows, but horſes are not fond of it. In that place it is called *fodder* by way of eminence, other ſorts of coarſe hay being denominated *ſtover*, which ſignifies *coarſe ſtuff*, and it is called *white leed*, from its drying of a white colour.

Poa *Bulboſa*, the bulbous meadow-graſs, which Mr. Sole finds to have all the good qualities of the pratenſis, in ſo far as its ſize will admit, and it is proper for hilly dry grounds and poor ſoils, where it delights to grow. It is found in the hilly dry paſtures about Newton St. Loe.

Poa *Compreſſa*, the compreſſed, or flat ſtalked meadow-graſs, which Mr. Sole thinks an excellent graſs for parks and ſheep-walks, as both deer and ſheep are fond of it; and as it is a dwarf graſs, the blades ſeldom exceeding two inches in height, it forms a fine turf, and cauſes the fleſh of the animal to cut ſhort, and be fine flavoured. It is found in bloſſom in ſome places about Claverſton Down, and probably on the down itſelf, but the ſheep there never ſuffer a bent of it to blow.

Poa *Diſtans*, the fen meadow-graſs, which Mr. Sole finds an exceedingly ſweet graſs, affording very rich milk, but it is difficult to cultivate, as it delights in miry ſituations. It grows in moſt ſea-marſhes, and abundantly about Cottenham, and the fens of Cambridgeſhire.

Poa *Loliacea*, the hard or darnel meadow-graſs, which Mr. Sole thinks the moſt inſignificant of all the poas, but which has one good property, that of growing where no other graſs is capable of living, as in the drieſt parching ſea-ſands.

Poa *Maritima*, the ſea meadow-graſs, which the ſame botaniſt conſiders as a fine nouriſhing graſs, being the principal one of our beſt ſalt-marſhes; but from its delighting in ſalt, is difficult of cultivation.

Poa *Paluſtris*, the marſh meadow-graſs, which Mr. Sole thinks a fine exuberant graſs, and probably the beſt dairy graſs. It grows in the rich marſhes in all parts of the iſland, particularly thoſe that are frequently refreſhed by the occaſional overflowings of rivers. It is valuable for laying down ſpongy lands. It has often the height of four or five feet; and the panicle, when full blown, is extremely fine and flowing.

Poa *Pratenſis*, the great or ſmooth-ſtalked meadow-graſs, which, for the purpoſes of agriculture, is conſidered by Mr. Sole as the moſt noble of all the graſſes. Its foliage begins to ſhoot and put on a fine verdure early in the ſpring, but not ſo ſoon as ſome other graſſes. Every animal that eats graſs is fond of it; while it makes the beſt hay, and affords the richeſt paſture. It abounds in the beſt meadows about Laycock and Chippenham, and it has the valuable quality of abiding in the ſame land, whilſt moſt other graſſes are continually changing. According to ſome, it delights in rather a dry than a moiſt ſoil and ſituation, on which account it keeps its verdure better than moſt others in dry ſeaſons; but it thrives moſt luxuriantly in rich meadows. It has been objected to by ſome from its creeping roots, which are difficult to extirpate, of courſe it is probably the moſt ſuited to permanent graſs lands. According to Curtis it is diſtinguiſhed from the rough-ſtalked meadow-graſs, by the ſtem being ſmooth when drawn between the finger and thumb, and while in that the membrane at the baſe of the leaf is long pointed, in this it is ſhort and blunt. And beſides, it only throws up flowering ſtems once in the ſeaſon, and is of courſe well ſuited for lawns, &c.

Poa *Setacea*, the fine meadow-graſs, which Mr. Sole conſiders as a fine rich graſs for upland paſtures, as it delights in a dry ſoil. It is found in the hilly paſtures about Newton, in Somerſetſhire. It is likewiſe an abiding graſs.

Poa *Trivialis*, the common or rough-ſtalked meadow-graſs, which Mr. Sole thinks a fine graſs for hay as well as paſtures, but inferior to the pratenſis. It delights in moiſture and ſheltered ſituations, on which account it is tender though productive. In rich land it grows tall; its height however is about two feet. It is ſaid by ſome to be well ſuited to good ſound moiſt loams. It is much eſteemed on the continent for dry paſtures and watered meadows, as it multiplies by ſeed as well as the root. It is of courſe proper to let the ſeeds fall. Its fattening property is conſiderable for cattle. It is, however, apt to go off after mowing, being overpowered by thoſe graſſes of the bent kind. Its radical leaves, as well as thoſe on the ſtem, grow much larger than in the pratenſis. In ſowing it the ſeeds ſhould be carefully ſeparated.

POAKE Root, in Virginia, is uſed to denote the ſolanum bacciferum. The Indians uſe it for a purge, though commonly deemed a poiſon. Phil. Tranſ. N° 454. § 1.

POBEDA, La, in *Geography*, a town of Spain, in Old Caſtile; 13 miles N. of Soria.

POBETTEN, a town of Pruſſia, in the province of Samland; 16 miles N.W. of Konigſberg.

POBIANITZA, a town of the duchy of Warſaw; 33 miles E.N.E. of Siradia.

POBINDEN, a town of Pruſſia, in the province of Samland; 15 miles N. of Königſberg.

POBLA, La, a town of Spain, in Catalonia; 25 miles N.W. of Salſona.

Pobla *de Llillett*, a town of Spain, in Catalonia; 20 miles E.S.E. of Urgel.

POBLACION, a town of Spain, in Navarre; 12 miles W. of Eſtella.

POBLEDA, La, a town of Spain, in Old Caſtile; 21 miles S.W. of Calahorra.

POBNITZ, a river of Bohemia, which riſes near Culmbach, on the borders of Sileſia, and runs into the Elbe, near Tetſchen.

POCAHONTAS, a town of Cheſterfield county, in Virginia, within the juriſdiction of Peterſburg, in Dinwiddie county; probably deriving its name from the famous princeſs Pocahontas, the daughter of king Powhatan. Morſe.

POCAR, a town of Naples, in Principato Citra; 7 miles W. of Salerno.

POCATSJETTI, H. M., in *Botany*, the name of a ſmall ſhrub which grows in Malabar. The leaves powdered and ſprinkled upon ulcers, repreſs luxuriant and fungous fleſh; and taken internally, they excite a ſweat, and diminiſh the paroxyſm of an intermitting fever.

Of the bark and root, powdered, and mixed with oil, an unguent is made, ſaid to be good for the itch, and other cutaneous diſorders.

POCCOON. See Puccoon.

POCHARD, in *Ornithology*, the name of a ſpecies of wild duck, called by ſome the *penelope* and *rothhals*, and by many in Engliſh the red-headed widgeon.

It is larger than the common widgeon, and is ſhorter and thicker bodied. This is the Anas *ferina* of Gmelin. See Duck.

POCHERRY, in *Geography*, a town of Hindooſtan, in Marawar; 5 miles S. of Ramanadporum.

POCK. See Pox.

Pock-*Wood*. See Guaiacum.

POCKESO, in *Geography*, a populous and commercial town of Africa, in the diſtrict of Axim, on the Gold Coaſt.

POCKET Sheriffs, in *Law*, ſheriffs nominated of the ſole authority of the crown. See Sheriff.

Pocket, in *Rural Economy*, a large ſort of bag, in which hops are packed up, in order to be ſold; being formed of a particular kind or quality of ſacking. See Hops.

Pocket *of Wool*, is half a ſack. See Sack *of Wool*.

The pocket contains uſually twenty-five hundred weight of wool.

Pocket *Inſtruments*, in *Surgery*, are ſuch as a ſurgeon ought always to have in readineſs, and may conveniently carry about him in a proper caſe: theſe are two lancets of different ſizes; the one proper to open abſceſſes, the other ſmaller, for bleeding; a pair of ſtraight ſciſſars, uſeful on many occaſions; a pair of crooked ſciſſars, proper to be uſed in dividing fiſtulæ, and in ſeveral other caſes; a pair of forceps, with teeth at one end, to remove dreſſings, and upon occaſion to extract ſplinters or thorns: theſe are alſo ſerviceable to the ſurgeon in his anatomical exerciſes; they are commonly made of ſteel, but thoſe of ſilver are much neater; a razor; a ſtraight inciſion-knife; a crooked inciſion-knife; a ſtraight double-edged inciſion-knife; a probe with one end broad and thin, proper for diſcovering a fiſſure in the cranium, and for many other uſes; and the other end rounded, to examine the depth and ſituation of wounds and ulcers. The neateſt probes are made of ſilver, though they are frequently made alſo of ſteel, ivory, or whalebone; a grooved probe or director, to direct the edge of the knife or ſciſſars in opening ſinuſes, or fiſtulæ, that by this means the ſubjacent veſſels, nerves, and tendons, may remain unhurt. The upper end of this inſtrument ſometimes is ornamented, and ſerves only for a handle; ſometimes it is made in form of a ſpoon, to contain powder to ſprinkle upon wounds or ulcers; ſometimes alſo this is made forked at the end, to divide the frænum of the tongue; a ſpatula to depreſs the tongue, in order to examine the ſtate of the tonſils, uvula, and fauces, when they are affected with any diſorders; it is alſo uſed to ſuſpend the tongue when the frænum is to be divided; for which purpoſe it is to be made with a fiſſure at its extremity, and ſhould therefore rather be made of ſilver than of any other metal. Beſides theſe, there ſhould be an ordinary ſpatula for ſpreading plaſters, ointments, and cataplaſms; and ſometimes, by means of their ſulcated extremity, they are of ſervice in raiſing up fractured bones of the cranium; ſeveral needles muſt alſo be kept here, ſome ſtraight and others crooked, for the ſtitching up of wounds, taking up of arteries, and many other uſes. Heiſter's Surg. p. 12.

Pocket *Medicines*. See Medicine.

POCKLINGTON, in *Geography*, is a market town and pariſh, ſituated partly within the liberty of St. Peter, York, and partly in Wilton-Beacon diviſion, in the wapentake of Harthill, Eaſt Riding of Yorkſhire. The town is diſtant from York 13 miles E. by S., and from London 197 N. by W. The market-day is Saturday every week, and there are four fairs annually. Here are held the petty ſeſſions for Wilton-Beacon diviſion of the wapentake of Harthill. The living is a vicarage in the patronage of the dean of York. According to the parliamentary returns of 1811, the houſes in this town were eſtimated at 396, and the inhabitants at 1539 in number.

Several places in the vicinity of Pocklington merit the notice of the topographer and antiquary. The Roman road, called the Ermine-ſtreet, paſſes within two miles to the weſt of the town. Londeſborough-park, which it interſects at the diſtance of three miles, is ſuppoſed by Drake, the hiſtorian of Yorkſhire, to be the ancient Delgovitia, but the circumſtances upon which he founds his opinion are by no means concluſive. This place was for many centuries a ſeat of the ancient and celebrated family of the Cliffords. It is now the property of the duke of Devonſhire, as deſcendant from the daughter and heireſs of Henry Clifford, the fifth and laſt earl of Cumberland. The houſe is ſituated on elevated ground, and is ſurrounded by an extenſive and well wooded park. At Melburn, five miles to the ſouth-weſt of Pocklington, is the ſeat of ſir Henry Vaſavour, bart. The manſion is a large modern edifice of brick, and commands ſome fine views of the weſtern acclivities of the wolds. Stamford-bridge, eight miles to the north-weſt, Drake conceives to be the ſcite of the Derventio, but Camden fixes that ſtation at Aldby, about a mile and a half to the northward. Here was fought, in 1066, one of the moſt bloody battles recorded in the hiſtory of England, between the forces of Harold II. and thoſe of Toſti his brother, the baniſhed earl of Northumberland, aſſiſted by Harfagar, king of Norway. The conteſt laſted from ſeven in the morning till three in the afternoon, when the Norwegians and rebels were routed with immenſe ſlaughter. Beauties of England and Wales, vol. xvi. by John Bigland.

POCKREKESKO, a river of North America, in New-Britain.

POCO ALLEGRO, in the *Italian Muſic*, is not ſo faſt as allegro.

Poco *Largo*, intimates to play or ſing a little ſlow. See LARGO.

Poco *meno Allegro*, is uſed to ſignify that the part it is joined to ſhould be played or ſung in a little leſs gay manner than allegro requires.

Poco *Preſto*, ſerves to let us know that we ought to ſing or play that part to which it is annexed, not quite ſo quick as preſto requires it ſhould.

POCOCK's ISLAND, in *Geography*, an iſland in the Eaſt Indian ſea, S. lat. 6° 2′. E. long. 118° 12′.

POCOCKE, EDWARD, in *Biography*, a celebrated orientaliſt, was born at Oxford in 1604: he received the early part of his education at the free ſchool of Tame, and in 1618 was entered a commoner of Magdalen Hall, Oxford. In 1620 he removed to Corpus Chriſti college, in which he obtained a ſcholarſhip. He now began to apply himſelf to the ſtudy of the oriental languages, and the ardour which he manifeſted in the purſuit, cauſed him to make extraordinary progreſs in a comparatively ſhort time. In 1627 he began to prepare, from a MS. in the Bodleian library, a Syriac verſion of four epiſtles, which were yet wanting to a complete tranſlation of the New Teſtament into that language. This work he finiſhed in 1628, and in the ſame year he was admitted probationary fellow of his college; and the epiſtles coming to the knowledge of Gerard John Voſſius, he carried them to Leyden, where they were printed under the inſpection of Lewis de Dieu. Pococke was ordained prieſt in that year; and having been appointed chaplain to the Engliſh factory in Aleppo, he arrived at that city in 1630. He inſtantly took advantage of the ſituation; engaged a maſter in the Arabic tongue, and a ſervant of the nation for the purpoſe of familiar converſe in it. As a ſtill ſurer guide, he undertook the tranſlations of ſeveral Arabic books, among which was a collection of 6000 proverbs. Having received a commiſſion from the famous Dr. Laud, biſhop of London, for the purchaſe of Greek coins, and Greek and Oriental MSS., he was eager in obtaining them; though more than once the zeal which he ſhewed for his employer expoſed him to imminent danger from the plague. In 1636 he was nominated by the biſhop firſt profeſſor of the Arabic lecture founded by that munificent prelate at Oxford. He accordingly returned to take poſſeſſion, and in Auguſt of the ſame year he opened his lectures with an eloquent Latin oration, on the nature and uſe of the Arabic tongue. Having commenced his official duties, he obtained leave of abſence to embark with a learned mathematician, in 1637, for Conſtantinople. Here he ſtaid till 1640, and paſſing through Paris on his return, he had an interview with the illuſtrious Grotius, who was much gratified on being conſulted by him on the Arabic tranſlation of his celebrated work, "De veritate Chriſtianæ Religionis."

On his arrival in England, he had the mortification and miſery to find his patron, biſhop Laud, a priſoner in the Tower. In 1643 he was preſented by his college to the rectory of Childrey, in Berkſhire, and he immediately ſet himſelf to perform the functions of a pariſh prieſt, with all the modeſty and ſimplicity of his character. In the following year, the ſalary of his profeſſorſhip being ſeized by the ſequeſtrators as part of the archbiſhop's eſtate, Pococke was reduced to his country living. He thought it now ſuitable to his ſituation to marry, and in 1646 he formed an union with the daughter of Thomas Burdett, eſq. of Hampſhire. Soon after this, by the intereſt of the learned Selden, he obtained the reſtoration of his ſalary, and was at the ſame time completely protected from the violences of the ſoldiery. In 1648, the Hebrew profeſſorſhip at Oxford, with the prebend of Chriſt-church annexed, was given to him; but as he ſteadily refuſed to ſubſcribe the engagement, he was not deemed eligible. Attempts were made to deprive him of his prebend and both his profeſſorſhips; the former he actually loſt, but by the interceſſion of powerful friends, he was allowed to retain the latter. In 1650 he publiſhed his "Specimen Hiſtoriæ Arabum," and in 1652 he engaged to afford his aſſiſtance to the editors of the Polyglott Bible, his taſk being the collation of the Arabic pentateuch. In 1654 he was in danger of being ejected from his living on account of ignorance and inſufficiency; at leaſt thoſe were the charges preferred againſt him by Cromwell's committee. Some of his Oxford friends, however, particularly Dr. John Owen, ſo warmly repreſented the diſgrace which would follow the rejection upon ſuch grounds, of a man more eminent than almoſt any other in Europe for ſound learning, that the proſecution was abandoned. In 1655 he publiſhed "Porta Moſis," being ſix prefatory diſcourſes of Moſes Maimonides, containing an account of the Jewiſh doctrine and diſcipline. Mr. Pococke added a Latin verſion, with a large appendix of miſcellaneous notes, and this was the firſt ſpecimen of the Hebrew preſs at Oxford. In 1659 he publiſhed, according to his promiſe made to Selden, the annals of the patriarch Eutychius, in Arabic and Latin, with Selden's preface and notes. On the reſtoration of Charles II. he obtained the reſtitution of his prebend and canonry of Chriſt-church, and in that year, 1660, he took his degree of D.D. He had the mortification to find, that in the new reign oriental literature fell into diſcouragement, neverthele ſs he continued through life to perform the duties of his profeſſorſhips. His other publications after this were "Carmen Abu Iſmaelis Tograi," Arab. et Lat.: "Gregorii Abul Farajii Hiſtoria Dynaſtarum," Arab. et Lat.: "Commentaries upon Micah, Malachi, Hoſea, and Joel;" in theſe he is a defender of the purity of the Hebrew text againſt the objections of ſeveral learned men, and he takes great pains to ſet in a ſtrong light the predictions of the Old Teſtament, generally ſuppoſed by Chriſtians to relate to Jeſus Chriſt. The laſt of theſe he publiſhed in 1691; and if he intended, which is not certain, to purſue the ſame plan with the other minor prophets, he was prevented therein by his death, which happened on the 10th of September, in that year, being in the 87th year of his age. A gradual diminution of ſtrength and bodily vigour had for ſome time, previouſly to this, indicated his approaching diſſolution, but his intellects and memory were continued almoſt unimpaired to the laſt. His body was interred in the cathedral of Chriſt-church, and on the north wall there is a monument, with an inſcription, from which the following is an extract, "Edwardus Pococke, S.T.D. cujus nomen audias, nihil hic defama deſideres." To the excellence of his private character, Mr. Locke bears the moſt ample teſtimony. He repreſents him as free, open, and intelligent in his converſation; ſincere, modeſt, humble, and tranquil, ſingularly charitable, and forgetful of injuries. He adds, "his life appeared to me one conſtant calm. To conclude, I can ſay of him what few men can ſay of any friend of theirs, nor I of any other of my acquaintance; that I do not remember I ever once ſaw in him one action, that I did, or could in my own mind blame, or thought amiſs in him."

As a ſcholar, his knowledge of language compriſed all the principal oriental tongues, with ſome European, beſides the Latin and Greek. He was father of a numerous family, of whom the eldeſt ſon, Edward Pococke, publiſhed under his father's direction, in 1671, an Arabic work, with a Latin verſion, entitled "Philoſophus Autodidactus, ſive Epiſtola Abu Jaafir Ebn Tophail de Hai Ebn Yokdhan." The deſign of the author Abu Jaafir Abn Tophail, who was a Mahometan philoſopher, is to ſhew, by an ingenious fiction, how human reaſon, by obſervation and experience, without any aſſiſtance, may arrive at the knowledge of natural things, and from thence riſe to ſupernatural, particularly to God and a future ſtate. For this purpoſe he ſuppoſes a perſon, Hai Ebn Yokdhan, brought up by himſelf, where he was altogether deſtitute of inſtruction, but what he could get from his own obſervations. Mr. Pococke had alſo prepared an Arabic hiſtory, with a Latin verſion, and actually ſent it to the preſs; but this performance, not being worked off when his father died, was withdrawn by him upon a diſguſt at his being diſappointed of ſucceeding him in the Hebrew profeſſorſhip. Biog. Brit.

Pococke, Richard, a diſtinguiſhed traveller, and a prelate of the Iriſh church, ſon of a clergyman of Southampton, was born in 1704. He was educated at his native place, whence he was removed to Corpus-Chriſti college, in Oxford. In 1731 he took the degree of bachelor of laws, and in 1733 that of doctor. About this time he made a tour on the continent, probably as tutor to ſome young man of rank. In 1736 he made a ſecond tour, in which he took his courſe through Holland, Germany, Hungary, and Italy, to Leghorn. In 1737 he embarked for Egypt, in which country he purſued his travels till the following ſpring. In the month of March, 1738, he embarked at Damietta for Paleſtine, and then took his road through Syria, Meſopotamia, Cyprus, Candia, and Leſſer Aſia, to Conſtantinople. He returned by ſea from Cephalonia to Meſſina, whence, through Italy, Germany, and Flanders, he proceeded homewards. He returned in 1741, having been abſent five years. The reſults of his obſervations and reſearches were given to the public, under the title of "Deſcription of the Eaſt, and ſome other Countries," of which the firſt volume, entitled "Obſervations on Egypt," dedicated to Henry, earl of Pembroke and Montgomery, appeared at London in 1743; and the ſecond, entitled "Obſervations on Paleſtine, Syria, Meſopotamia, Cyprus, and Candia," dedicated to Philip, earl of Cheſterfield, in 1745. Theſe publications were well received: his remarks chiefly relate to buildings, inſcriptions, and other remains of antiquity, but he has likewiſe many obſervations reſpecting manners and cuſtoms, and the products of nature and art, in the countries which he viſited.

When the earl of Cheſterfield was appointed lord-lieutenant of Ireland, in 1745, he carried Dr. Pococke with him as one of his domeſtic chaplains, and he ſoon appointed him archdeacon of Dublin. In 1756, the duke of Devonſhire, then lord-lieutenant, promoted him to the biſhopric of Oſſory. He was tranſlated to Meath in 1765, in which he died. Dr. Pococke, beſides being an Oriental traveller, made a tour in Scotland, and gave a deſcription of the baſaltic rock in the harbour of Dunbar, reſembling the Giant's cauſeway, which was printed in the Philoſ. Tranſ. vol. 32; alſo of ſome antiquities found in Ireland, printed in the ſecond vol. of the Archæologia, vol. ii. Several MSS. which he preſented to the Britiſh Muſeum, are preſerved in that repoſitory. Pococke's Travels.

POCOGNACA, in *Geography*, a town of Italy, in the department of the Mincio; four miles N. of Mantua.

POCOKOLIGO, a village of South Carolina; 15 miles from Combabec ferry, and 67 from Charleſton.

POCOMOCK, a river of the ſtate of Maryland, which diſcharges itſelf into the Cheſapeak bay, forming a large bay at its mouth, called "Pocomock bay." N. lat. 37° 50′. W. long. 75° 50′.

POCONA, a town of Peru; 60 miles S. of Cuzco.

POCUMMA, in *Botany*, a name given by the people of Guinea to a ſpecies of plant which they uſe as an aſtringent. Their manner of taking it is very ſingular; for they put the leaves among their dough, and bake them into a maſs with the bread, and then eat the whole together in their food. Phil. Tranſ. N° 232.

POCUTIA, or Pokucia, in *Geography*, a province of Poland, annexed to Auſtria, and included in the kingdom of Galicia.

POD, in *Botany* and *Vegetable Phyſiology*, has been conſidered as ſynonimous with the Latin *legumen*, as well as with *ſiliqua*; but it is now reſtricted to the latter, *legume* being uſed for the former. See Legume and Siliqua.

PODAGRA, ϖοδαγρα, thus called from ϖȣς, *foot*, and αγρα, *captura*, *ſeizure*, in *Medicine*, the gout in the feet.

Podagra *Dentium*, ſometimes, though with impropriety enough, is uſed for the tooth-ach.

Podagra *Lini*, in *Botany*, a name given by ſome of the later Greek writers to cuſcuta, or dodder, when found growing on the linum of flax. The Latins have called this *epilinum*, as they do the dodder growing on thyme *epithymum*; the earlier Greeks called this *linozoſtes*. Where this dodder takes root in a field of flax, it generally occupies many plants; and where it twines round them it cauſes protuberances and ſwelling, and has therefore been reſembled to the gout on that plant.

PODAGRARIA, a name given by many authors to the leſſer wild angelica, called alſo *herba Gerardis*.

PODALA, in *Geography*, a town of Hindooſtan, in the Carnatic; 18 miles W. of Ongole.

PODALIRIUS, in *Biography*, an illuſtrious phyſician, and reputed ſon of Æſculapius, is celebrated by Homer as having accompanied the Grecian army in the Trojan war, together with his brother Machaon. He appears to have been the younger brother, and to have been on the whole leſs diſtinguiſhed than Machaon; though, like him, he was married to the daughter of a king. On his return from the ſiege of Troy, he was ſhipwrecked on the coaſt of Caria, where he was hoſpitably received by a ſhepherd, who, having learned that he was a phyſician, took him to king Damæthus, whoſe daughter had accidentally fallen from the top of a houſe. Podalirius bled her in both arms, after which ſhe recovered, which ſo delighted the king, that he gave him his daughter in marriage, with the Cherſones as a portion. Here Podalirius built two cities, the one of which he called Syrnum, from his wife, Syrna, and the other Bybaſſus, which was the name of the ſhepherd who had received him when ſhipwrecked. Among other children, he had a ſon, called Hippolochus, from whom, in a direct line, Hippocrates conſidered himſelf as deſcended. See Le Clerc. Hiſt. de la Medecine, p. i. chap. 18. See MACHAON.

PODALYRIA, in *Botany*, a well-ſounding name, which ſeems its chief recommendation; for we do not perceive what title the brother of Machaon, however famous a phyſician, has to botanical honours. The etymology of the original ſeems to be ποδαλειριος, *lily-footed*. The Hindoos at this day uſe *lotus-footed* as a compliment.—Lamarck Illuſtr. t. 327. f. 3, 4. Willd. Sp. Pl. v. 2. 501. Ait. Hort. Kew. v. 3. 6.—Claſs and order, *Decandria Monogynia*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, ſhort, bell-ſhaped, in five unequal ſegments; its baſe externally concave. *Cor.* papilionaceous, of five petals. Standard twice as large as the reſt, kidney-ſhaped, with a thick claw. Wings two, ſhorter than the ſtandard, half-obovate, converging at their upper edges. Keel ſhorter than the wings, and covered by them, of two oblong converging petals. *Stam.* Filaments ten, awl-ſhaped, aſcending, equal, inſerted into the baſe of the calyx, permanent, cohering at the bottom; anthers roundiſh, ſmall. *Piſt.* Germen ſeſſile, ovate; ſtyle longer than the ſtamens, aſcending; ſtigma ſimple, obtuſe. *Peric.* Legume ovate, turgid, coriaceous, of one cell. *Seeds* ſeveral, kidney-ſhaped.

Eſſ. Ch. Calyx in five unequal ſegments; hollow externally at the baſe. Corolla papilionaceous; the ſtandard largeſt. Stamens permanent, combined at the baſe. Legume inflated, with many ſeeds.

This genus is limited by Mr. Saliſbury and Mr. Brown to the ſimple-leaved ſpecies of Lamarck and Willdenow, to which only the above characters apply. They are ſhrubs, natives of the Cape of Good Hope, with a very ſilky habit, and confounded by Linnæus and Thunberg under *Sophora*. The ternate-leaved ſpecies of Lamarck and Willdenow compoſe the *Baptiſia* of Ventenat, and Hort. Kew.; for thoſe with pinnate foliage, ſee VIRGILIA.

1. P. *myrtillifolia*. Bilberry-leaved Podalyria. Willd. n. 13. Ait. n. 1. (Geniſta arboreſcens africana, ſtyracis folio, flore cæruleo; Herm. Lugd.-Bat. 270. t. 271.)—"Leaves oblong-obovate, ſilky on both ſides. Calyx ſilky. Stalks ſingle-flowered, nearly as long as the leaves."—A greenhouſe plant, flowering from April to July, introduced at Kew in 1795, but cultivated at Leyden more than a century earlier. Hermann ſays it grows at the Cape, in watery places. The *ſtem* is buſhy, with hoary branches. *Leaves* numerous, alternate, coriaceous, rather pointed, clothed on both ſides with white ſilky down. *Flowers* axillary, generally ſolitary, blueiſh. The ſpecific name is not happy.

2. P. *ſericea*. Silky Podalyria. Ait. n. 2. (Sophora ſericea; Andr. Repoſ. t. 440.)—"Leaves oblong-obovate, ſilky on both ſides. Calyx ſilky. Stalks ſingle-flowered, many times ſhorter than the leaves."—Found at the Cape by Mr. David Nelſon, and introduced into Kew garden in 1778. It flowers from Auguſt to November, but rarely. This has more conſiderable recurved points to the *leaves*, and pale purpliſh *flowers*, ſupported by ſhort, ſimple, ſolitary, axillary *ſtalks*. The *legume* is an inch long, very ſilky, like every other part, except the *corolla*.

3. P. *biflora*. Two-flowered Podalyria. Lamarck f. 3. Willd. n. 12. Ait. n. 3. Curt. Mag. t. 753. (P. argentea; Saliſ. Parad. t. 7.)—Leaves oval, pointed, ſilky on both ſides. Calyx clothed with denſe rigid down. Stalks two-flowered, much longer than the leaves.—Native of the ſame country. Mr. Maſſon ſent it to Kew in 1789. It flowers in May and June, and occaſionally at other ſeaſons. The *leaves* are rather leſs decidedly obovate than in the two former. *Flower-ſtalks* ſtout, twice or thrice as long as the leaves, each bearing two, rarely three, large, handſome, ſweet-ſcented, white or pale purpliſh *flowers*, whoſe *calyx* is of a ruſty hue, rough with rigid ſhort down, that is moſt denſe in the wild ſpecimens. Linnæus doubtleſs comprehended this plant under his *Sophora biflora*, but he confounded with it two or three others, ſo that he cannot, with preciſion, be quoted for any.

4. P. *calyptrata*. Reticulated Podalyria. Willd. n. 11. Ait. n. 4. (Sophora calyptrata; Retz. Obſ. faſc. 1. 36. Crotalaria; Seb. Muſ. v. 2. t. 99. f. 3, good. *Willd.*)—Leaves ſomewhat obovate, reticulated beneath; downy when young. Stalks ſingle-flowered, about equal to the leaves. Calyx villous; its limb membranous, reflexed.—From the ſame country; ſent to Kew in 1792. It flowers during ſummer. The ſmoothneſs of the adult *leaves*, and their ſtrong copious reticulations beneath, mark this ſpecies at firſt ſight. The *ſtalks*, ſhorter than the laſt, bear but one *flower*, accompanied, as in the reſt, by a deciduous *bractea*. *Corolla* purpliſh.

5. P. *hirſuta*. Hairy Podalyria. Willd. n. 14. Ait. n. 5. (P. ſtyracifolia; Sims in Curt. Mag. t. 1580?)—"Leaves villous, ſtalked; the upper ones ovate; the lower roundiſh. Stalks ſingle-flowered. Calyx villous; its ſegments the length of the wings."—Sent by Mr. Maſſon from the Cape, in 1774. The *flowers* are more copious than in any of the former, but not of frequent occurrence. *Leaves* in our wild ſpecimen nearly orbicular; the adult ones almoſt ſmooth above. *Flower-ſtalks* about the length of the leaves. *Corolla* pink, large and handſome. The foliage in the Botanical Magazine is drawn more ovate than we have ſeen it, but anſwers the better to Mr. Brown's ſpecific character given above, and we are therefore more inclined to refer Dr. Sims's plant to the preſent than to the laſt ſpecies. He ſpeaks of it as a beautiful ſhrub, requiring an airy greenhouſe, propagated by cuttings, and blooming from May to July. No wonder that it has paſſed unexamined, under the name of *biflora*, as it ſo rarely produces flowers. Linnæus applied that name to a ſpecimen of this, paſted with one of the *calyptrata*, on the ſame paper.

6. P. *buxifolia*. Box-leaved Podalyria. Willd. n. 15. (Podalyria; Lamarck f. 4. Sophora buxifolia; Retz. Obſ. faſc. 1. 35. S. pedunculata; Thunb. Prodr. 79.)—Leaves elliptic-obovate; ſmooth above; ſilky beneath. Stalks ſingle-flowered, longer than the leaves. Calyx downy, coloured, acute.—Native of the Cape, but not yet known in our greenhouſes. We have ſeen no ſpecimen. The *leaves* are repreſented about the ſize and ſhape of Box, ſcarcely half, or one-third, the length of the *flower-ſtalks*; but Retzius deſcribes the latter as no longer than the *leaves*. The *calyx* is hairy within, as well as without; its ſegments acute. *Corolla* purpliſh, with paler wings.

7. P. *cordata*. Heart-leaved Podalyria. Ait. n. 6.

(Sophora cordata; Thunb. Prodr. 79? *Brown.*)—"Leaves heart-ſhaped, roundiſh, nearly ſeſſile, extremely villous. Stalks two-flowered. Calyx villous, its ſegments ſhorter than the wings. Sent by Mr. Maſſon from the Cape to Kew, in 1794. It flowers there from May to July. We have ſeen neither ſpecimen nor figure. Willdenow omitted Thunberg's plant, becauſe the character was not ſufficient to ſatisfy him reſpecting it.

Lamarck repreſents, at his fig. 5, another ſuppoſed ſpecies; a ſmall ſhrub, with inverſely heart-ſhaped *leaves*, and ſolitary, nearly ſeſſile, *flowers;* the *legume* ſmall, ovate, hairy, ſingle-ſeeded. This ſeems unnoticed by any ſubſequent writer, nor are we acquainted with the plant.

PODANA, in *Geography,* a town of Hindooſtan, in the circar of Condapilly; eight miles from Maſulipatam.

PODANG-MEW, a large and populous city of the Birman empire, not far from the city of Prome.

PODARIA, in the *Hiſtory of Inſects,* a claſſical name comprehending all ſuch inſects as have limbs, but no wings. Hill. See APTERA.

Of this claſs there are two ſubdiviſions. 1. Such *aptera podaria* as have oblong bodies with numerous legs, or more than ſix pair: theſe are the julus, or gally-worm; the ſcolopendra, or centipes; and the oniſcus, or wood-louſe. 2. The *aptera podaria* with ſhorter bodies, and leſs numerous legs, or fewer than ſix pair. This ſubdiviſion contains numerous genera, as the pulex; the podura or puceron, the pediculi of various kinds, the monoculi, the acari, the aranei, the ſcorpio, and a great many others. See GALLY-*Worm,* SCOLOPENDRA, &c.

PODEM, in *Geography,* a town of Aſiatic Turkey, in the government of Trebizond; 30 miles E. of Trebizond.

PODEMNO, a town of Ruſſia, in the government of Tobolſk; 44 miles E. of Kemſkoi.

PODENDA, a town of Aſiatic Turkey, in Aladulia, at the confluence of Seihoun with the Adana; 33 miles N. of Adana.

PODENSEE, a town of France, in the department of the Gironde, and chief place of a canton, in the diſtrict of Bourdeaux; five miles N.W. of Cadilhau. The place contains 1425, and the canton 15,688 inhabitants, on a territory of 250 kiliometres, in 13 communes.

PODENSEE, a town of Auſtria; eight miles W. of Tulin.

PODENTES, a town of Portugal, in the province of Beira; 10 miles N.E. of Coimbra.

PODENZANA, a town of the duchy of Piacenza or Placentia; five miles S. of Piacenza.

PODERADOS, in *Ancient Geography,* an epiſcopal town of Phœnicia, the epiſcopate being dependent on Theſus, the ſecond metropolis of the patriarchate of Antioch.

PODERIS, ποδηρης, from πȣς, *pes,* and αγω, *apto,* in *Antiquity,* a robe hanging down to the feet; but it is chiefly uſed to expreſs a linen garment, a ſurplice, a ſhirt. The Jewiſh prieſts were covered with this kind of long ſurplices during the time of their attendance in the temple; and this was the proper habit of their order.

PODESTA, or POTESTA, a magiſtrate, or officer of juſtice and policy, in a free city.

The name is originally Italian, *podeſta;* and is chiefly applied to certain magiſtrates of Venice and Genoa, whoſe function is to adminiſter juſtice in thoſe republics.

The podeſta in Venice correſponds to the prætor in ancient Rome, though appeals lie from his deciſions to the new auditors, or the new civil quaranty. See QUARANTIA.

PODESTANA, in *Geography,* a town of Italy, in the Veroneſe; 15 miles N. of Verona.

PODETIUM, in *Botany,* from πȣς, *a foot,* a name appropriated by Acharius to the peculiar footſtalk of the tubercles in the cup lichens. See LICHENES.

PODEX, in *Anatomy,* &c. the ſame with anus, or fundament.

PODGINOCK, in *Geography,* a town of Ruſſia, in the province of Uſting; 100 miles E.S.E. of Uſt Siſolſk.

PODGORODKOI, a fort of Ruſſia, in the government of Upha, on the Ural; 92 miles E. of Orenburg.

PODGURZA, a town of the duchy of Warſaw, on the Viſtula, oppoſite to Thorn.

PODHORSAN, a town of Bohemia, in the circle of Saatz; eight miles S.S.W. of Saatz. N. lat. 50° 12′. E. long. 13° 29′.

PODICEPS, in *Ornithology,* a name given by many to the ſeveral kinds of *colymbi,* or divers, as they are alſo called in Engliſh *arſe-foots;* from their legs being placed very backward on their bodies, by which means they have great advantages in ſwimming and diving. See COLYMBUS *Podiceps.*

PODIEBRAD, in *Geography,* a town of Bohemia, in the circle of Konigingratz; 14 miles S.E. of Biezow.

PODISMUS, ποδισμος, among the Greeks, a certain ſpace or number of feet laid out by ſurveyors: it was the ſame with what the Romans call *pedatura.*

PODIUM, in the *Theatre of the Ancients,* the wall that ſeparated the orcheſtra from the ſcene. Mem. de l'Acad. vol. i. p. 190.

PODKAMIEN, in *Geography,* a town of Auſtrian Poland, in Galicia; 56 miles E. of Lemberg.

PODKAMNEN, a town of Ruſſia, in the government of Tobolſk, on the Tchulim; 32 miles N. of Atchinſk.

PODLACHIA, a county or palatinate of Poland; bounded on the N. by Pruſſia and Lithuania, on the E. by Lithuania, on the S. by the palatinate of Lublin, and on the W. by Maſovia; annexed by the conqueſt of Poland in 1596. It is alſo called the "Palatinate of Bielſk," from its capital.

PODMASCHESCHNAIA, a town of Ruſſia, in the government of Archangel; 48 miles S.W. of Mezen.

PODOK, a town of Poland, in the palatinate of Braclaw; 30 miles N.W. of Braclaw.

PODOL, a town of Bohemia, in the circle of Chrudim; five miles W.S.W. of Chrudim.

PODOLEPIS, in *Botany,* aptly ſo named by Labillardiere, from πȣς, *a foot,* and λεπις, *a ſcale,* in alluſion to the numerous ſcales, which clothe the flower-ſtalks.—Labill. Nov. Holl. v. 2. 56. Brown in Ait. Hort. Kew. v. 5. 82. (Scalia; Sims in Curt. Mag. v. 24. 956; a name adopted from Theophraſtus, whoſe σκαλιας appears to belong to the ſame tribe.)—Claſs and order, *Syngeneſia Polygamia ſuperflua.* Nat. Ord. *Compoſitæ capitatæ,* Linn. *Corymbiferæ,* Juſſ.

Gen. Ch. *Common Calyx* hemiſpherical, imbricated, with numerous ſtalked membranous ſcales. *Cor.* compound, radiated. Florets of the diſk numerous, tubular, all perfect, with five equal ſpreading ſegments; thoſe of the radius female, ligulate, with from two to four oblong ſegments. *Stam.* Filaments, in the florets of the diſk only, five, capillary; anthers united into a rather prominent tube. *Piſt.* in all the florets, Germen inferior, obovate; ſtyle cylindrical, ſcarcely ſo long as the ſtamens; ſtigmas two, bluntiſh, ſpreading. *Peric.* none, except the permanent calyx. *Seeds* ſolitary, oblong, compreſſed. *Down* ſeſſile, capillary, roughiſh. *Recept.* naked, dotted.

Eſſ. Ch. Receptacle naked. Down ſimple. Calyx hemiſpherical, imbricated, with ſtalked membranous ſcales.

1. P. *rugata.* Wrinkle-ſcaled Podolepis. Labill. Nov. Holl. v. 2. 57. t. 208. Ait. n. 1.—Scales of the calyx rugged, obtuſe.—Native of the ſouth-weſt coaſt of New Holland. Sent to Kew by Mr. Peter Good, in 1803. It requires the ſhelter of a greenhouſe in winter, and flowers in July and Auguſt. *Root* perennial. *Stem* herbaceous, either quite ſimple, or a little branched at the top only, about a foot high, minutely downy. *Leaves* linear, acute, entire; the lower ones ſomewhat lanceolate. *Flowers* few, on long, terminal, ſimple, ſcaly ſtalks. Their *diſk* is about an inch wide; the *radius* ſhort. *Calyx* of a tawny or ruſty hue, ſhining, chaffy; the outermoſt ſcales ſpatulate.

2. P. *acuminata.* Sharp-ſcaled Podolepis. Ait. n. 2. (Scalia jaceoides; Curt. Mag. t. 956.)—Scales of the calyx even, ſharp-pointed. Gathered in New South Wales by Mr. Brown, and ſent to Kew by Colonel Paterſon, in 1803. It is a hardy greenhouſe plant, flowering all through the ſummer, and differs from the former chiefly in having a larger *flower*, the *radius* being conſiderably longer, as well as in the ſharpneſs of the *calyx-ſcales.* All the *florets* are of a golden yellow.

PODOLIA, in *Geography*, a province of Poland, bounded on the N. by Volhynia, on the E. by the palatinate of Kiev, on the S. by Moldavia, and on the W. by the palatinate of Lemberg, near the kingdom of Galicia. The country is fertile, but expoſed to the plunder of barbarous nations, by which it has been cruelly ravaged. It abounds with a fine breed of horſes and horned cattle. The inhabitants are warlike, and were formerly governed by their own dukes or ſovereigns. In the fifteenth century it was the object of violent conteſts between the Lithuanians and Poles; but by the decree of a diet held at Lublin in 1569, it was annexed to Poland. Podolia conſiſts of two palatinates, that of Podolia and that of Braclaw; both of which are annexed to Ruſſia, except a ſmall part towards the W., including Tarnopol, and a few more towns.

PODOLICZ, a town of Hungary, on the river Poprat; 12 miles S.W. of Palotza.

PODOLOBIUM, in *Botany*, from πȣς, *a foot*, and λοβος, *a pod* or *legume*, becauſe that part is elevated on a footſtalk. Brown in Ait. Hort. Kew. v. 3. 9. Sims in Curt. Mag. v. 36. 1477.—Claſs and order, *Decandria Monogynia.* Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

This genus is comprehended under *Chorozema*, by the writer of the preſent article, in Tr. of the Linn. Soc. v. 9. 251, nor does he perceive a character by which they can well be ſeparated, though Dr. Sims and Mr. Brown have thought otherwiſe. The keel in *Podolobium* is rather longer than the wings; in *Chorozema* ſhorter. The *leaves* are indeed oppoſite in *P. trilobatum*, Curt. Mag. t. 1477, but this does not appear to be the caſe with every ſpecies, nor is it very preciſely or conſtantly ſo, even with the plant in queſtion.

PODOLSK, in *Geography*, a town of Ruſſia, in the government of Moſcow; 28 miles S. of Moſcow. N. lat. 53° 16′. E. long. 37° 29′.

PODOLYB, a town of Bohemia, in the circle of Koningratz; 12 miles W.N.W. of Koningingratz.

PODOMETER, for PEDOMETER. See PEDOMETER.

PODONIPTÆ, formed from πȣς, ϖοδος, *foot*, and νιπτω, *I waſh*, in *Eccleſiaſtical Hiſtory*, a name given to ſome of the rigid Anabaptiſts, who enjoin it as an obligation upon the members of their community to waſh one another's feet, in compliance with the example of Chriſt.

PODOPERURA, in *Ancient Geography*, a town of India, on this ſide of the Ganges, in the country of the people called Limyrices. Ptolemy.

PODOPHYLLUM, in *Botany*, from πȣς, *a foot*, and φυλλον, *a leaf.* Tournefort originally called it *Anapodophyllon*, from *anas*, the Latin name for a duck; thus compoſing a hybrid word, unworthy of his taſte and ſcholarſhip. De Theis erroneouſly lays the blame on Cateſby. The idea of this appellation aroſe from a vague reſemblance in the leaves, to the webbed feet of many aquatic birds, which is ſufficiently intelligible in the word as Linnæus has pruned it.—Linn. Gen. 262. Schreb. 349. Willd. Sp. Pl. v. 2. 1141. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 3. 287. Purſh. v. 2. 366. Juſſ. 235. Lamarck Illuſtr. t. 449. (Anapodophyllon; Tourn. t. 122.)—Claſs and order, *Polyandria Monogynia.* Nat. Ord. *Rhoeadeæ*, Linn. *Ranunculaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of three large, coloured, ovate, concave, aſcending leaves, ſoon falling. *Cor.* Petals nine, orbicular, concave, plaited at the margin. *Stam.* Filaments numerous, very ſhort; anthers oblong, large, erect. *Piſt.* Germen ſuperior, roundiſh; ſtyle none; ſtigma obtuſe, furrowed. *Peric.* Berry globoſe, crowned with the permanent ſtigma, of one cell. *Seeds* numerous, roundiſh. *Receptacle* central, unconnected.

Eſſ. Ch. Corolla of nine petals. Calyx of three leaves, deciduous. Berry of one cell, crowned with the ſtigma.

1. P. *peltatum.* Duck's-foot, or May-apple. Linn. Sp. Pl. 723. Willd. n. 1. Ait. n. 1. Trew Ehret, t. 29. (Anapodophyllum canadenſe; Cateſb. Car. v. 1. t. 24. Aconitifolia humilis, flore albo unico campanulato, fructu cynoſbati; Mentz. Pugill. t. 11.)—Native of North America, from New England to Carolina, in ſhady woods, generally where the ground is moiſt, growing in large patches, and flowering in March and April. The fruit is the ſize of a common plum, green, eatable, known by the name of May-apple: the root is ſometimes uſed as Ipecacuanha. *Purſh.* This is a hardy perennial herbaceous plant, known time out of mind in our more curious gardens. The *root* creeps, and reſembles that of the *Helleborus niger.* *Stems* ſolitary, ſimple, round, ſmooth, about a foot high, crowned with two large, ſtalked, peltate, lobed, and jagged, ſmooth *leaves*, between whoſe *footſtalks* grows a ſolitary, ſtalked, drooping white *flower*, an inch and a half broad, whoſe *petals* are curiouſly reticulated with veins.

The other ſpecies of Linnæus, *P. diphyllum*, Sp. Pl. 723, is ſeparated from this genus by Barton, Michaux, and Purſh, and is thus diſtinguiſhed.

Calyx of five leaves, deciduous. Petals eight, incurved. Capſule obovate, ſomewhat ſtalked, of one cell, burſting below the ſummit. Seeds ſeveral, oblong, tunicated at the baſe.—This has received the name of *Jefferſonia diphylla.* It belongs to *Octandria Monogynia*, and appears to us a tolerably diſtinct genus, though retained in *Podophyllum* by Willdenow, and conſequently in Hort. Kew. See Purſh v. 1. 268.

PODOR, in *Geography*, a fortreſs of Africa, on the Senegal, built by the French, and ceded to the Engliſh in 1763; afterwards retaken by the French, and kept by them in the peace of 1783. N. lat. 17° 1′. W. long. 14° 20′.

PODOSTEMUM, in *Botany*, derived from πους, *a foot*, and στημων, *a ſtamen*; ſo named by Michaux on account of the ſtamens being ſituated on a baſe or foot, which is divided into two branches.—Michaux Boreal-Amer. v. 2. 164. Willd. Sp. Pl. v. 4. 196. Purſh. v. 1. 3.—Claſs and order, *Monoecia Diandria.* Nat. Ord. . . . . . .

Gen. Ch. Male, *Cal.* Perianth none. *Cor.* none. *Stam.* Filaments two, capillary, connected at the baſe by a common footſtalk; anthers ſomewhat heart-ſhaped, two-celled.

Female, *Cal.* Perianth none. *Cor.* none. *Piſt.* Germen ſeſſile, ovate, with two ſcales at the baſe, between which ſprings the foot of the ſtamens; ſtyle none; ſtigmas two, ſeſſile, ſomewhat thread-ſhaped, a little ſhorter than the germen, ſpreading. *Peric.* Capſule ovate, eight-ſtreaked, with two cells and two valves; partition parallel to the valves, ſlightly opening, not fixed. *Seeds* numerous, almoſt covering each ſide of the tumid partition, ſomewhat imbricated downwards, nearly oval.

Eſſ. Ch. Male, Calyx none. Corolla none. Stamens two, on a common ſtalk.—Female, Calyx none. Corolla none. Germen ovate. Stigmas two, ſeſſile. Capſule of two cells and two valves, many-ſeeded.

1. P. *Ceratophyllum.* Michaux t. 44. Willd. n. 1.—Native of rocks about the falls of the river Ohio.—*Stem* a finger's length, thread-ſhaped, floating. *Leaves* pinnate, alternate; leaflets alternate, briſtle-ſhaped, much cloven. *Flowers* axillary, ſolitary, the males inſerted at the baſe of the females.

We are unable to trace any affinity to this curious genus. It has certainly no relation to *Ruppia* as Michaux has ſuggeſted. Mr. Purſh places it in *Monandria Digynia.*

PODRELSKOI, in *Geography*, a town of Ruſſia, in the government of Viatka; 32 miles N.N.E. of Viatka.

PODRUS, a river of Walachia, which runs into the Syl, about three miles E. of Motril.

PODSPUSKNOI, a fort of Ruſſia, in the government of Kolivan; 220 miles S.W. of Kolivan. N. lat. 51° 20′. E. long. 78° 34′.

PODSTEPNOI, a fort of Ruſſia, in the government of Kolivan; 196 miles S.W. of Kolivan. N. lat. 52° 10′. E. long. 77° 40′.

PODULLUNG, a town of European Turkey, in Moldavia; 28 miles S.W. of Jaſſi.

PODURA, the *Spring-tail*, in *Entomology*, a genus of inſects of the order Aptera. The generic character is, lip bifid; feelers four, ſubclavate; two eyes, compoſed of eight facets; the antennæ are filiform; the body is ſcaly; tail forked, bent under the body and acting as a ſpring; it has ſix legs that are formed for running. There are about thirty ſpecies enumerated by Gmelin. They are all ſmall inſects, which, in general, are found in damp places, under ſtones, on the bark of trees, &c. When diſturbed they ſuddenly ſpring to a ſmall diſtance by the help of a long fork, which is doubled under the abdomen, and which is ſuddenly thrown out during the act of leaping. They feed on the leaves of various plants; the larva and pupa are ſix-footed, nimble, and reſemble the perfect inſect.

SIGNATA. Sub-globular, brown; abdomen with fulvous ſpots at the ſides.

* VIRIDIS. Sub-globular, green, with a yellowiſh head. Found on the leaves of the Polygonum fagopyrum.

* POLYPODA. Sub-globular, black; antennæ as long as the body, and tipt with white. Found on various plants, in this and other countries of Europe.

* ATRA. Globular, ſhining brown or black; antennæ long, compoſed of many articulations. It is found on the bark of trees.

* PLUMBEA. Round, brown, with a blue gloſs. It is found in ſimilar ſituations with the laſt.

* MINUTA. Ovate, yellow, with two ferruginous ſpots on the back. This and the four following are found on plants in many parts of Europe.

* NIVALIS. Oblong, yellow, with two ferruginous ſpots on the back. It is frequently found in the winter on the ſnow in the footſteps of men and other animals.

* VAGA. Oblong, black; abdomen and antennæ with a white band.

* ARBOREA. Oblong, black, with white legs and forks.

* VILLOSA. Oblong, villous, variegated with brown and black.

CINETA. Cylindrical, grey, with a black belt, which is white on the fore-part. This and the next are found chiefly in woods.

ANNULATA. Livid, with black wings.

LIGNORUM. Lead-colour, with pale head, thorax, legs, and fork. This is an European inſect, very ſmall, and found in old wood.

PUSILLA. Cylindrical, bronzed with a white fork. It inhabits woods.

* AQUATICA. Black, aquatic. This is one of the moſt common ſpecies of the genus, meaſuring ſcarcely the one-twelfth of an inch in length, and entirely of a black colour. It is a gregarious ſpecies, and is occaſionally ſeen aſſembled in vaſt numbers, particularly near the brinks of ponds, covering the ground to the diſtance of ſeveral feet, and ſometimes even the ſurface of the water itſelf. On the ground its numbers are ſo great, as to have the appearance of ſcattered grains of gunpowder; and if cloſely examined, will be found in an almoſt perpetual ſkipping motion.

* FIMETARIA. White, terreſtrial. This perfectly reſembles the laſt except in colour, and in that the ſpecific difference conſiſts. It is found early in the ſpring in freſh earth, and alſo in damp places.

AMBULANS. White, with a bifid extended tail. Found among moſs in different parts of Europe.

MONURA. Whitiſh, with an undivided conic tail. It inhabits Auſtria, and found with the laſt, which it reſembles, but is much leſs.

* RUFESCENS. Reddiſh-yellow, villous; eyes black; fork whitiſh. A native of Auſtria, and found among ſtones.

VIRIDIS. Sub-cylindrical, yellow-green, with black eyes. This is found in Norway.

MOTITANS. Long, red, with an extended tail; antennæ and legs hyaline. This and the eight that follow inhabit Denmark.

SYLVATICA. Cylindrical, grey-brown; tail pointed and unarmed.

FEMORALIS. Oblong, cinereous; tip of the antennæ and legs white; tail of a ſulphur colour.

AQUATILIS. Cylindrical, yellowiſh, with black eyes, back, and ſides of the abdomen.

CRYSTALLINA. Body entirely hyaline.

LONGICORNIS. Cylindrical, yellowiſh; antennæ as long as the body, and with legs cinereous.

PALUSTRIS. Yellowiſh, with black eyes and line down the back; the fork is white.

LANUGINOSA. Silvery-gilt covered above with blue wool; antennæ recurved.

CRASSICORNIS. Dull blue, cylindrical and growing thicker towards the tail.

HUMICOLA. Blue-brown; antennæ ſhort, thick; body cylindrical, and growing thicker towards the tail. Inhabits Greenland, as does the next.

MARITIMA. Blueiſh-black, with a whitiſh abdomen; body nearly round, and growing thicker towards the tail.

PODURA is alſo a ſpecies of *Cercaria*, in the claſs of *Vermes Infuſoria.*

PODURUEVA, in *Geography*, a town of Ruſſia, in the government of Irkutſk, on the Lena; 12 miles N.N.W. of Vercholenſk.

POE, a river of the county of Tyrone, Ireland, which riſes in the ſouth-weſtern part, and joins the Cameron a little below Omagh.—Alſo, a town of Africa, in Baol; five miles S. of Portudel.

PŒANOPSIA, ποιανοψια, in *Antiquity*, a name ſometimes given to the feſtival Pyanepſia.

PŒCILASIUM, in *Ancient Geography*, a town ſituated on the ſouthern coaſt of the iſle of Crete. Ptolemy.

PŒDICULI, or Pœdicli, the name of one of the three people who compoſed the nation of the Liburni. They came originally from Illyria, about the 16th century B.C.; ſettling at firſt between the Alps and the Atheſis, when they retired towards the ſouth of Italy into Japygia. The Pœdiculi, Apuli, and Calabri ſpoke the ſame language, which they retained. Strabo.

POEJANNY, in *Geography*, a town of Bengal; ſeven miles S. of Koonda.

POEL, an iſland in the Baltic, near the coaſt of Pomerania, irregular in its figure, and about ſix or ſeven miles in circumference, containing ſeveral villages; two miles N. of Wiſmar. N. lat. 53° 57′. E. long. 11° 26′.

POELEMBURG, Cornelius, in *Biography*, was born at Utrecht in 1586, where he became the diſciple of Abraham Bloemart; but he quitted that maſter as ſoon as he had made a reaſonable proficiency in the art, and travelled to Rome. His firſt determination was to imitate the manner of Elſheimer; but he found himſelf ſo affected while he contemplated the works of Raphael, that he reſolved on endeavouring to emulate the grace of that incomparable maſter; particularly in the naked.

He formed for himſelf a ſtyle that was entirely new, and in many reſpects preferable to the Flemiſh guſto; but it did not reſemble the ſtyle of any Italian maſter, except in the ruins of the antique buildings, with which he adorned his landſcapes; and which he had with great care copied after nature. He ſurpaſſed all his contemporaries in the delicacy of his touch, in the ſweetneſs of his colouring, and in the choice of agreeable objects and ſituations. His ſkies are clear, light, and tranſparent; his back-grounds, ornamented often with the veſtiges of magnificent Roman edifices, which always contribute to the harmony of the whole compoſition; and his female figures, which he generally repreſented naked, are beautiful and elegant forms. His greateſt excellence appeared in the ſmall pictures of his hand, for in the larger ſize he is not ſo deſerving of commendation.

The Italians were exceſſively pleaſed with the works of Poelemburg; and ſome of the cardinals at Rome, of the fineſt taſte, attended him frequently while he was painting, to obſerve his manner of working, and expreſſed their admiration in the ſtrongeſt terms.

It was not without regret that he left Rome to return to his own country; though he afterwards found ſufficient cauſe to be pleaſed with the honours he received from the grand duke of Florence, and the reſpect ſhewn to him in every city through which he travelled, as well as in his native city Utrecht. For, not long after his arrival, Rubens paid him a friendly viſit, and having expreſſed a ſingular pleaſure in examining the works of Poelemburg, he purchaſed ſeveral for his own cabinet, and beſpoke others; by which generous conduct, ſo ſimilar to that of Apelles towards Protogenes of Rhodes, he inſtructed the lovers of the art to eſtimate the merit of Poelemburg as highly as they ought; and at the ſame time advanced the fortune and the reputation of that artiſt.

By king Charles I. he was invited to the court of London; where he painted many curious pictures, for which he was nobly recompenſed; and that monarch endeavoured earneſtly to induce him to continue in England; but his fondneſs for his own country prevailed over all other conſiderations, and he returned to Utrecht, where he acquired an affluent fortune, and lived in univerſal eſteem. Several very eminent artiſts procured him to paint the figures in their works, particularly Steenwyck and Kierings; and the excellent perſpectives of the former are ſometimes rendered ſtill more eſtimable by the pencil of Poelemburg.

The genuine works of this maſter are exceeding ſcarce; but his diſciple, John Vander Lis, imitated his manner ſo ſucceſsfully, that the paintings of Lis are very often taken for the works of his maſter. Fuſeli's Pilkington.

POELSBROECK, in *Geography*, a town of Holland; ſeven miles S.E. of Gouda.

POEM, Poema, ποιημα, a compoſition in verſe, of a due length and meaſure.

Poems, *Carmina*, are of various kinds; ſome denominated from the perſons who firſt invented, or moſt uſed them; as the *Archilotian*, *Sapphic*, &c. Others from their compoſition, as the *monocolon*, conſiſting of one kind of verſe; *dicolon*, of two; and *tricolon*, of three kinds. Others from their entireneſs or deficiency; as *brachycatalectus*, which in every verſe wants two ſyllables; *catalectus*, which wants one; *acatalectus*, none; and *hypercatalectus*, which hath a ſyllable too much, which, if cut off at the beginning of the next verſe, the verſe is ſaid to be *hypermeter*. (See Acatalectic, &c.) Others are denominated from the ſubject matter; as the *apobaterion*, *epibaterion*, *epinicion*, *epithalamium*, *genethliac*, *propemptic*, *elegiac*, *ſatiric*, *epicedion*, *epitaph*, *threnos* or *lamentation*, *encomiaſtic*, *panegyric*, *ſoteric*, *lyric*, *paſtoral*, &c. Others from the manner of narration; as *exegetic*, which relates a thing under the author's own perſon, *dramatic*, and *epic*. See each on its proper head, Epic, Drama, &c. To theſe may be added, odes, eclogues, and idylliums.

To this head muſt alſo be referred ſeveral other poetical compoſitions of a leſs ſerious kind, which the idly-labouring vein of little poets has produced into the world, and which, though frequently admired by perſons of a low taſte, are juſtly ranked by Mr. Addiſon in the claſs of falſe wit. Such are the acroſtic, enigma, anagram, centochronogram, proteus, echo, &c.

PŒNITENTES, in the church of Rome, a deſignation given to heretics, who being admoniſhed by the eccleſiaſtical judge, have abjured their errors, and given ſufficient ſatisfaction to the biſhop or inquiſition. Confiſcation of goods is a puniſhment common to all heretics; but if they confeſs and abjure of their own accord, without being formally proſecuted, this part of their puniſhment is uſually remitted. See Inquisition.

POEROU, in *Natural Hiſtory*, a name given at Otaheite in the South-ſeas to the hibiſcus tiliaceus of Linnæus, of the bark of which they make matting, coarſe cloth, and ropes and lines from the thickneſs of an inch to the ſize of a ſmall packthread. Hawkeſworth's Voyages, vol. ii. p. 217.

PŒSTUM, in *Ancient Geography*, called alſo *Poſidonia*, a city of Italy, on a gulf of the ſame name, at ſome diſtance to the S. of the mouth of Silarus. Obſcurity hangs over, not only the origin, but the general hiſtory of this city, though it has left ſuch magnificent monuments of its exiſtence. According to the learned Mazzochi, Pœſtum was founded by a colony of Dorians, from Dora, a city of Phœnicia. It was firſt called Pœſtan, or Poſtan, which in the Phœnician language ſignifies Neptune, to whom it was dedicated. It was afterwards invaded, and its primitive inhabitants expelled by the Sybarites, which event is ſuppoſed to have taken place about 500 years B.C. Under its new maſters Pœſtum aſſumed the Greek appellation “Poſidonia,” of the ſame import as its Phœnician name, became a place of great opulence and magnitude, and is ſuppoſed to have extended from the preſent ruins ſouthward to the hill, on which ſtands the little town ſtill called, from its ancient deſtination, “Acropoli.” The Lucanians afterwards expelled the Sybarites, and checked the proſperity of Poſidonia, which was in its turn deſerted, and left to moulder away imperceptibly. Veſtiges of it are ſtill viſible all over the plain of Spinazzo or Saracino: the original city then recovered its firſt name, and not long after was taken, and at length colonized by the Romans, U.C. 480. From this period Pœſtum is mentioned almoſt ſolely by the poets, who, from Virgil to Claudian, ſeem all to expatiate with delight amidſt its gardens, and grace their compoſition with the bloom, the ſweetneſs, and the fertility of its roſes. But unfortunately the flowery retreats, “Victuria roſaria Pœſti,” ſeem to have had few charms in the eyes of the Saracens, and, if poſſible, ſtill fewer in thoſe of the Normans, who, each in their turn, plundered Pœſtum, and at length compelled its few remaining inhabitants to abandon their ancient ſeat, and take ſhelter in the mountains. To them “Capaccio Vecchio” and “Novo” are ſuppoſed to owe their origin: both theſe towns are ſituated on the hills: the latter is the reſidence of the biſhop and chapter of Pœſtum.

The edifices which ſtill ſubſiſt owe their origin, as it is moſt reaſonably ſuppoſed, to the Dorians; and their form ſeems to indicate that they are the oldeſt ſpecimens of Grecian architecture now in exiſtence. In fact, the temples of Pœſtum, Agrigentum, and Athens, appear to be inſtances of the commencement, the improvement, and the perfection of the Doric order. The firſt temple that preſents itſelf to the traveller from Naples is the ſmalleſt: it conſiſts of ſix pillars at each end, and thirteen at each ſide, counting the angular pillars in both directions. The architrave is entire, as are alſo conſiderable remains of the pediments at the W. and E. ends. The “cella” occupied more than one-third of the length, and had a portico of two rows of columns, the ſhafts and capitals of which, now overgrown with graſs and weeds, encumber the pavement, and almoſt fill the whole area of the temple. The ſecond temple has ſix columns at each end, and fourteen on each ſide, including thoſe of the angles: the whole entablature and pediments are entire. The “cella,” the interior of which is adorned by a double row of columns, ſupporting each another row of ſmall pillars, had two entrances, one at each end, with a portico formed of two pillars and two antæ. The whole of the foundation and part of the wall of this “cella” ſtill remain: under it was a vault. The third edifice is the largeſt: it has nine pillars at the ends, and eighteen on the ſides, including, as before, the angular columns. A row of pillars, extending from the middle pillar at one end to the middle pillar at the other, divides it into two equal parts, and is conſidered as a proof that it was not a temple. Some ſuppoſe it to have been a curia, others a baſilica, and others a mere market or exchange. In common to all theſe edifices it may be obſerved, that they are raiſed upon ſubſtructions, viſible in all the Doric temples of Italy and Sicily, forming three gradations, intended ſolely to give due elevation and relievo to the ſuperſtructure; that the columns in all riſe without baſes from the uppermoſt of theſe degrees; that theſe columns are all fluted between four and five diameters in height, and taper as they aſcend, about one-fourth; that the capitals are all very flat and prominent; that the intercolumniation is a little more than one diameter; that the order and ornaments are in all the ſame, and the pediment in all very low: in fine, that they are all built of a porous ſtone, of a light or rather yellow grey, and in many places perforated and worn away. In the open place between the firſt and ſecond temple were two other large edifices, built of the ſame ſort of ſtone, and nearly of the ſame ſize. All the temples ſtand in a line, and border a ſtreet that ran from gate to gate, and divided the town into two, nearly equal, parts. A hollow ſpace ſcooped out in a ſemicircular form ſeems to be the traces of a theatre, which lying in front of the temples gives reaſon for ſuppoſing that other public buildings might have ornamented the ſame ſide and made it to correſpond in grandeur with that oppoſite; in which caſe few cities could have ſurpaſſed Pœſtum in ſplendid appearance.

The walls of the town remain in all the circumferences, five at leaſt, and in ſome places twelve feet high; they are formed of ſolid blocks of ſtone, with towers at intervals: the archway of one gate only ſtands entire. This rampart encloſes a ſpace of nearly four miles in circuit; and its extent, with the many towers that roſe at intervals, and its elevation of more than forty feet, ſhew it to have been a work of great ſtrength and magnificence.

Within theſe walls that once encircled a populous and ſplendid city, now riſe one cottage, two farm-houſes, a villa, and a church. The remaining ſpace is covered with thick matted graſs, overgrown with brambles ſpreading over the ruins, or buried under yellow undulating corn. A few roſe buſhes, the remnants of the “biferi roſaria Pœſti,” flouriſh neglected here and there, and ſtill bloſſom twice a year in May and December, as if to ſupport their ancient fame, and juſtify the deſcriptions of the poets. Virgil and Ovid juſt mention the Pœſtan roſes: Propertius introduces them as an inſtance of mortality: Claudian employs them to grace a complimentary compariſon: Auſonius alone preſents them in all their beauty and ſweetneſs.

> “Vidi Pœſtano gauderi roſaria cultu
> Exoriente novo roſcida Lucifero.”
> Idyll. xxv.

Amid theſe objects and ſcenes, rural and ordinary, riſe the three temples, like the mauſoleums of the ruined city, dark, ſilent, and majeſtic.

Pœſtum ſtands on a fertile plain, bounded on the W. by the Tyrrhene ſea; about a mile diſtant on the S. by five hills, in the midſt of which Acropoli ſits emboſomed; on the N. by the bay of Salerno and its rugged border; while to the E. the country ſwells into two mountains, which ſtill retain their ancient names “Callimara” and “Cantena,” and behind them towers “Mount Alburnus” with its pointed ſummits. A ſtream called the “Soloſone” flows under the walls, and by ſpreading its waters over its low borders, and thus producing pools that corrupt in hot weather, continues, as in ancient times (ſee Strabo, lib. v.) to infect the air, and render Pœſtum a dangerous reſidence in ſummer.

Mr. Watkins has given accurate and minute delineations and meaſurements of theſe celebrated temples; and he, as well as other travellers, ſuppoſes, that the pillars of Pœſtum were covered with a ſort of plaſter, or ſtucco, which, by its long duration, ſeems to have acquired the hardneſs and conſiſtency, as it certainly has the appearance, of ſtone. Near Pœſtum there are four mineral ſprings, to which is aſcribed conſiderable efficacy in different complaints: from theſe ſprings flow as many ſtreamlets, that form the “fiume ſalſo” which falls into the Soloſone cloſe to the walls of the city. Beyond the ruins, and ſeparated from them by a little ſtream, now called "Paſtena," riſes the hill of the Acropoli, which merits the examination of the naturaliſt. As the plains that extend for ſome way on each ſide of the Silarus are very thinly inhabited, and at the ſame time covered with woods and thickets, they are become the reſort of banditti and outlaws. At the mouth of the Silarus is the ſcite of the temple of Juno Argiva, of high antiquity, and attributed even to Jaſon. Euſtace's Claſſical Tour through Italy, vol. ii.

POESY, Poesis. See Poetry.

The word is formed from the Greek ϖοιησις, of ϖοιεω, *facio, fabricor, fingo, I make, I frame, I invent.*

Hence alchemy, or the art of making gold, we anciently called *poeſy, chryſopoeſy, &c.*

POET, Poeta, an author who compoſes poems or diſcourſes in verſe.

Cicero relates it as a ſaying of Democritus and Plato, that there could be no good poet *ſine afflatu furoris, without a tincture of madneſs;* and Ariſtotle calls poets expreſsly, *maniaci, maniacs, madmen.*

M. Spanheim tells us that the Arab authors are more poetically given than thoſe of any other people; and adds that there are more verſes among the Arabians than among all the other nations of the world put together.

The Greek word ϖοιητης, *poet*, ſignifies *maker*, from ϖοιεω, *facio, I make;* whence the poets were anciently alſo called *fatiſts.* The name they were properly denoted by among the Romans, was *vates*, which ſignifies alſo *prophet.*

By a law of the emperor Philip, inſerted in the Code, lib. x. tom. lii. poets are expreſsly excluded from the immunities granted the profeſſors of all other ſciences.

Homer, Virgil, Milton, and Taſſo, are the chief, almoſt the only, epic poets. Sophocles, Euripides, Shakſpeare, Otway, Corneille, and Racine, are the beſt tragic poets. Ariſtophanes, Menander, Plautus, Terence, Fletcher, Johnſon, Moliere, &c. the chief comic poets. Horace, Cowley, Malherbe, and Rouſſeau, excelled as lyric poets. And Juvenal, Perſius, Regnier, Boileau, Dryden, and Oldham, as ſatiric poets.

Poet *Laureat.* See Laureat.

This title, ſays Mr. Gibbon, is perpetuated by cuſtom, rather than vanity, in the Engliſh court; and he adds, "from Auguſtus to Louis, the muſe has too often been falſe and venal; but I much doubt whether any age or court can produce a ſimilar eſtabliſhment of a ſtipendiary poet, who, in every reign, and at all events, is bound to furniſh, twice a year, a meaſure of praiſe and verſe, ſuch as may be ſung in the chapel, and, I believe, in the preſence of the ſovereign. I ſpeak the more freely, as the beſt time for aboliſhing this ridiculous cuſtom, is while the prince is a man of virtue, and the poet a man of genius." Decl. and Fall of the Rom. Emp. vol. xii. 8vo. 1790.

Poet, *Provençal.* See Provençal, and Troubadours.

Poet's *Cæſia*, or *Poet's Roſemary*, in *Botany.* See Osyris.

POETICAL, ϖοιητικος, ſomething that relates to poetry or poets. In this ſenſe we ſay, a poetical genius, a poetical phraſe, poetical licence, poetical fury, &c.

Poetical *Epiſtle.* See Epistle, *Poetical.*

Poetical *Juſtice*, is chiefly uſed in reſpect to the drama, to denote a diſtribution of rewards and puniſhments to the ſeveral perſons, at the cataſtrophe or cloſe of the piece, anſwerable to the ſeveral characters in which they have appeared. See Character.

Whatever difficulties and diſtreſſes the virtuous and innocent may labour under, and how proſperouſly ſoever it may go with the wicked, in the courſe of the piece; the poet uſually takes care to give each of them their due before he parts with them. But it is controverted whether this piece of juſtice be indiſpenſable, and whether it may not be allowed to leave virtue oppreſſed, and vice flouriſhing.

Poetical *Language*, is that language or ſtyle, which acquires a peculiar elevation and ardour from the ſentiments of a mind, ſuppoſed to be animated by ſome intereſting object that fires the imagination and engages the paſſions of the poet; and this language is very different from that mode of expreſſion which is natural to the mind in its calm ordinary ſtate. This language of paſſion or imagination is formed, *moſt commonly*, into regular numbers; becauſe, though verſification be, in general, the exterior diſtinction of poetry, yet there are ſome forms of verſe ſo looſe and familiar, as to be hardly diſtinguiſhable from proſe, ſuch as the verſe of Terence's comedies; and there is alſo a ſpecies of proſe, ſo meaſured in its cadence, and ſo much raiſed in its tone, as to approach very near to poetical numbers, ſuch as the Telemachus of Fenelon, and the Engliſh tranſlation of Oſſian. The origin and firſt uſe of poetical language, ſays Dr. Lowth, are undoubtedly to be traced into the vehement affections of the mind. For what is meant by that ſingular frenſy of poets, which the Greeks, aſcribing to divine inſpiration, diſtinguiſhed by the appellation of *enthuſiaſm*, but a ſtyle and expreſſion directly prompted by nature itſelf, and exhibiting the true and expreſs image of a mind violently agitated? Hence proceed ſudden exclamations, frequent interrogations, apoſtrophes, even to inanimate objects; for, to thoſe who are violently agitated themſelves, the univerſal nature of things ſeems under a neceſſity of being affected with ſimilar emotions. Every impulſe of the mind has not only a peculiar ſtyle and expreſſion, but a certain tone of voice, and a certain geſture of the body adapted to it. Some, indeed, not ſatisfied with that expreſſion which language affords, have added to it dancing and ſong; and as we know there exiſted in the firſt ages a very ſtrict connection between theſe arts and that of poetry, we may poſſibly be indebted to them for the accurately admeaſured verſes and feet, to the end that the modulation of the language might accord with the muſic of the voice, and the motion of the body.

Moſt languages have their poetical words, which are ſeldom, if ever, uſed on other occaſions. Theſe words are of great uſe to the poets, who are thus enabled to raiſe their ſtyle and diction to the poetical character with the greater eaſe. The French lament the want of ſuch appropriate words in their language; from a defect of which the ſtyle of their poetry is not ſufficiently diſtinguiſhed from the common language. It is too reſerved, not being allowed any boldneſs or flights, but ſuch as might paſs in proſe. To this circumſtance is attributed, in a conſiderable degree, the little ſucceſs which their authors have met with in epic compoſitions. Phraſes alſo, as well as words, which might originally have been in common uſe, are now reſtricted to poetical compoſitions. The language of Homer differs materially in the mode of inflexion, the ſyntax, and even the words, from that which was written and ſpoken in Greece in the days of Socrates; after an interval of 400 years. Homer, however, muſt have written in a dialect that was intelligible, though not perhaps in familiar uſe at the period in which he wrote. Notwithſtanding the change that muſt have taken place, during ſo long an interval, in the ſtyle both of diſcourſe and writing, the Iliad continued to be the ſtandard of heroic poetry, and was conſidered as affording a ſpecimen of the moſt perfect poetical language; though

Ariſtotle had doubts about the correct meaning of particular expreſſions. If Chaucer had ranked ſo highly as a poet as Homer did, and the Engliſh language under Edward III. had been as perfect as the Greek was in the ſecond century after the Trojan war, his ſtyle would probably have been the model of poetical language at this day; as Petrarch, his contemporary, ſets even now the ſtandard for the beſt Italian poets. Many words and phraſes, uſed by Ennius, a Latin poet, but not adopted by any proſe writer now extant, are to be found in Lucretius and Virgil, and by them tranſmitted to ſucceeding poets. Theſe form part of the Roman poetical dialect, which, as the writings of Virgil, where it is found in perfection, teſtify, was very copious. The ſtyle of this charming poet is ſo different from proſe, and ſo peculiar, that it cannot be analyſed on the common principles of Latin grammar; and yet no author can be more perſpicuous or more expreſſive; or knew better, according to the judgment of Quintilian, to improve even Greciſm, and old words by which he ſeems to be attached, into decoration.

The poetical dialect of modern Italy is ſo different from the proſaic, that Petrarch or Taſſo can ſcarcely be conſtrued by thoſe who are well acquainted with the common language of that country; and yet it is not probable that Petrarch, whoſe works furniſh a ſtandard of the Italian poetical diction, made any material innovations in his native tongue. The French poetry, in general, is diſtinguiſhed from proſe rather by the rhime and the meaſure, than by any old or uncommon phraſeology. Nevertheleſs, the French, on certain ſubjects, imitate the ſtyle of their old poets, particularly of Marot, and may therefore be ſaid to have a poetical dialect, though leſs extenſive than that of the Italian, or even of the Engliſh. The Engliſh poetical dialect is not characteriſed by any peculiarities of inflection, nor by any great latitude in the uſe of foreign idioms. Words and phraſes, however, occur in Engliſh poetry that are not to be found in proſe writings. Several of them will occur to the readers of our poets. The introduction of ſuch words and phraſes ſerves to render the poetical ſtyle more melodious; and when they are known to be ancient, more ſolemn, and by aſſociation more elegant and ſublime. The following lines afford a ſpecimen of poetical words, which no one can read without perceiving their effect:

> "The breezy call of incenſe-breathing morn,
> The ſwallow twittering from the ſtraw-built ſhed,
> The cock's ſhrill clarion, and the echoing horn,
> No more ſhall rouſe them from their lowly bed."

We may add, that tropes and figures ſerve very much to improve poetical language. They render it more pleaſing, and greatly contribute to its effect. They ſupply the unavoidable defects of common language; they are alſo favourable to delicacy of expreſſion; they promote brevity, which, without interfering with perſpicuity, is very pleaſing; they give ſtrength and energy to language, and make a deep and durable impreſſion on the mind; they are the appropriate language of emotion and paſſion. See Figure and Trope, and each figure under its proper name, as *Apoſtrophe*, *Hyperbole*, and *Proſopopeia;* which ſee. The ſound of words ought alſo to be regarded in poetical language; as it contributes to harmony of compoſition, without which no poet can be popular. See Verse and Rhyme.

Poetical *Licence*. See Licence.

Poetical *Numbers*. See Numbers.

Poetical *Riſing and Setting*. See Rising and Setting. The ancient poets, referring the riſing, &c. of the ſtars to that of the ſun, make three kinds of riſing and ſetting, *viz.* coſmical, acronical, and heliacal.

Poetical *Theology*. See Theology.

POETICS, Poetice, ποιητικη, the doctrine of poetry, or the laws and rules of conducting pieces, or compoſitions of poetry. Ariſtotle's Poetics is a work very highly valued; and M. Dacier's comment upon it is one of his beſt pieces. Horace, Vieta, Voſſius, and Scaliger, have likewiſe publiſhed Poetics in Latin; the duke of Buckingham in Engliſh; and Menardiere, Hedelin, and Deſpreaux, in French.

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